

ENVIRONMENTAL CONSEQUENCES

This section describes the potential environmental consequences associated with the alternatives. This section contains the environmental impacts, including direct and indirect effects, and their significance to the alternatives. Impacts are evaluated based on context, duration, and intensity, and on whether they are direct, indirect, or cumulative impacts. The analysis is based on the assumption that the mitigation measures identified in the “Mitigation” section of this EA would be implemented for the action alternatives. NPS policy also requires that potential impairment of all resources be evaluated in environmental documents, except for visitor experience and recreation, safety, and park operations, which require no impairment determination.

METHODOLOGY

Overall, the NPS based these impact analyses and conclusions on a review of existing literature and park studies; information provided by experts within the park, area tribes, and other agencies; professional judgment and park staff insights; and public input.

There are several terms used within the “Environmental Consequences” section to assess the impacts of each alternative on each impact topic. The following terms were used to define the nature of impacts associated with project alternatives:

Type: Impacts can be beneficial or adverse.

Context: Context is the setting within which an impact would occur, such as local, parkwide, or regional.

Impact intensity: Impact intensity is defined individually for each impact topic. There may be no impact, or impacts may be negligible, minor, moderate, or major.

Duration: Duration of impact is analyzed independently for each resource because impact duration is dependent on the resource being analyzed. Depending on the resource, impacts may last for the construction period, a single year or growing season, or longer. For purposes of this analysis, impact duration is described as short term or long term.

Direct and indirect impacts: Effects can be direct, indirect, or cumulative. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later or farther away, but are still reasonably foreseeable. Direct and indirect impacts are considered in this analysis, but are not specified in the narratives.

A table of impact intensity definitions (negligible, minor, moderate, and major) for each impact topic is included within each impact topic description.

CUMULATIVE EFFECTS

Effects can be direct, indirect, or cumulative. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later or farther away, but are reasonably foreseeable. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively

significant, actions taking place over a period of time. The CEQ regulations that implement NEPA require assessment of cumulative impacts in the decision-making process for federal projects.

Cumulative impacts are considered for all alternatives and are presented at the end of each impact topic discussion.

METHODS FOR ASSESSING CUMULATIVE EFFECTS

To determine potential cumulative effects, actions and land uses were identified that have occurred, are occurring, or are reasonably expected to occur near the project areas. Potential future actions were determined by reviewing the plans and activities of Sequoia and Kings Canyon National Parks. Since the project area and areas of effect are well within designated wilderness, there are few planned actions for future projects. Identified actions include trail repairs and maintenance, and projects that involve ongoing and reoccurring flights over park wilderness. Also, existing and future visitor use was analyzed. These actions were then assessed in conjunction with the impacts of the alternatives to determine if they would have any added adverse or beneficial effects on a particular natural resource, park operation, or visitor use. The evaluation of cumulative effects was based on the available information about the actions.

PROJECTS THAT MAKE UP THE CUMULATIVE IMPACT SCENARIO

To determine potential cumulative impacts, projects in the area within the wilderness of Sequoia and Kings Canyon National Parks and lands adjacent to the park and proximate to the project areas (including lands administered by the U.S. Department of Agriculture Forest Service [USFS]) were reviewed. Potential projects identified as cumulative actions included any past projects that currently affect the same resources as the alternatives, and development or projects that are currently being implemented or that would be implemented in the reasonably foreseeable future that could impact the same resources as any of the alternatives.

These actions are evaluated in the cumulative impact analysis in conjunction with the impacts of each alternative to determine if they would have any additive effects on a particular resource, including natural and cultural resources, the wilderness environment, and visitor use. Because some of the future activities are in the early planning stages, the evaluation of cumulative effects may be based on preliminary descriptions of those projects.

Past, Current, and Future Actions

The following actions occurred in the past, will likely occur in the present, and potentially would occur or are planned to occur in the future and could contribute to the cumulative effects of the alternatives.

Use and Existence of Ranger Stations and Other Structures in Wilderness

There are 20 ranger stations and patrol cabins located in the wilderness in Sequoia and Kings Canyon National Parks (9 in Kings Canyon and 11 in Sequoia) (Table 5 and).

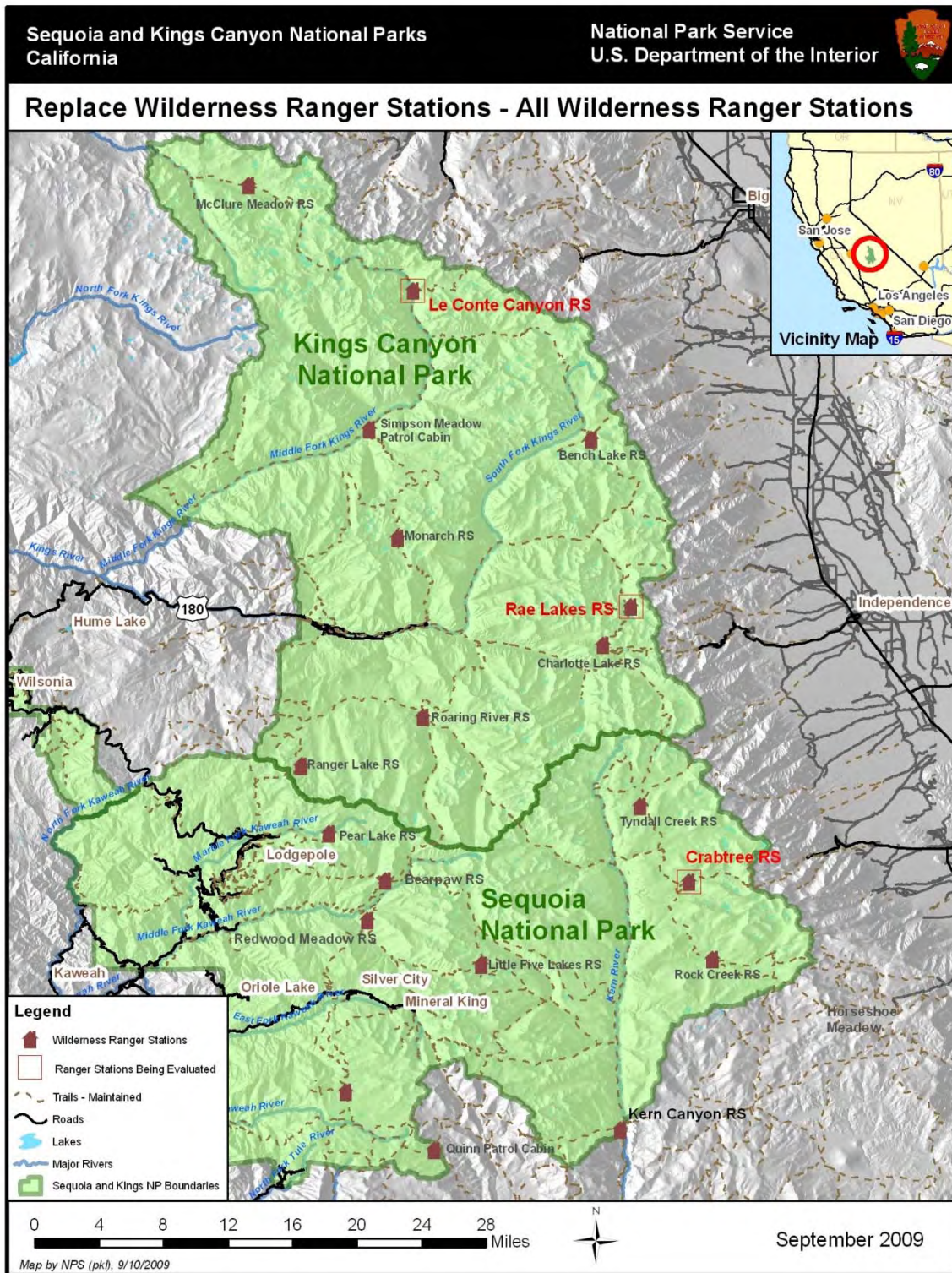


Figure 9. Existing Ranger Stations and Patrol Cabins within Sequoia and Kings Canyon National Parks

Of those, 12 are usually or always staffed during the summer, 3 are staffed periodically, 1 is rarely staffed, and 4 have not been staffed in recent history. Of those staffed, seven are used in the winter in support of snow surveys. The structures vary in construction type and include log structures, a board structure, platform/wall tents, stone/log construction, a yurt, and an A-frame. In the past 10 years, light rehabilitation has occurred to four structures, and periodic maintenance has occurred to those stations that are usually or always staffed.

Table 5. Sequoia and Kings Canyon National Parks Wilderness Ranger Stations (RS) and Patrol Cabins (PC) from North to South

Name	Location	Construction Type	Approx. Size	Staffing
Kings Canyon National Park				
McClure RS	McClure Mdw. – Evol. Valley (JMT/PCT)	Log	12 × 16 ft	Always
Le Conte RS	Le Conte Cyn. – Mid. Fork Kings (JMT/PCT)	T-111/frame	14 × 18 ft	Always
Simpson PC	Simpson Mdw. – Mid. Fork Kings	Log—no window	8 × 10 ft (no windows)	Not in recent history
Bench Lake RS	NE of Bench Lk. – So. Fork Kings (JMT/PCT)	Wall tent on platform w/boxes	12 × 16 ft	Sometimes
Monarch RS	S of Granite Pass – Monarch Divide	Wall tent on platform w/boxes	14 × 14 ft	Sometimes
Rae Lakes RS	Rae Lake #2 (JMT/PCT)	Wooden tent frame w/boxes	10 × 12 ft	Always
Charlotte Lake RS	At Charlotte Lake – just off JMT/PCT	Panel/frame	12 × 16 ft	Always
Roaring River RS	Roaring River @ bridge	Board	20 × 24 ft	Always
Ranger Lake RS	Ranger Lake – E of Silliman Pass	Tent	10 × 12 ft	Rarely
Sequoia National Park				
Tyndall RS	Tyndall Ck. (JMT/PCT)	Stone—no windows	12 × 14 ft	Usually
Pear Lake RS	N of Pear Lake	Stone/log	16 × 24 ft	Always
Bearpaw Mdw. RS	Bearpaw Mdw. – High Sierra camp (HST)	A-frame	16 × 24 ft	Always
Crabtree RS	Whitney Creek – (JMT)	T-111/frame	12 × 24 ft	Always
Redwood Mdw. RS	Redwood Mdw. – Mid. Fork Kaweah	Log	16 × 24 ft	Not in recent history
Big Arroyo PC	Chagoopa Plateau (HST)	Log—dirt floor	12 × 14 ft	Never
Rock Creek RS	Rock Creek (JMT)	Log	12 × 14 ft	Always
Little 5 Lakes RS	Little 5 Lakes – W side Kern Plateau	Yurt on platform w/fence/boxes	14 ft diam.—round	Always
Hockett RS	Hockett Mdw.	Log	20 × 24 ft	Sometimes
Kern	Kern River Cyn. at S boundary	Log	20 × 24 ft	Usually
Quinn PC a.k.a. Soda Spgs.	Quinn Mdw.	Sawed log/stockade style	14 × 16 ft	Never

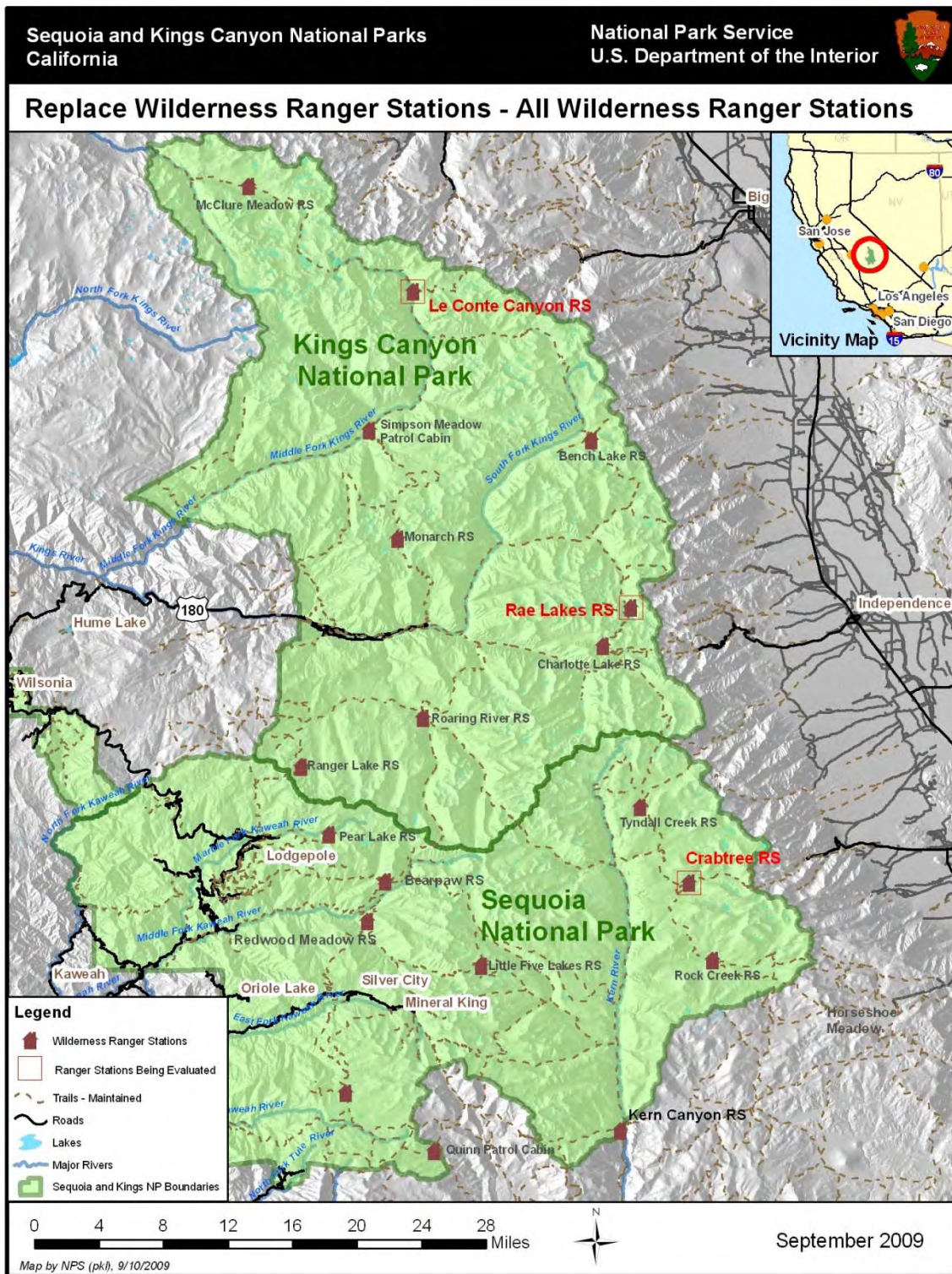


Figure 8. Existing Ranger Stations and Patrol Cabins within Sequoia and Kings Canyon National Parks

At the staffed ranger stations, yearly operations include mobilization and demobilization activities using stock and/or helicopter, staffing and visitor contacts, patrols, periodic maintenance and repairs to the existing structures, and digging and/or relocating privy sites.

There are a few other structures located in wilderness, including historic cabins and remnants of cabins. Generally, standing historic structures receive infrequent and minimal maintenance to preserve their historic character and prevent further deterioration.

Trail Maintenance and Rehabilitation

Parkwide trail maintenance and rehabilitation is ongoing, and additional work is planned in the future. This project involves the reconstruction and rehabilitation of deteriorated erosion-control structures and failing segments of trails throughout the park trail system, particularly in the wilderness. Project work will include replacing drainage structures, soil-retention devices, retaining walls, and similar trail structures that have failed or are beyond their normal service life. Segments of trail that are failing due to tread erosion, side hill sloughing, or age will be reconstructed to good condition. Trail-associated meadow damage and erosion will be assessed and repaired to prevent the need for major repair or rehabilitation later. Basic tread filling, water bar repairs, corridor clearing, and storm damage rehabilitation work occurs to prolong the life of the trail systems and protect park resources.

The project involves at least two trail crews, packstock use, and occasional helicopter use to transport equipment and materials. The project will repair 20%, or approximately 143 miles, of the park trails over 5 years, and will result in improved trail conditions, reduced risk to visitors, improved visitor experience, and more effective resource protection. The equipment and tools used for the trail projects depends on the work involved and is determined through the minimum requirement / minimum tool analysis process, and could include non-motorized and motorized tools.

Flights

Every year, through the minimum requirement / minimum tool analysis, selective helicopter flights have been determined to be the minimum tool for project work. From May through October the park has a helicopter based at park headquarters for use in fire suppression, SAR, and support of park wilderness management activities. Except for SARs, most helicopter operations are completed in less than 30 minutes at the operation site. The helicopter normally based at Sequoia and Kings Canyon National Parks is classified as a light helicopter (Type 3).

There is an average of 288 planned and unplanned hours of helicopter flight time per year within and outside wilderness. Planned flights include those used for administrative purposes, and unplanned flights generally include law enforcement and SAR emergencies and fire-related flights. In 2007 there were approximately 87 flight hours for administrative purposes, and in 2008, 65 flight hours.

Types of projects where helicopter use may be considered the minimum tool include snow surveys, trail maintenance (delivery of equipment, materials, and supplies), restoration/rehabilitation activities, exotic plant removals, wildlife surveys, research and monitoring activities, mobilizing/demobilizing wilderness ranger stations, and radio repeater maintenance. Flights also occur for law enforcement, SAR operations, and fire suppression. As the projects are analyzed on a case-by-case basis, helicopter operations vary by project and by year. Flights can occur at any time in the year, but they are generally scheduled to avoid conflicts with wilderness users. It is likely that flight operations would continue to be the minimum tool for select projects in wilderness.

Resource Management and Research

Resource management, research, and monitoring activities occur in the parks' wilderness areas. Examples of ongoing and future planned activities include wildlife monitoring, lake sampling, air quality monitoring, exotic plant removal, resource rehabilitation and revegetation, and snow surveys. The equipment and tools used for these projects depends on the project and the minimum requirement / minimum tool analysis, and could include non-motorized and motorized tools.

Fire and Fuels Management Program

The parks' fire and fuels management program occurs in park wilderness. Activities are planned to conform to the *Wilderness Act*, wilderness policies, and the parks' BMP. The fire and fuels management program at Sequoia and Kings Canyon National Parks focuses on the restoration and maintenance of natural conditions. Prescribed burning occurs periodically throughout the year to attain those goals (*Fire and Fuels Management Plan*, NPS 2003). If any portion of a planned burn falls within wilderness, fire managers complete the minimum requirement / minimum tool analysis to determine the appropriate tool for the project. The use of mechanized equipment in wilderness (including chainsaws and helicopters) must be justified and preapproved by park management in non-emergency incidents.

Unplanned events, either human-caused or natural fires, may occur and are evaluated to determine the parks' response. The parks' response plan identifies the range of initial actions for all wildland fires. The response plan is designed to consider values to be protected, risks, hazards, forecasted fire danger, and ecological benefit. All fire management activities in the parks rely on tactics that minimize resource damage while maintaining the safety of the public, firefighters, and other personnel. Tactical tools used in wilderness are chosen carefully.

In addition, firewise practices, such as trimming vegetation, may be conducted infrequently around those wilderness ranger stations in at-risk areas. These activities include the least intrusive measures to protect the cabins and may include using hand tools to trim back grasses, vegetation, tree limbs, and small shrubs close to the structures. If the ranger stations are located outside at-risk areas, these activities do not occur.

Visitor Use

Approximately 25,000 to 35,000 visitors hike or use stock through the Sequoia and Kings Canyon wilderness areas each year. Stock use refers to travel and camping with stock (horses, mules, burros, or llamas) and grazing in designated forage areas.

According to wilderness use statistics, the Rae Lakes Loop and Mount Whitney trails (Crabtree Ranger Station) are two of the most popular hikes in Sequoia and Kings Canyon National Parks.

The Crabtree Ranger Station and patrol area has a steady flow of park visitors from mid-July to Labor Day (this window is wider on a dry year). The focal point for most visitors is a trip to Mount Whitney, which averages approximately 4,000 backpackers per season. Most of them stay at least 1 night within 2 miles of the Crabtree Ranger Station. Stock parties visit the Crabtree area for its fishing opportunities and to climb Mount Whitney. Upper Crabtree Meadow receives the most overnight stock use in the area. Typically, groups are in the area for 2 or 3 nights and use Upper Crabtree Meadow or Guitar Lake as their base camps. Area pack stations will often help the clients to Guitar Lake and then pick them up after their day on Mount Whitney.

The Rae Lakes area is very busy from about July 15 until August 30. Often, according to ranger reports, more than 50 campers are in the Rae Lakes area on any given night. Most hikers enter the Rae Lakes area

from the following: Cedar Grove, doing the popular Rae Lakes loop; Onion Valley (the closest entry point, 14 miles); or the John Muir Trail, coming from both north and south. Some enter by the more remote eastside passes: Sawmill, Baxter, and Taboose. A few enter by rugged cross-country passes: Dragon and Gould passes, and also from the west through Gardiner Basin. The Rae Lakes ranger station is in a convenient location for visitors and the rangers. The station overlooks the peninsula and isthmus area where about 85% of the campers congregate. Area pack stations generally support John Muir Trail hikers that camp in the Rae Lakes Basin. Depending on site conditions, stock users may use the following meadows around the Rae Lakes Station: Castle Dome, Baxter, and Woods Creek, as well as Junction and East Lake meadows.

The Le Conte Ranger Station is located on the John Muir and Pacific Crest trails, and the patrol area includes Dusy Basin, Muir Pass, Mather Pass, Palisades Creek to Palisades Lake, and the Upper Basin. In addition, kayaking is somewhat popular in the Middle Fork of the Kings River. Within the Le Conte patrol area, there are five meadows: Deer, Grouse, Little Pete, Pete, and Ladder. Most meadows generally open later in the season. Ladder Meadow receives moderate grazing. Big Pete Meadow generally receives moderate grazing (under 40 stock-use nights). Deer, Grouse, and Little Pete meadows all generally receive light grazing. Stock use in park meadows is managed in accordance with the parks' *Stock Use and Meadow Management Plan* (NPS 1986b).

IMPAIRMENT OF SEQUOIA AND KINGS CANYON NATIONAL PARKS RESOURCES OR VALUES

In addition to determining the environmental consequences of the alternatives, NPS *Management Policies* 2006 (NPS 2006a) and *Director's Order 12 Conservation Planning Environmental Impact Analysis, and Decision Making* (NPS 2001) require an analysis of potential effects to determine if actions would impair park resources or cause unacceptable impacts. The fundamental purpose of the national park system established by the *Organic Act* and reaffirmed by the *General Authorities Act*, as amended, begins with a mandate to conserve park resources and values. NPS managers must seek ways to avoid, or minimize to the greatest degree practicable, adversely impacting park resources and values. Congress has given NPS managers direction, however, to allow impacts on park resources and values when necessary and appropriate to fulfill the purpose of the park, provided that the impact does not constitute impairment of the affected resources and values.

The prohibited impairment is an impact that would, in the professional judgment of the responsible NPS manager, harm the integrity of park resources or values, including opportunities that would otherwise be present for the enjoyment of those resources or values. An impact would be more likely to constitute impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is

Necessary to fulfill specific park purposes identified in the establishment legislation or proclamation of the park.

Key to the natural and cultural integrity of the park or to opportunities for enjoyment of the park.

Identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the parks. The "Environmental Consequences" section includes a determination on impairment in the conclusion statement of the

appropriate impact topics for each alternative. Impairment statements are not required for recreation and visitor experience, park operations, and safety topics.

UNACCEPTABLE IMPACTS

The impact intensity at which impairment occurs is not always readily apparent. Therefore, the NPS applies a standard that offers greater assurance that impairment will not occur. The NPS does this by avoiding impacts that it determines to be unacceptable. These are impacts that fall short of impairment, but are still not acceptable within a particular park's environment. Therefore, for the purposes of these policies, unacceptable impacts are impacts that, individually or cumulatively, would

- Be inconsistent with a park's purposes or values.

- Impede the attainment of a park's desired future conditions for natural and cultural resources as identified through the park's planning process.

- Create an unsafe or unhealthful environment for visitors or employees.

- Diminish opportunities for current or future generations to enjoy, learn about, or be inspired by park resources or values.

- Unreasonably interfere with any of the following:

 - Park programs, activities, or appropriate use.

 - The atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations within the park.

 - NPS concessioner or contractor operations or services.

A determination on unacceptable impacts is made in the conclusion statement of each impact topic for each alternative in the "Environmental Consequences" section.

VEGETATION

METHODOLOGY

Predictions about short- and long-term impacts were based on professional judgment and experience gained from previous projects with similar vegetation. Impacts were assessed qualitatively (see Table 6). The assessment includes the potential to cause adverse impacts on native plants or populations and the potential to introduce or promote non-native species in the area.

Table 6. Vegetation Impact and Intensity Descriptions

Impact Intensity	Intensity Description
Negligible	The impacts on vegetation (individuals or communities) would not be measurable. The abundance or distribution of individuals would not be affected or would be slightly affected. The effects would be on a small scale and no species of special concern would be affected. Ecological processes and biological productivity would not be affected.
Minor	The alternative would not necessarily decrease or increase the project area's overall biological productivity. The alternative would affect the abundance or distribution of individuals in a localized area, but would not affect the viability of local or regional populations or communities. Mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective. Mitigation may be needed to offset adverse effects, it would be relatively simple to implement, and it would likely be successful.
Moderate	The alternative would result in effects on some individual native plants and could also affect a sizeable segment of the species' population over a relatively large area. Permanent impacts could occur to native vegetation but in a relatively small area. Some species of special concern could also be affected. Mitigation measures would be necessary to offset adverse effects and would likely be successful.
Major	The alternative would have considerable effects on native plant populations, including species of special concern, and would affect a relatively large area in and out of the park. Extensive mitigation measures to offset the adverse effects would be required; success of the mitigation measures would not be guaranteed.

Short-term—recovers in less than 1 year.

Long-term—takes more than 1 year to recover.

ALTERNATIVE 1: NO ACTION

There would be no additional facilities constructed and no ground disturbance or removal of vegetation as part of this alternative; therefore, there would be no direct impacts on vegetation. There would be indirect effects related to the slight increase in stock use to support ongoing and increased maintenance operations at the ranger stations. This would result in an estimated additional 4 stock-use nights per summer in area meadows, resulting in a slight increase in grazing at the selected meadows.

Cumulative Impacts

Vegetation in the park and specifically at the project areas has been affected by past activities, such as the initial construction of the ranger stations and trails, and continued use by park staff, visitors, and stock. The Rae Lakes station currently occupies an area of 10 × 12 feet, the Crabtree Station occupies an area of 12 × 24 feet, and the Le Conte Station occupies 14 × 18 feet. Some additional ground disturbance has occurred at each site from trampling and ground disturbance associated with use and visitation at the cabins. The amount of vegetation disturbed at each site varies based on site conditions. For example, at

Rae Lakes, the area around the ranger station is rocky and there is very little vegetation, so disturbance has been minimal. At Crabtree and Le Conte, historically, more vegetation has been disturbed around the stations. There would be no additional ground disturbance or removal of vegetation at the project sites under this alternative. Stock would continue to carry most of the supplies to the site, and this could result in the transport of non-native seeds to the area. However, the sites are already used by stock, and the change would not be measurable. Also, the park uses weed-free hay, so the risk of introducing non-native vegetation is reduced. With the additional 4 stock-use nights in area meadows to support the existing ranger stations, there would be a slight additive impact on the vegetation at those meadows in the long term. However, because of the existing stock-meadow monitoring program, if these impacts combined with ongoing uses are determined to be unacceptable, then the meadows would be closed to grazing slightly earlier to protect vegetation, resulting in no additional impacts on vegetation at these locations, and no cumulative effects.

Conclusion

There would be no direct impacts on vegetation from this alternative, and indirect effects from the increased use of stock are negligible to minor. There would be no cumulative effects on vegetation from this alternative. Because there would be no major adverse or unacceptable impacts on vegetation, there would be no impairment of park resources or values under this alternative.

ALTERNATIVE 2: REPAIR AND REHABILITATE EXISTING RANGER STATIONS AT EXISTING SITES

At Le Conte, due to concerns over cultural resources, no rehabilitation of the station would take place under alternative 2. Le Conte Ranger Station would remain unchanged, and there would be no direct impact on vegetation. There would be indirect effects related to the increase in stock use to support ongoing and increased maintenance operations at the Le Conte Ranger Station. This would result in an additional 4 stock-use nights per summer at the ranger station.

Under this alternative, the Crabtree ranger station would be repaired, and the Rae Lakes ranger station would be replaced. During construction at Rae Lakes and Crabtree, native vegetation at the construction sites would be impacted by digging for the foundation wall and work crews trampling plants. There would also be impacts associated with six to eight people camping in the area during the construction period. Overall, the area immediately adjacent to the ranger station sites are not heavily vegetated, so few plants would be impacted. The crew camp would also be located in a previously impacted camping area with few plants. Where any clumps of herbaceous perennials are in the construction zone, they would be transplanted to a safer location. A few branches of whitebark or lodgepole pine may have to be trimmed during construction, but no trees would be removed.

Stock would carry most of the supplies to the project sites, and this could result in vegetation impacts at the project areas and on the trails to the project areas. Stock would generally be restricted to existing trails and areas designated for stock use. There would be some stock use close to the ranger stations when supplies and materials are unloaded and loaded.

Stock could transport non-native seeds to the area. However, the sites are already heavily used by stock and changes would not be measurable. Also, the park uses weed-free hay, so the risk of introducing non-native vegetation is reduced. Soil disturbance at the Rae Lakes and Crabtree project sites could promote the establishment of non-natives, but this would be localized and follow-up treatment of exotics would occur as part of project mitigation.

There is a moderate to high risk of introducing non-native species by importing logs and staging materials at heliports or other locations where weeds could be picked up. The effects would be reduced through project mitigation.

Cumulative Impacts

Vegetation in the park and specifically at the project areas has been affected by past activities, such as the initial construction of the ranger stations and trails, trail maintenance, and continued use by park staff, visitors, and stock. There would be limited additional ground disturbance and removal of vegetation at the Rae Lakes and Crabtree project sites under this alternative.

There would be additional stock-use nights during the project at these locations, and long-term effects from a slight increase of stock use to support the Le Conte Ranger Station (an addition of 4 stock-use nights) until the station is determined uninhabitable. Stock used to support the project work at Rae Lakes and Crabtree would be confined and would not rely on meadows for grazing, instead being fed supplemental feed, so no additive effects on the meadows are anticipated. In the future, stock would continue to carry most of the supplies to the site, and this could result in the transport of non-native seeds to the area. However, the sites are already used by stock, and the change under this alternative would be short term (during the project) and would not be measurable. Also, the park uses weed-free hay, so the risk of introducing non-native vegetation is reduced. Therefore, this alternative would not measurably contribute to adverse cumulative effects on park vegetation.

Conclusion

Overall, this alternative would result in negligible to minor adverse effects on vegetation at the Crabtree and Rae Lakes project sites, and negligible to minor adverse effects on vegetation at the Le Conte site with increased stock use to support the maintenance and operation of that facility. There would be no cumulative effects.

Because there would be no major adverse or unacceptable impacts on vegetation, there would be no impairment of park resources or values under this alternative.

ALTERNATIVE 3: REPLACE RANGER STATIONS WITH NEW STRUCTURES (PREFERRED ALTERNATIVE)

Under this alternative, all three ranger stations would be replaced with new structures. The Crabtree and Rae Lakes stations would be replaced in their existing locations, and Le Conte would be constructed approximately 100 feet south of its current location.

During construction, native vegetation at the three construction sites would be impacted by digging for the foundation wall and work crews trampling plants. There would also be impacts associated with six to eight people camping in the area during the construction period. Overall, the areas immediately adjacent to the ranger stations sites are not heavily vegetated, so few plants would be impacted. The crew camp would also be located in a previously impacted camping area with few plants. Where any clumps of herbaceous perennials are in the construction zone, they would be transplanted to a safer location. This alternative would involve the removal of sparse vegetation, including mountain heather and sparse perennial grasses and sedges, and the removal of ten lodgepole or whitebark pines approximately 8 to 12 inches dbh at the new ranger station site. A few branches of whitebark or lodgepole pine may be trimmed during construction.

At the Le Conte site, the area selected for construction is approximately 13×17 feet, with an expected total new ground disturbance area of 20×24 feet for cabin construction activities and 150 feet of new 1.5-foot-wide trail to the new ranger station site. The existing ranger station site and adjacent area (total disturbed area of approximately 30×40 feet) and 150 feet of trail to the existing station would be rehabilitated and revegetated, resulting in a net restoration area of 705 square feet.

Stock would carry most of the supplies to the project sites, and this could result in vegetation impacts at the project areas and on the trails to the project areas. Stock would generally be restricted to existing trails and areas designated for stock use. There would be some stock use close to the ranger stations when supplies and materials are unloaded and loaded, resulting in trampling of previously disturbed areas.

Stock could transport non-native seeds to the area. However, the sites are already used by stock, and changes would not be measurable. Also, the park uses weed-free hay, so the risk of introducing non-native vegetation is reduced. Soil disturbance at the Rae Lakes and Crabtree project sites could promote the establishment of non-natives, but this would be localized, and follow-up treatment of exotics would occur as part of project mitigation.

There is a moderate to high risk of introducing non-native species by importing logs and staging materials at heliports or other locations where weeds could be picked up. The effects would be reduced through project mitigation.

Cumulative Impacts

Vegetation in the park and specifically at the project areas has been affected by past activities, such as the initial construction of the ranger stations and trails, trail maintenance, and ongoing visitor and stock use.

Routine trail corridor and ranger station maintenance may include periodic trimming of encroaching vegetation. Visitor use may impact vegetation by trampling, and stock use impacts vegetation by trampling and grazing. While there would be increased staff presence during construction activities, these activities would be restricted to the previously disturbed site, except at Le Conte. The removal of an additional 20×30 -foot area of vegetation at the Le Conte site would be offset by the restoration of 720 square feet at the existing Le Conte Ranger Station site. This alternative would not contribute to adverse effects on park vegetation.

There would be additional stock-use nights during the project at these locations, and short-term effects from a slight increase of stock use to support the project work at Le Conte, Rae Lakes, and Crabtree. Stock used to support the project work would stage in nearby meadows, but stock would be restricted to previously impacted areas and would use supplemental feed. In the future, stock would continue to carry most of the supplies to the sites, and this could result in the transport of non-native seeds to the area. However, the sites are already heavily used by stock, and the change under this alternative would be short term (during the project) and would not be measurable. Also, the park uses weed-free hay, reducing the risk of introducing non-native vegetation. Therefore, this alternative would not measurably contribute to adverse cumulative effects.

Conclusion

Implementing this alternative would result in short- and long-term adverse effects on vegetation at the project site from trampling and increased stock use, and the potential for introduction of non-native plant species. Disturbance of native vegetation at the Le Conte site would occur from relocating the station and trail, resulting in the permanent removal of vegetation from a 720-square-foot area. Restoration of the former Le Conte site would offset this new disturbance and result in beneficial effects on vegetation.

Vegetation is expected to recover at Crabtree and Rae Lakes in the construction zone within a year or two after project completion.

This alternative may affect the abundance or distribution of individual plants in a localized area, but would not affect the viability of local or regional populations or communities. Overall, this alternative would result in negligible to minor adverse effects on vegetation at the project sites, and no cumulative effects.

Because there would be no major adverse or unacceptable impacts on vegetation, there would be no impairment of park resources or values under this alternative.

ALTERNATIVE 4: REMOVE RANGER STATIONS

Under this alternative, the three ranger stations would be removed and the sites would be rehabilitated. Native vegetation at the demolition sites would have localized minor and short-term adverse effects from workers removing the stations and trampling plants. There would also be impacts associated with six to eight people camping in the area during the demolition period. Generally, the areas immediately adjacent to the ranger station sites are not heavily vegetated, and few plants would be impacted. The crew camps would also be located in previously impacted camping areas with few plants. Any clumps of herbaceous perennials located in the demolition zone would be transplanted to a safer location. The removal activities would result in short-term adverse and minor impacts on vegetation.

After removal of the structures, the sites would be rehabilitated using the most current methods for restoring upper montane and subalpine areas to make them indistinguishable from their surroundings. This would result in the restoration of approximately 2,313 square feet. Le Conte has the largest disturbed area (1,425 square feet including the trail). Rae Lakes has a much smaller area of disturbance (600 square feet total) and Crabtree has the least disturbance (288 square feet), primarily due to the sandy soils in the area. Restoration would involve mechanically loosening the soil layer of the previous station area and planting vegetation to match the surrounding area. The area might then be posted to prohibit camping and traveling in for a period of years until the vegetation becomes established. Because of the high elevation and short growing seasons, rehabilitation in subalpine and upper montane zones can take decades before an area is ecologically indistinguishable from its surroundings. In the future, the area would be monitored and additional plantings done as necessary. In the long term, as site conditions are restored, there would be long-term localized beneficial effects on native vegetation under this alternative at the project sites.

Stock would carry most of the supplies to the project sites, and this could result in short-term minor adverse impacts on vegetation at the project areas and on the trails to the project areas during project work. Stock would generally be restricted to existing trails and areas designated for stock use. There would be some stock used close to the ranger stations when supplies and materials are unloaded and loaded. Stock could transport non-native seeds to the area. However, the sites are already heavily used by stock, and changes would not be measurable. Also, the park uses weed-free hay, so the risk of introducing non-native vegetation is reduced. Soil disturbance at the project sites could promote the establishment of non-natives, but this would be localized, and follow-up treatment of exotics would occur as part of project mitigation. These areas would be part of the overall restoration effort, so the impacts would be short term, minor, and adverse.

The primary impact on meadows in the long term would result from the lack of long-term meadow monitoring. The parks have meadow-monitoring plots located within the patrol areas of the ranger stations under consideration. Under alternative 4, meadow monitoring would be reduced because there would be no rangers present on site for the duration of the summer. As a result, damage to the meadows

could occur from overuse by stock, resulting in moderate long-term adverse impacts on the meadows in these areas.

Helicopters would be used to haul materials to a staging area, from where they would be transported to a disposal site. There would be a minor to moderate risk of introducing non-native species from heliports under this alternative, because no construction materials (such as logs) would be hauled into the site and the effects would be reduced through project mitigation.

Cumulative Impacts

Vegetation in the park and specifically at the project areas has been affected by past activities, such as the initial construction of the ranger stations and trails, and use by visitors and stock. As the ranger station sites would be restored under this alternative, there would be no cumulative effects from this portion of the project. However, the lack of monitoring combined with ongoing stock use in these areas could result in long-term moderate adverse cumulative effects on park vegetation at the meadow sites in the patrol areas of the ranger stations.

Conclusion

The removal of the ranger stations and subsequent rehabilitation efforts would result in short-term minor adverse effects on vegetation at the project sites. However, as native plants become established and the area is restored, this alternative would result in long-term minor beneficial effects on vegetation at the project sites. There would be long-term moderate adverse cumulative effects on vegetation at the meadows in the ranger station patrol areas due to lack of ranger presence and meadow monitoring.

Because there would be no major adverse or unacceptable impacts on vegetation, there would be no impairment of park resources or values under this alternative.

WILDLIFE

METHODOLOGY

The NPS *Organic Act*, which directs parks to conserve wildlife unimpaired for future generations, is interpreted to mean that native animal life should be protected and perpetuated as part of the parks' natural ecosystems. Natural processes are relied on to control populations of native species to the greatest extent possible; otherwise, they are protected from harvesting, harassment, or harm by human activities. According to NPS *Management Policies 2006* (NPS 2006a), the restoration of native species is a high priority (section 4.1). Impacts were assessed based on satisfying management goals for wildlife, which include maintaining components and processes of naturally evolving park ecosystems, including natural abundance, diversity, and the ecological integrity of plants and animals (see Table 7). Information on the parks' wildlife was taken from park documents and records. Park natural resource management staff, USFWS, and the CDFG also provided information.

Table 7. Wildlife Impact and Intensity Descriptions

Impact Intensity	Intensity Description
Negligible	There would be no observable or measurable impacts on native species, their habitats, or the natural processes sustaining them. Impacts would be well within natural fluctuations.
Minor	Impacts would be detectable but they would not be expected to be outside the natural range of variability of native species' populations, their habitats, or the natural processes sustaining them. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Breeding animals of concern are present; animals are present during particularly vulnerable life stages such as migration or juvenile stages; mortality or interference with activities necessary for survival could be expected on an occasional basis, but would not be expected to threaten the continued existence of the species in the park unit. Impacts on native species, their habitats, or the natural processes sustaining them would be detectable and could be outside the natural range of variability. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
Major	Impacts on native species, their habitats, or the natural processes sustaining them would be detectable and would be expected to be outside the natural range of variability. Key ecosystem processes might be disrupted. Loss of habitat might affect the viability of at least some native species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

Short-term—recovers in less than 1 year.

Long-term—takes more than 1 year to recover.

ALTERNATIVE 1: NO ACTION

Under this alternative, the ranger stations would remain at their existing sites. There would be no new construction activity, other than the yearly maintenance activities to attempt to prevent further deterioration of the ranger stations. It is likely that in the future the Rae Lakes Station would become too deteriorated to use and would be closed. Until that time, wildlife would continue to have access to the interior of the tent frame and human food. If wildlife such as bears become habituated to human food, they may have to be destroyed.

Since this project does not involve new construction, there would be no direct impacts on wildlife from human use and noise associated with construction activities.

Cumulative Impacts

The maintenance and operation of the existing ranger stations at Le Conte, Rae Lakes, and Crabtree and associated facilities and trails can create seasonal disturbance to wildlife species because of noise and human presence. The occupation of the sites by humans (both park staff and visitors) can cause wildlife to relocate or flee from an area, or can attract wildlife. The use of tools and equipment and the use of stock can disturb wildlife, causing flight behavior. However, because these ranger stations have been in place for an extended period of time, it is likely that area wildlife have become habituated to human activities at these sites. Since no additional facilities would be developed at these sites under the no-action alternative and there would be no change to wildlife use in the area, there would be no cumulative effects on wildlife.

Conclusion

Continued use of the ranger stations would result in long-term minor adverse effects on wildlife. Some wildlife, such as bears, could be destroyed if they become a nuisance (particularly at Rae Lakes, where

they have access to the interior of the tent frame), resulting in long-term moderate adverse effects on individuals. There would be no cumulative effects on wildlife. Because there would be no major adverse or unacceptable impacts on wildlife, there would be no impairment of park resources or values under this alternative.

ALTERNATIVE 2: REPAIR AND REHABILITATE EXISTING RANGER STATIONS AT EXISTING SITES

At Le Conte, due to concerns over cultural resources, no rehabilitation of the station would take place under alternative 2. Le Conte Ranger Station would remain unchanged, and the environmental consequences would be the same as under the no-action alternative.

Under this alternative, the Rae Lakes and Crabtree ranger stations would be rehabilitated at their existing locations. During the 10- to 12-week duration of construction at each site, there would be adverse effects on wildlife at each station because of the use of helicopters and equipment (noise) and presence of work crews (disturbance). Indirect effects would include some loss of habitat from limited cutting of no more than one or two trees and/or shrubs for construction. Also, there would be less yearly maintenance required on the rehabilitated structures, resulting in beneficial impacts on wildlife from reduced noise associated with those activities. Implementation of this alternative is not expected to cause measurable changes in animal behavior or distribution, species composition, or abundance of resident populations, and it would result in localized short-term minor adverse effects.

The approximately 8-inch-thick log wall siding of the proposed rehabilitated stations would have a moderate and long-term beneficial effect on wildlife at Crabtree and Rae Lakes. Sturdier walls and metal shutters would prevent bears and other wildlife from breaking into the stations to get food. Bears habituated to human food are sometimes destroyed; this potential would be reduced with the rehabilitation of the two stations, resulting in long-term beneficial effects on wildlife.

Cumulative Impacts

As discussed under the no-action alternative, since the new facilities would replace the existing facilities at these sites and there would be no change to wildlife use in the area, there would be no cumulative effects on wildlife.

Conclusion

Continued use of the ranger stations would result in long-term minor adverse effects on wildlife. Some wildlife, such as bears, could be protected by the rehabilitation of the stations at Rae Lakes and Crabtree because they no longer would have access to human food, resulting in long-term beneficial effects. There would be no cumulative effects on wildlife. Because there would be no major adverse or unacceptable impacts on wildlife, there would be no impairment of park resources or values under this alternative.

ALTERNATIVE 3: REPLACE RANGER STATIONS WITH NEW STRUCTURES (PREFERRED ALTERNATIVE)

Under this alternative, all three ranger stations would be replaced with prefabricated stations. During the 7 to 9 weeks of construction at each site, there would be adverse effects on wildlife at each station because of the use of helicopters and equipment (noise) and presence of work crews (disturbance). Indirect effects would include some loss of habitat from limited cutting of trees and shrubs for construction. Also, there would be less yearly maintenance required on these new structures, resulting in decreased impacts on wildlife from noise associated with those activities. Implementation of this

alternative is not expected to cause measurable changes in animal behavior or distribution, species composition, or abundance of resident populations, and it would result in localized short-term minor adverse effects.

The approximately 1-foot-thick log walls of the proposed new stations would have a beneficial effect on wildlife at the Le Conte, Rae Lakes, and Crabtree areas. Sturdier walls and metal shutters would prevent bears and other wildlife from breaking into the stations to get food. Bears habituated to human food are sometimes relocated or destroyed; this potential would be reduced with the rehabilitation of the three stations, resulting in long-term beneficial effects on wildlife.

Cumulative Impacts

Because these ranger stations have been in place for an extended period of time, it is likely that area wildlife have become habituated to human activities at these sites. Since the new facilities would replace the existing facilities at these sites and there would be no change to wildlife use in the area, there would be no cumulative effects on wildlife.

Conclusion

Continued use of the ranger stations would result in long-term minor adverse effects on wildlife. Wildlife, such as bears, could be protected by the rehabilitation of the stations at Le Conte, Rae Lakes, and Crabtree because they no longer would have access to human food, resulting in long-term beneficial effects. There would be no cumulative effects on wildlife. Because there would be no major adverse or unacceptable impacts on wildlife, there would be no impairment of park resources or values under this alternative.

ALTERNATIVE 4: REMOVE RANGER STATIONS

During the 3 weeks of station demolition, site rehabilitation, and materials removal at each site, there would be adverse effects on wildlife at each station because of the use of helicopters and equipment (noise) and presence of work crews (disturbance). Station removal would result in locally increased habitat for wildlife as vegetation reestablishes on the three sites. Also, bears and other wildlife would no longer be able to access the ranger stations to get food, resulting in beneficial effects on wildlife.

Wilderness rangers are responsible for educating the public about proper food storage and for removing garbage, which is often a source of unnatural food for wildlife. Without the ranger stations, rangers would become less effective at patrols. Assuming historic wilderness ranger staffing levels of one ranger per patrol area, the same number of rangers on patrol would have much less time to enforce food-storage regulations and to educate the public about how to behave and securely store food in bear habitat. As bears get more human food, they become more persistent in obtaining it. A few that become aggressive have to be destroyed, resulting in long-term moderate adverse effects on individual bears.

Cumulative Impacts

The sites would no longer be occupied by humans, other than for infrequent patrols, trail maintenance activities, and visitor use in the area. The presence of humans and noise generated by human activities can create short-term negligible to minor adverse effects on area wildlife. Since no additional facilities would be developed at these sites and there would be only a slight change to wildlife use in the area, there would be no cumulative effects on wildlife.

Conclusion

The ranger stations would be removed and habitat in the area would be restored, resulting in beneficial effects on area wildlife. However, due to the lack of ranger presence in the area to educate visitors about food storage and to enforce regulations, some wildlife, such as bears, could be relocated or destroyed if they become a nuisance, resulting in long-term moderate adverse effects on individuals. There would be no cumulative effects on wildlife. Because there would be no major adverse or unacceptable impacts on wildlife, there would be no impairment of park resources or values under this alternative.

SPECIAL-STATUS SPECIES

METHODOLOGY

Section 7 of the ESA mandates all federal agencies to determine how to use their existing authorities to further the purposes of the ESA to aid in recovering listed species, and to address existing and potential conservation issues. Section 7(a)(2) states that each federal agency shall, in consultation with the Secretary of the Interior, ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. NPS *Management Policies 2006* (NPS 2006a) state that potential effects of agency actions would also be considered for state- or locally listed species. Only one sensitive species occupies the project area. The bighorn sheep is known to occur at Rae Lakes. In addition, critical habitat has been designated for bighorn sheep at the Rae Lakes area. Other species of concern have been dismissed from further evaluation because they either do not occur in the project areas, are rare visitors to the park (bald eagle), or the project would result in less than negligible effects (see Table 8 for explanation of impact intensity).

Table 8. Special-Status Species Impact and Intensity Descriptions

Impact Intensity	Intensity Description
Negligible	The action could result in a change to a population or individuals of a species, but the change would not be of any measurable or perceptible consequence and would be well within natural variability. In the case of federally listed species, this impact intensity equates to a USFWS determination of <i>may affect, not likely to adversely affect</i> .
Minor	The action could result in a change to a population or individuals of a species. The change would be measurable, but small and localized, and not outside the range of natural variability. Mitigation measures, if needed, would be simple and successful. In the case of federally listed species, this impact intensity equates to a USFWS determination of <i>may affect, not likely to adversely affect</i> .
Moderate	Impacts on special-status species, their habitats, or the natural processes sustaining them would be detectable and occur over a large area. Breeding animals of concern are present, animals are present during particularly vulnerable life stages, and mortality or interference with activities necessary for survival could be expected on an occasional basis but is not expected to threaten the continued existence of the species in the park unit or conservation zone. Mitigation measures would be extensive and likely successful. In the case of federally listed species, this impact intensity equates to a USFWS determination of <i>may affect, likely to adversely affect</i> .

Impact Intensity	Intensity Description
Major	The action would result in noticeable effects on the viability of the population or individuals of a species. Impacts on special-status species or the natural processes sustaining them would be detectable, both inside and outside the park. Loss of habitat might affect the viability of at least some special-status species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed. In the case of federally listed species, the impact intensity equates to a USFWS determination of <i>may affect, likely to jeopardize the continued existence of a species</i> .

Short-term—recovers in less than 1 year.

Long-term—takes more than 1 year to recover.

ALTERNATIVE 1: NO ACTION

Under this alternative, the ranger stations would remain at their existing sites. There would be no new construction activity, other than the yearly maintenance activities to attempt to prevent further deterioration of the ranger stations. It is likely that in the future the Rae Lakes Ranger Station would become too deteriorated to use and would be closed. The closure of the Rae Lakes station would limit the presence of rangers in the area and reduce noise from human activities, such as construction and maintenance activities, and helicopter operations. Therefore, this alternative could result in slight beneficial effects on bighorn sheep in the Rae Lakes area.

Since this project does not involve new construction, there are no direct impacts on bighorn sheep or critical habitat from human use and noise associated with construction activities.

No populations of sheep exist at or near the project area at Crabtree and Le Conte, so there would be no effect on bighorn sheep at these locations.

Cumulative Impacts

The maintenance and operation of the existing ranger stations at Le Conte, Rae Lakes, and Crabtree and associated facilities and trails can create seasonal disturbance because of noise and human presence. The primary area of effect would be in the Rae Lakes area because of the proximity of sheep habitat to the ranger station. The occupation of the Rae Lakes area by humans (both park staff and visitors) could cause bighorn sheep to relocate or flee from the area. The use of tools, equipment, and helicopters, and the use of stock can disturb sensitive species, causing flight behavior.

Because the Rae Lakes Ranger Station has been in place for an extended period of time, it is likely that bighorn sheep have become habituated to human activities at the site (appendix F). Previous helicopter use in the area (approximately four to eight flights per season) does not appear to disturb bighorn sheep behavior. Since no additional facilities would be developed at these sites under the no-action alternative and there would be no change to bighorn sheep use in the area, there would be no cumulative effects.

Conclusion

There would be no effect on sensitive species or critical habitat under this alternative. There would be no cumulative effects. Because there would be no major adverse or unacceptable impacts on sensitive species, there would be no impairment of park resources or values under this alternative.

ALTERNATIVE 2: REPAIR AND REHABILITATE EXISTING RANGER STATIONS AT EXISTING SITES

At Le Conte, due to concerns over cultural resources, no rehabilitation of the station would take place under alternative 2 and the environmental consequences would be the same as under the no-action alternative. There would be no impact on bighorn sheep or critical habitat at Crabtree since no sheep are known to occur close to that ranger station and there is no critical habitat in the area.

Under this alternative, the Rae Lakes Ranger Station would be rehabilitated at its existing location. During the 10- to 12-week duration of construction, the use of helicopters and equipment (noise) and presence of work crews (disturbance) could disturb bighorn sheep populations located nearby. The landing zone for the helicopter is located approximately 500 feet from an area where sheep have been observed. Mitigation during construction would consist of requiring the helicopters to use a flight path that stays well away from known bighorn use areas; keeping the final approach to the landing zone below the area of the historic sightings; and halting flights if sheep venture within 1/2 mile of the construction area.

In the long term, there would be less yearly maintenance required on the rehabilitated structure, resulting in decreased impacts on bighorn sheep from noise associated with those activities. Implementation of this alternative is not expected to cause measurable changes in bighorn sheep behavior or distribution, species composition, or abundance of resident populations. This alternative would result in localized short-term minor adverse effects, long-term beneficial effects resulting from less maintenance, and a determination under the ESA (section 7) of *may affect, but would not likely adversely affect*. There would be no change to critical habitat, and therefore no effect.

Cumulative Impacts

The maintenance and operation of the existing ranger station at Rae Lakes can create seasonal disturbance because of noise and human presence. Because the ranger station at Rae Lakes has been in place for an extended period of time, it is likely that area bighorn sheep have become habituated to human activities at the site (appendix F). Previous helicopter use in the area (approximately four to eight flights per season) does not appear to have disturbed bighorn sheep behavior. Since this alternative would rehabilitate existing facilities and no additional facilities would be developed at the site, and rehabilitation should result in less yearly maintenance and helicopter flight activities, there would be no change to bighorn sheep use in the area, resulting in no cumulative effects.

Conclusion

This alternative would result in localized short-term minor adverse effects, long-term beneficial effects resulting from less maintenance, and a determination under the ESA (section 7) of *may affect, but would not likely adversely affect*. There would be no change to critical habitat, and thus no effect. There would be no cumulative effects. Because there would be no major adverse or unacceptable impacts on sensitive species, there would be no impairment of park resources or values under this alternative.

ALTERNATIVE 3: REPLACE RANGER STATIONS WITH NEW STRUCTURES (PREFERRED ALTERNATIVE)

Under this alternative, during the 7- to 9-week duration of construction at Rae Lakes, the use of helicopters and equipment (noise) and the presence of work crews (disturbance) could disturb bighorn sheep populations located nearby. The landing zone for the helicopter is located approximately 500 feet from an area where sheep have been observed. Mitigation during construction would consist of requiring

the helicopters to use a flight path that stays well away from known bighorn use areas; keeping the final approach to the landing zone below the area of the historic sightings; and halting flights if sheep venture within 1/2 mile of the construction area.

The majority of flights would be done in a 1-week operational period in September and the helicopter would stay in the construction area for about 10 minutes per flight.

In the long term, there would be less yearly maintenance required on the rehabilitated structures, resulting in decreased impacts on bighorn sheep from noise associated with those activities. Implementation of this alternative is not expected to cause measurable changes in bighorn sheep behavior or distribution, species composition, or abundance of resident populations. This alternative would result in localized short-term minor adverse effects, long-term beneficial effects resulting from less maintenance, and a determination under the ESA (section 7) of *may affect, but would not likely adversely affect*. There would be no change to critical habitat, and thus no effect.

No populations of bighorn sheep exist at or near the project areas at Le Conte and Crabtree, so there would be no effect on bighorn sheep at these locations.

Cumulative Impacts

As discussed previously, because the ranger station at Rae Lakes has been in place for an extended period of time, it is likely that area bighorn sheep have become habituated to human activities at this site (appendix F). Previous helicopter use in the area (approximately four to eight flights per season) does not appear to have disturbed bighorn sheep behavior. Since this alternative proposes the replacement of an existing facility, there should be less yearly maintenance and fewer helicopter flights in the long term. Thus, there would be no change to bighorn sheep use in the area, resulting in no cumulative effects.

Conclusion

This alternative would result in localized short-term minor adverse effects from construction activities, long-term beneficial effects resulting from less maintenance at the Rae Lakes site, and a determination under the ESA (section 7) of *may affect, but would not likely adversely affect*. There would be no effect on critical habitat. There would be no cumulative effects. Because there would be no major adverse or unacceptable impacts on sensitive species, there would be no impairment of park resources or values under this alternative.

ALTERNATIVE 4: REMOVE RANGER STATIONS

During the 3 weeks of station demolition, site rehabilitation, and materials removal at Rae Lakes, there would be adverse effects on bighorn sheep because of the use of helicopters and equipment (noise) and the presence of work crews (disturbance). Demolition activity would have a negligible short-term adverse impact from noise disturbance generated by removing the facility, and from helicopter use. The landing zone for the helicopter is located approximately 500 feet from the area where sheep have been observed. Mitigation during construction would consist of requiring the helicopters to use a flight path that stays well away from known bighorn use areas; keeping the final approach to the landing zone below the area of the historic sightings; and halting flights if sheep venture within 1/2 mile of the construction area. Removal of the Rae Lakes Ranger Station would have negligible long-term beneficial effects on bighorn sheep critical habitat as the area is naturalized and former habitat is restored.

Crabtree and Le Conte have not had sightings of bighorn sheep anywhere near the area where construction or helicopter activity would take place; therefore, no effects on bighorn sheep would occur at these locations.

Cumulative Impacts

Because the ranger station at Rae Lakes will be removed, in the long term there would be fewer flights to this area for maintenance and other ranger activities, and human presence would be reduced, removing an ongoing impact on bighorn sheep. However, since bighorn have likely become habituated to human use in the area, there would be no measurable cumulative effects.

Conclusion

This alternative would result in localized short-term minor adverse effects from demolition activities and long-term beneficial effects on bighorn sheep resulting from the removal of the ranger station at the Rae Lakes site, and a determination under the ESA (section 7) of *may affect, but would not likely adversely affect*. A structure would be removed from critical habitat, resulting in a slight beneficial effect. There would be no measurable cumulative effects. Because there would be no major adverse or unacceptable impacts on sensitive species, there would be no impairment of park resources or values under this alternative.

WATER QUALITY

METHODOLOGY

Available information on hydrology in the project area was compiled. Potential impacts from the alternatives are based on professional judgment and experience with similar actions. Impacts would be considered short term if hydrologic effects would occur during construction activities and long term if effects would occur beyond the duration of construction (see Table 9).

Table 9. Water Quality Impact and Intensity Descriptions

Impact Intensity	Intensity Description
Negligible	No change to water quality, or changes that are not detectable and within historical baseline water quality conditions.
Minor	Changes are detectable but within historical baseline water quality conditions. If mitigation were needed it would be relatively simple and would likely be successful.
Moderate	Changes are detectable and outside historical baseline water quality conditions on a short-term basis. Mitigation measures would be needed and would likely be successful.
Major	Changes are detectable and significantly and persistently outside historical baseline water quality conditions. Extensive mitigation would be needed and success would not be guaranteed.

Short-term—following project completion, recovery would take less than 1 year.

Long-term—following project completion, recovery would take more than 1 year.

The pollution of surface waters and groundwater by both point and non-point sources can impair the natural functioning of aquatic and terrestrial ecosystems, and diminish the utility of park waters for visitor use and enjoyment. The NPS will determine the quality of park surface water and groundwater resources

and avoid, whenever possible, the pollution of park waters by human activities occurring within and outside of parks (NPS 2006a, 4.6.3).

Each alternative was examined to determine its effect on surface water (streams and runoff) and groundwater. Analysis focused on the types and concentration of pollutants that could reach groundwater or surface water sources as a result of the alternatives under consideration.

ALTERNATIVE 1: NO ACTION

Effects on water quality would continue. None of the stations have gray-water treatment built in to their design. Gray water is disposed of near each station by pouring it into a rock and gravel-lined hole in the ground. The disposal sites are all more than 100 feet from any stream or water source.

Each station has an outhouse about 75 feet from the structure and more than 100 feet from any open source of water. Currently, when the outhouse fills up, it is covered with dirt and a new outhouse is dug in the area. Under the no-action alternative, this practice would continue. Disposal of both gray water and human waste show no effect on water quality in the area of the ranger stations.

These activities and their resulting effects could eventually lead to detectable changes in water quality, but the water quality would remain within the historical baseline, resulting in continuing and long-term negligible to minor adverse impacts on park surface water and groundwater near the ranger stations.

In the long term, if the Rae Lakes station is determined to be unsafe for occupation, human and stock use from park operations at the ranger station would be reduced, resulting in less gray-water disposal and the closure of outhouses. This would result in a slightly beneficial effect on water quality at the Rae Lakes site.

Cumulative Impacts

Localized effects on water quality at the project areas could result from past, ongoing, and future visitor use and stock use. Water pollution can occur if visitors are not using “Leave No Trace” practices, which could result in pollution from trash and human waste, and increased sediment due to erosion from trampling. Also, stock use around streams can create pollution from stock waste and increase sediment due to erosion from trampling. Under this alternative, in the long term there would be beneficial effects on water quality as rangers continue to be available for patrols and visitor education at Le Conte and Crabtree; however, in the long term, ranger presence would likely be reduced at Rae Lakes, and there would be less enforcement of “Leave No Trace” practices. This could result in long-term negligible to minor adverse effects on water quality in the Rae Lakes area.

The overall effects of past, ongoing, and future actions in combination with the effects from this alternative would result in short- and long-term minor adverse cumulative effects on water quality at Rae Lakes, and would not measurably contribute to the ongoing impacts at Le Conte and Crabtree, resulting in no cumulative effects at these locations.

Conclusion

This alternative would result in localized long-term negligible to minor adverse effects from continued gray-water disposal and human waste management. Cumulative effects would be short term and long term, minor, and adverse at Rae Lakes. This alternative would not measurably contribute to the adverse cumulative effects at Le Conte and Crabtree. Because there would be no major adverse or unacceptable impacts on water quality, there would be no impairment of park resources or values under this alternative.

ALTERNATIVE 2: REPAIR AND REHABILITATE EXISTING RANGER STATIONS AT EXISTING SITES

At Le Conte, no rehabilitation of the station would take place under this alternative and no improvements would be made to gray-water disposal methods at Rae Lakes; therefore, the environmental consequences would be the same for these two structures as under the no-action alternative. At Crabtree, a gray-water treatment system would be part of the station upgrades, with a sink, drain trap, and sump designed for gray-water disposal beneath the structure. This would improve the water quality of the gray water, resulting in a long-term beneficial impact on park surface water and groundwater.

Cumulative Impacts

Cumulative effects would be the same as described under the no-action alternative.

Conclusion

This alternative would result in localized long-term negligible to minor adverse effects from continued gray-water disposal and human waste management at Le Conte and Rae Lakes. At Crabtree there would be improved gray-water disposal, resulting in beneficial effects. Cumulative effects would be short term and long term, minor, and adverse. Because there would be no major adverse or unacceptable impacts on water quality, there would be no impairment of park resources or values under this alternative.

ALTERNATIVE 3: REPLACE RANGER STATIONS WITH NEW STRUCTURES (PREFERRED ALTERNATIVE)

Under this alternative, gray-water treatment would be built into each station design, with a sink, drain trap, and sump designed for gray-water disposal beneath the structure. This would improve the water quality of the gray water, resulting in a long-term beneficial impact on park surface water and groundwater.

Each station has an outhouse about 75 feet from the structure and over 100 feet from any open source of water. Currently, when the outhouse fills up, it is covered and a new one dug. Under this alternative, this practice would continue. This activity and resulting effects could lead to detectable changes to water quality, but the water quality would remain within the historical baseline, resulting in continuing and long-term negligible to minor adverse impacts on park surface water and groundwater near the ranger stations.

During project work, disposal of construction waste water from cement mixing inside the foundation wall would have a localized negligible and short-term adverse effect on water quality.

Cumulative Impacts

Localized effects on water quality at the project areas could result from past, ongoing, and future visitor use and stock use as described under the no-action alternative. Under this alternative, in the long term there would be beneficial effects on water quality as rangers continue to be available for patrols and visitor education at Le Conte, Rae Lakes, and Crabtree. There would be beneficial effects as a result of improved gray-water filtering and disposal. The overall effects of past, ongoing, and future actions in combination with the adverse and beneficial negligible to minor effects from this alternative would result in short- and long-term negligible to minor adverse localized effects on water quality. This alternative would not measurably contribute to adverse cumulative effects.

Conclusion

This alternative would result in localized long-term beneficial effects from improved gray-water disposal practices, and continued localized long-term negligible to minor adverse effects from human waste management. This alternative would not measurably contribute to adverse cumulative effects.

Because there would be no major adverse or unacceptable impacts on water quality, there would be no impairment of park resources or values under this alternative.

ALTERNATIVE 4: REMOVE RANGER STATIONS

Removing the ranger stations at Le Conte, Rae Lakes, and Crabtree would result in negligible and long-term beneficial impacts on water quality as there would no longer be gray-water disposal related to the use of the cabins. Outhouses would be removed and the areas would be restored to natural conditions. This would result in localized and long-term beneficial effects on groundwater and water quality in the project areas.

Cumulative Impacts

Localized effects on water quality at the project areas could result from past, ongoing, and future visitor use and stock use as described under the no-action alternative. Under this alternative, there would be reduced ranger presence in the three project areas, resulting in less enforcement of “Leave No Trace” practices. This could create long-term negligible to minor adverse effects on water quality in the three patrol areas. The overall effects of past, ongoing, and future actions in combination with the adverse and beneficial negligible to minor effects from this alternative would result in short- and long-term, negligible to minor, adverse localized effects on water quality. This alternative would not measurably contribute to adverse cumulative effects.

Conclusion

This alternative would result in localized long-term beneficial effects from removing gray water and outhouses from the three ranger station sites. Continued visitor use and reduced visitor education in the area would result in short- and long-term negligible to minor adverse effects on water quality. This alternative would not measurably contribute to adverse cumulative effects. Because there would be no major adverse or unacceptable impacts on water quality, there would be no impairment of park resources or values under this alternative.

WILDERNESS

METHODOLOGY

Working from definitions included in the *Wilderness Act of 1964*; and *Keeping it Wild: An Interagency Strategy to Monitor Trends in Wilderness Character Across the National Wilderness Preservation System* (Landres, Barns, et al. 2008), and following the tradition of wilderness preservation at Sequoia and Kings Canyon National Parks, the following wilderness resource values have been identified for the parks and are a component of the wilderness character. The USFS national framework for monitoring wilderness character (Landres, Hennessy, et al. 2008) concluded that wilderness character is ideally described as the unique combination of (a) natural environments that are relatively free from modern human manipulation and impacts, (b) opportunities for personal experiences in environments that are relatively free from the encumbrances and signs of modern society, and (c) symbolic meanings of humility, restraint, and

interdependence in how individuals and society view their relationship to nature. The following are considered the four qualities of wilderness character:

Untrammeled: Wilderness is essentially unhindered and free from modern human control or manipulation.

Natural: Wilderness ecological systems are substantially free from the effects of modern civilization, and marked by the following:

Absence of evidence of people and their activities.

Perpetuation of natural ecological relationships and processes and the continued existence of native wildlife populations in largely natural conditions.

Undeveloped: Wilderness retains its primeval character and influence, and is essentially without permanent improvement or modern human occupation.

Providing Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation:

Wilderness provides outstanding opportunities for solitude or primitive and unconfined experiences, and promises the following:

The likelihood of not encountering other people while in wilderness, including privacy and isolation.

The absence of distractions (such as large groups, mechanization, unnatural noise, signs, and other modern artifacts).

Freedom from the reminders of modern society.

The freedom of visitors to explore, with limited or no restrictions; the ability to be spontaneous.

Self-sufficiency and absence of support facilities or motorized transportation; direct experience of weather, terrain, and wildlife with minimal shelter or assistance from devices of modern civilization.

Impacts on natural and cultural resources; park, recreation, and visitor use; soundscapes; and other resources are evaluated elsewhere in this section (Environmental Consequences of the Alternatives). The analysis for this topic will focus on wilderness character and wilderness experience, which are integrally related because much of wilderness character can only be subjectively determined by the visitor's experience (for example, solitude or freedom of movement) (see Table 10). In addition, wilderness operations are evaluated as they relate to the ranger patrol function and the ability for the parks to carry out wilderness protection and administrative functions under each alternative.

Table 10. Wilderness Impact and Intensity Descriptions

Impact Intensity	Intensity Description
Negligible	The action would have no discernible effect on opportunities for solitude. Opportunities for primitive and unconfined forms of recreation would essentially remain unchanged. The action would have no effect on the prevalence of natural conditions, and the wilderness area would continue to be primarily affected by forces of nature.
Minor	The action would have a slightly beneficial or adverse effect on opportunities for solitude in a limited area of wilderness, such as along a single trail or an area of less than 100 acres. The action would slightly reduce or improve opportunities for primitive and unconfined forms of recreation in limited areas of the wilderness. The action would result in slightly detectable human-caused impacts (either beneficial or adverse) on the natural environment in limited areas of the wilderness; natural conditions would continue to predominate.
Moderate	The action would result in readily apparent beneficial or adverse effects on opportunities for solitude in limited areas of wilderness. The action would noticeably improve or reduce opportunities for primitive and unconfined forms of recreation in limited areas of the wilderness. The action would result in readily apparent human-caused impacts (either beneficial or adverse) in limited areas of the wilderness; natural conditions would continue to predominate.
Major	The action would have readily apparent beneficial or adverse impacts on opportunities for solitude in one or more wilderness units. The action would substantially improve or reduce opportunities for primitive and unconfined forms of recreation in one or more wilderness units. The action would result in readily apparent human-caused impacts (either beneficial or adverse) on the natural environment in one or more wilderness units.

Short-term—effects occur during project work.

Long-term—effects occur after project work and would continue to impact wilderness resources in the future.

ALTERNATIVE 1: NO ACTION

Untrammeled: Under this alternative, there would be no change to the untrammeled quality of wilderness within the parks. The ranger stations would remain in place, with no modifications except for continued maintenance. This alternative provides for regular ranger presence deep in wilderness to control or correct unauthorized trammeling actions. There would be a moderate reduction of rangers' time for this duty in order to address station maintenance needs.

Natural: Under this alternative, there would be no change to the natural quality of the wilderness. This alternative provides for regular ranger presence to monitor, rehabilitate, and report on natural systems and features. There would be a moderate reduction of rangers' time for this duty in order to address station maintenance needs and the expected future closure of the Rae Lakes Ranger Station.

Undeveloped: Under this alternative, there would continue to be structures (developments) in wilderness and the infrequent use of mechanized transport and equipment. Helicopters and stock would be required to bring in the materials needed for maintenance and repair. It is estimated that approximately one to two flights per year would be required for repair materials that cannot be carried in on stock or where snow prevents stock access. Under this alternative, in the short term there is a stable number of developments and stable use of motorized equipment for station maintenance. In the long term, when Rae Lakes is determined to be unusable, the station would be abandoned but the structure would remain in place and left to molder, resulting in a decreased number of developments.

Providing Solitude or Primitive and Unconfined Recreation: Under this alternative, the opportunities for solitude or primitive and unconfined recreation would not change. Solitude is easily achievable for wilderness users who choose not to contact rangers or avoid travel to ranger stations. Unconfined and self-reliant recreation is available throughout the park wilderness. Rangers at stations provide recreational information or assistance to those who seek it.

Cumulative Impacts

Existing facilities, trails, park operations, and periodic flights result in adverse moderate cumulative effects on the wilderness resource. The use of helicopters would increase slightly under this alternative, as more repairs to the two remaining stations would be needed in the long term. However, it is unlikely that this slight increase in use would be noticeable to the average wilderness visitor and it would contribute only slightly to the overall cumulative effects from ongoing park activities and existing structures in wilderness. Cumulative effects would be moderate and adverse.

Conclusion

As stations deteriorate, a few more helicopter flights per year would occur, and stock use would continue for maintenance and repair work. These activities would result in slightly detectable but transitory human-caused impacts in limited areas of the wilderness, and would have a minor short- and long-term adverse effect on wilderness character from the project work and from the presence of structures in wilderness. This alternative would contribute slightly to the overall moderate adverse cumulative effects from ongoing park activities and existing structures in wilderness.

This alternative does not meet the project objectives or the BMP objectives of protecting wilderness resources and enhancing visitor enjoyment. It does not achieve the goal of making ranger stations fully operational for wilderness stewardship (resource protection, visitor protection, and education).

Because there would be no major or unacceptable impacts on wilderness resources, there would be no impairment of park resources and wilderness values under this alternative.

ALTERNATIVE 2: REPAIR AND REHABILITATE EXISTING RANGER STATIONS AT EXISTING SITES

At Le Conte, no rehabilitation of the station would take place under this alternative, and the environmental consequences would be the same as for the no-action alternative.

Untrammelled: Under this alternative, there would be a slight change to the untrammelled quality of wilderness within the park. Because the structure at Crabtree would be rehabilitated, rangers would spend less time on yearly maintenance activities. However, a new tent-frame structure at Rae Lakes would effectively be the same as the no-action alternative. There would be yearly maintenance requirements for the tent frame, thus removing rangers from their wilderness protection duties. This alternative would continue to provide for regular ranger presence deep in wilderness to control or correct unauthorized trammeling actions. Overall, there would be a minimal reduction of rangers' time for this duty in order to address station maintenance needs at Rae Lakes.

Natural: Under this alternative, there would be no change to the natural quality of the wilderness, as all three ranger stations would remain. This alternative provides for regular ranger presence to monitor, rehabilitate, and report on natural systems and features. There is a minor reduction of rangers' time for this duty in order to address station maintenance needs.

Undeveloped: Under this alternative, there would continue to be structures in wilderness, which would disrupt wilderness character in the immediate vicinity of the ranger stations. The Crabtree Ranger Station would be designed with the goal of blending in with the wilderness setting. However, regardless of the design, the presence of any structure in wilderness can disrupt the wilderness character and be considered intrusive on wilderness aesthetic qualities and visitor experience.

Under this alternative, the Rae Lakes and Crabtree ranger stations would be rehabilitated at their existing locations. During construction, helicopters and stock would be required to bring in materials. At Rae Lakes, approximately 11 hours of helicopter flight time would be required to transport in materials too big for stock to carry. At Crabtree, approximately 21 hours of helicopter flight time would be required to bring in materials not able to be carried by stock. Flights would be scheduled to avoid the peak visitor periods. The helicopter would drop material by sling load and be in the station area, requiring an estimated 10 minutes on site for each flight plus about 30 minutes on a flight path over the wilderness, spread out over approximately 5 to 6 days of flight activities per station.

Rangers and permit issuing stations would inform visitors of possible noise intrusions by helicopters. Visitors would be given times and, where possible, alternate routes to avoid these intrusions. The flight paths would be restricted and timing would reduce the number of visitors affected, and natural conditions would continue to predominate in the park wilderness. The flights would result in detectable short-term adverse impacts on those wilderness users within or near the flight path and near the project site. Also, there may be individuals who oppose any use of motorized equipment in wilderness and who, regardless of whether they are within the park wilderness during the operation, would be adversely affected solely from the knowledge that these types of activities are occurring in a wilderness area.

Because of the work proposed under this alternative, in the long term there would be a decreased use of motorized equipment for station maintenance.

Providing Solitude or Primitive and Unconfined Recreation: Under this alternative, there would be temporary reductions in opportunities for solitude and primitive and unconfined recreation around the project sites at Rae Lakes and Crabtree. In the immediate project areas at Rae Lakes and Crabtree, the construction phase would have a minor short-term adverse effect on wilderness qualities of natural sounds and solitude from the use of power tools for construction; the use of helicopters to bring in large building materials that cannot otherwise be brought in by stock; and by the effects of increased stock needed to bring in construction materials and supplies for the construction crew. Approximately eight animals per week would be used during the project duration of 10 to 12 weeks. Another 20 strings of eight head each would be required to bring in additional supplies and concrete. This project would result in increased potential for trail contacts between wilderness users and NPS crews during the construction periods.

However, solitude would still be easily achievable for wilderness users who choose not to contact rangers or visit other areas of the wilderness during construction. Unconfined recreation is available throughout the parks' wilderness areas. Rangers at stations provide recreational information or assistance to those who seek it.

Cumulative Impacts

Existing facilities, trails, park operations, and periodic helicopter flights result in adverse and beneficial minor to moderate cumulative effects on the wilderness resource. The use of helicopters during the removal operation would result in adverse impacts on wilderness resources in the short term during project completion. The impacts of this alternative, including the short-term construction project and the periodic maintenance of the structures, would be short term and long term, minor to moderate, and

beneficial and adverse, and would contribute slightly to the overall cumulative effects from ongoing park activities and existing structures in wilderness.

Conclusion

Under this alternative, there would be helicopter and stock use to rehabilitate the ranger station at Crabtree and to reconstruct the tent frame at Rae Lakes. There would be no change at Le Conte, so in the long term, continued and infrequent helicopter support would likely be necessary to maintain this facility. This work would result in readily apparent human-caused impacts in limited areas of the wilderness, and would have a short-term minor to moderate adverse effect on wilderness character during the project duration, and a minor to moderate long-term adverse effect on wilderness character from the continued presence of structures in wilderness. This alternative would contribute slightly to the overall moderate adverse cumulative effects from ongoing park activities and existing structures in wilderness.

Compared to the no-action alternative, there would be fewer repairs and less maintenance needed for Crabtree Ranger Station, but the same time would be spent maintaining the Rae Lakes and Le Conte stations. Such actions would have long-term and negligible to minor beneficial and adverse effects on the parks' ability to carry out their mandate for wilderness stewardship.

This alternative partially meets the project and BMP objectives of protecting wilderness resources and enhancing visitor enjoyment. It does not achieve the goal of making the three ranger stations fully operational for wilderness stewardship. It does not provide a sustainable solution for long-term wilderness administration and resource management.

Because there would be no major or unacceptable impacts on wilderness resources, there would be no impairment of park resources and wilderness values under this alternative.

ALTERNATIVE 3: REPLACE RANGER STATIONS WITH NEW STRUCTURES (PREFERRED ALTERNATIVE)

Under this alternative, new structures would replace the existing ranger stations at Le Conte, Rae Lakes, and Crabtree. The Le Conte Ranger Station would be relocated approximately 100 feet south of the existing station. All of the stations would be designed to fully comply with the parks' *Architectural Character Guidelines* for rustic structures in wilderness settings and for safe winter use.

Untrammeled: Under this alternative, there would be a slight change to the untrammeled quality of wilderness within the park. Because the structures at Le Conte, Rae Lakes, and Crabtree would be replaced, rangers would spend less time on yearly maintenance activities. Thus, this alternative provides for increased ranger presence deep in wilderness to control or correct unauthorized trampling actions because they would be spending less time addressing ranger station maintenance.

Natural: Under this alternative, there would be no change to the natural quality of the wilderness, as all three ranger stations would remain. This alternative provides for increased ranger presence to monitor, rehabilitate, and report on natural systems and features because there would be less time spent addressing ranger station maintenance.

Undeveloped: Under this alternative, there would continue to be structures in wilderness, which would disrupt wilderness character in the immediate vicinity of the ranger stations. The three stations would be designed with the goal of blending in with the wilderness setting. However, regardless of the design, the presence of any structure in wilderness can disrupt the wilderness character and be considered intrusive on wilderness aesthetic qualities and visitor experience.

The construction phase would have a minor to moderate short-term adverse effect on wilderness qualities from the occasional use of power tools for construction; the use of helicopters to bring in large building materials that cannot otherwise be brought in by stock; and the effects of increased stock needed to bring in construction materials and supplies for the construction crew.

During construction, helicopters and stock would be required to bring in materials. At Rae Lakes, approximately 31 hours of helicopter flight time would be required to transport in materials too big for stock to carry. At Crabtree, approximately 35 hours of helicopter flight time would be required to bring in materials not able to be carried by stock. At Le Conte, approximately 31 hours of flight time would be required. The flights would be scheduled to avoid peak visitor use periods. The helicopter would drop material by sling load and be in the station area for about 10 minutes for each flight plus about 30 minutes on a flight path above wilderness. The work at each ranger station would be accomplished over a 2-year period, and it is estimated that it would take 6 to 10 years to replace all three stations.

Rangers and permit issuing stations would inform visitors of possible noise intrusions by helicopters. Visitors would be given times and, where possible, alternate routes to avoid these intrusions. The flight paths would be restricted and timing would reduce the number of visitors affected, and natural conditions would continue to predominate in the park wilderness. The flights would result in detectable short-term adverse impacts on those wilderness users under or near the flight path and near the project site. Also, there may be individuals who oppose any use of motorized equipment in wilderness, and, regardless if they are within the park wilderness during the operation, would be adversely affected solely from the knowledge that these types of activities are occurring in a wilderness area.

Because of the work proposed under this alternative, in the long term there would be a decreased use of motorized equipment for station maintenance at the three ranger stations.

Providing Solitude or Primitive and Unconfined Recreation: Under this alternative, there would be temporary reductions in opportunities for solitude and primitive and unconfined recreation around the project sites at Le Conte, Rae Lakes, and Crabtree. In the immediate project areas, the construction phase would have a minor short-term adverse effect on wilderness qualities of natural sounds and solitude from the use of power tools for construction; the use of helicopters to bring in large building materials that cannot otherwise be brought in by stock; and the effects of increased stock needed to bring in construction materials and supplies for the construction crew. This alternative would require approximately three pack trains (a maximum of 21 stock) per ranger station. Work would occur at one ranger station at a time and as funding becomes available. Approximately 200 pounds per week would be transported to the project site by stock for the duration of the project. Three pack trains with six to eight head of stock per train would be used for the resupply operations. Stock would deliver supplies to the site on a rotating basis, staging out of meadows en route. Demobilization is expected to take eight mule loads. This project would result in increased potential for trail contacts between wilderness users and NPS crews during the construction periods, resulting in an adverse impact on solitude on the trails to the project locations.

However, solitude would still be easily achievable for wilderness users who choose not to contact rangers or who visit other areas of the wilderness during construction. Unconfined recreation is available throughout the park wilderness areas. Rangers at stations provide recreational information or assistance to those who seek it.

Cumulative Impacts

Existing facilities, trails, park operations, and periodic flights result in adverse moderate cumulative effects on the wilderness resource. The use of helicopters during the removal operation would in the short term add to the overall adverse effects from the use of helicopters for ongoing park operations. The

current impacts on park wilderness from helicopter use are moderate, short term, and adverse. During the project construction phase, the additional helicopter work would contribute slightly to the overall moderate adverse effects from ongoing park activities and existing structures in wilderness. The impacts of this alternative, including the short-term construction project to replace the structures, would be short term and long term, minor to moderate, and beneficial and adverse, and would contribute to the overall cumulative effects from ongoing flights and existing structures in wilderness, resulting in moderate adverse cumulative effects.

Conclusion

Under this alternative, there would be helicopter and stock use to replace the ranger stations at Le Conte, Rae Lakes, and Crabtree. This work would result in readily apparent human-caused impacts in limited areas of the wilderness, and would have a minor to moderate short-term adverse effect on wilderness character during the project duration, and minor to moderate long-term adverse effects on wilderness character from the continued presence of structures in wilderness. This alternative would contribute to the overall moderate adverse cumulative effects from ongoing park activities and existing structures in wilderness.

Compared to the no-action alternative, there would be fewer repairs needed on the three ranger stations and more time devoted to wilderness administration and protection. Such actions would have a long-term and beneficial effect on the parks' ability to carry out their mandate for wilderness stewardship.

Wilderness resource management objectives are met by this alternative, since rangers would continue patrols from within the wilderness, allowing them to patrol more effectively, report on resource issues, and carry out maintenance of campsites and trails more efficiently. This alternative fully meets the objectives of the project and the parks' BMP. It provides a long-term and sustainable solution to providing necessary support for wilderness stewardship, administration, and resource management.

Because there would be no major or unacceptable impacts on wilderness resources, there would be no impairment of park resources and wilderness values under this alternative.

ALTERNATIVE 4: REMOVE RANGER STATIONS

Under this alternative, the three ranger stations would be physically removed, resulting in three fewer structures in the parks' wilderness.

Untrammeled: Under this alternative, there would be reduced ranger presence in deep in the wilderness, resulting in a reduced ability to control or correct unauthorized trammeling actions. There would be short-term adverse impacts from the removal operations and on-site manipulations to rehabilitate the disturbed areas.

Natural: This alternative would result in increased natural quality of the wilderness because three structures would be completely removed and the disturbed areas would be restored. However, regular ranger presence deep in wilderness to monitor, rehabilitate, and report on natural systems and features is notably reduced due to time spent in transit to and from patrol areas, resulting in long-term adverse effects on the natural quality of wilderness.

Undeveloped: Under this alternative, the wilderness would have three fewer ranger stations as developments (structures). In the short term, during the 3-week removal operations per station, there would be minor to moderate adverse effects on wilderness qualities from the use of tools for demolition; the use of helicopters to bring in large equipment and to remove materials that cannot be transported by

stock; and the effects of increased stock needed to bring in supplies for the demolition crew. Up to 5 hours of helicopter flight time would be required per station to haul large objects that cannot be transported by stock.

In the long term, because of the removal of the three structures, there would be a reduction in number of developments (structures) in the park and a decreased use of motorized equipment at the station sites, resulting in beneficial effects on the undeveloped character of wilderness.

Providing Solitude or Primitive and Unconfined Recreation: Under this alternative, there would be temporary reductions in opportunities for solitude and primitive and unconfined recreation around the project sites at Le Conte, Rae Lakes, and Crabtree during demolition. In the immediate project areas and flight paths, the deconstruction phase would have a minor short-term adverse effect on wilderness qualities of natural sounds and solitude from the use of power tools, helicopters, and the effects of increased stock needed to bring in supplies for the work crew. Approximately three pack trains (a maximum of 21 stock) would transport 200 pounds per week to each project site, and three pack trains with six to eight head of stock per train would be used for the resupply operations. Approximately eight additional mule loads would be needed for the final demobilization from the site after all the cabin debris is removed. This project would result in increased potential for trail contacts between wilderness users and NPS crews during the construction periods, resulting in an adverse impact on solitude on the trails to the project locations.

In the long term, opportunities for solitude would be enhanced for those visitors who feel that structures are an intrusion on their wilderness experience. In general, in park wilderness, solitude is easily achievable for wilderness users who choose not to contact rangers. Unconfined recreation is available throughout the park wilderness areas, resulting in beneficial effects on wilderness visitors.

Cumulative Impacts

Existing facilities, trails, park operations, and periodic flights result in adverse and beneficial minor to moderate cumulative effects on the wilderness resource. The impacts of this alternative, including the short-term demolition project and the removal of the structures, would result in beneficial effects on the wilderness character by restoring natural conditions, but could result in adverse effects on wilderness stewardship activities from the reduction of wilderness ranger patrols in those areas. The use of helicopters during the removal operation would in the short term add to the overall adverse effects from the use of helicopters for ongoing park operations, but this impact would be short term. In the long term there would be no helicopters required to support the three stations, since they would be removed. Therefore, this alternative would not contribute to the overall cumulative effects from ongoing park activities and existing structures in wilderness and there would be no cumulative effects.

Conclusion

During project activities, there would be impacts on wilderness resources from the use of helicopters and mechanized tools, stock, and the presence of work crews. After the stations are removed, there would be beneficial effects on the wilderness character from the removal of structures from the wilderness. However, the reduced amount of patrol times would result in long-term moderate adverse effects on wilderness character and natural resources due to reduced visitor education and monitoring and rehabilitation efforts. This would result in a moderate and long-term adverse effect on the parks' ability to preserve wilderness resources around the Le Conte, Crabtree, and Rae Lakes patrol areas. There are no cumulative effects.

This alternative does not meet the project objectives or the BMP objectives of protecting wilderness resources and enhancing visitor enjoyment. It does not achieve the goal of making ranger stations fully operational for wilderness stewardship (i.e., resource protection, visitor protection, and education).

Because there would be no major or unacceptable impacts on wilderness resources, there would be no impairment of park resources and wilderness values under this alternative.

WILDERNESS OPERATIONS

METHODOLOGY

Table 111. Wilderness Operations Impact and Intensity Descriptions

Impact Intensity	Intensity Description
Negligible	Wilderness operations would not be affected.
Minor	For wilderness operations, the effect would be detectable but short term and would not have an appreciable impact.
Moderate	For wilderness operations, the effects would be readily apparent and short term or long term, and would result in a substantial change that would be noticeable to park staff and the public.
Major	For wilderness operations, the effects would be readily apparent and would result in a substantial change in park operations that would be noticeable to park staff and the public and would be markedly different from existing operations.

Short-term—effects occur during project work.

Long-term—effects occur after project work and would continue to impact wilderness resources in the future.

ALTERNATIVE 1: NO ACTION

Rangers would continue to devote time to maintenance that they would otherwise spend carrying out the parks' wilderness stewardship mandate: educating visitors, patrolling trails, maintaining and rehabilitating campsites, and monitoring park resources. It is estimated that about 1 to 2 weeks per season would be devoted to maintenance tasks as the stations deteriorate and require more repair. This means that approximately 30 to 100 visitors per day would not be contacted by the area ranger because of the time spent performing station maintenance tasks. While conducting maintenance activities, each ranger would be unable to hike the average 6 to 10 miles per day of wilderness patrol to perform monitoring and other wilderness administrative functions, such as contacting visitors, cleaning campsites, and reporting on resource and safety conditions.

Cumulative Impacts

Under this alternative, there would continue to be maintenance associated with the ranger stations. Although rangers would still patrol in these areas, their patrol time would continue to be reduced as maintenance requirements increase. This alternative would maintain a ranger presence in these areas, and would result in decreased patrol time due to increased maintenance on the stations. Overall, the cumulative effects to ongoing park operations in wilderness would be long-term, moderate and adverse.

Conclusion

As stations deteriorate, a few more helicopter flights per year would occur, and stock use would continue for maintenance and repair work. Continued minor to moderate long-term adverse effect on wilderness

operations would occur as a result of increased maintenance requirements on the ranger stations resulting in decreased patrol times. This alternative would contribute slightly to the overall moderate adverse cumulative effects to park operations.

This alternative does not meet the project objectives or the BMP objectives of protecting wilderness resources and enhancing visitor enjoyment. It does not achieve the goal of making ranger stations fully operational for wilderness stewardship (resource protection, visitor protection, and education).

ALTERNATIVE 2: REPAIR AND REHABILITATE EXISTING RANGER STATIONS AT EXISTING SITES

Under this alternative, a new tent frame would be constructed at Rae Lakes and the Crabtree Station would have major rehabilitation work. A new tent station replacement for Rae Lakes would, effectively, be the same as the no-action alternative. A new tent-frame structure would not be secure from wildlife or people. It is estimated that about 1 to 2 weeks per season would be devoted to maintenance tasks even with a new tent frame and approximately 30 to 100 visitors per day would not be contacted by the Rae Lakes ranger because of the time spent performing station maintenance tasks. The ranger would not be able to hike the average of 6 to 10 miles per day of wilderness patrol for the 2 weeks per season spent on maintenance tasks. Trail patrols allow rangers to carry out the parks' wilderness stewardship mandate by contacting visitors, cleaning camps, and monitoring and reporting on resource and safety conditions. Therefore, a tent-frame station would continue to have an adverse effect on carrying out the parks' wilderness stewardship mandate of providing visitor services and meeting resource management goals.

A tent-frame structure would continue to have space limitations. Secure storage would be needed outside the station and that storage would have to be anchored to prevent bears from moving the boxes. The tent-frame structure and outside storage units would detract from the visual aesthetics of the area and adversely impact wilderness character. Because these boxes are not optimally waterproof, a large amount of equipment has been damaged over the years, requiring replacement by stock supply or helicopter. It is estimated that approximately one to two additional flights would be necessary to transport materials and ranger supplies when conditions do not allow use of packstock.

Compared to the no-action alternative, rangers would probably spend 1 week less per season on maintenance tasks at Crabtree. Compared to the no-action alternative, they would be able to contact and educate approximately 210 to 700 visitors more per season, and would be able to hike approximately 40 to 70 more miles of wilderness trail patrol. Trail patrols allow rangers to carry out the parks' wilderness stewardship mandate by contacting visitors, cleaning camps, and monitoring and reporting on resource and safety conditions.

Compared to the no-action alternative and assuming historic staffing levels of one ranger per patrol area, ranger stations allows rangers to be present approximately 98 days of a total 98-day patrol season in their primary patrol area. Depending on the station, each ranger would contact and educate between 1,100 and 4,200 visitors per season. Rangers would patrol approximately 600 to 1,000 miles of trail in their primary patrol area. Trail patrols allow rangers to carry out the parks' wilderness stewardship mandate by contacting visitors, cleaning camps, and monitoring and reporting on resource and safety conditions.

Cumulative Impacts

The impacts of this alternative, including the replacement of the tent frame and the rehabilitation of the Crabtree Station would result in adverse and beneficial effects on wilderness operations and stewardship activities. While the Crabtree station would be repaired, there would still be maintenance associated with the tent frame at Rae Lakes, and eventually the Le Conte station would not be usable. This alternative

would maintain a ranger presence in these areas, and would result in decreased patrol time due to increased maintenance on the stations. Overall, this alternative would reduce the cumulative effects to ongoing park operations in wilderness as compared with the no action alternative, but cumulative effects would still be long-term, minor and adverse.

Conclusion

Under this alternative, there would be helicopter and stock use to rehabilitate the ranger station at Crabtree and to reconstruct the tent frame at Rae Lakes. There would be no change at Le Conte, so in the long term, continued and infrequent helicopter support would likely be necessary to maintain this facility. Compared to the no-action alternative, there would be fewer repairs and less maintenance needed for Crabtree Ranger Station, but the same time would be spent maintaining the Rae Lakes and Le Conte stations. Such actions would have long-term and negligible to minor beneficial and adverse effects on the parks' ability to carry out their mandate for wilderness stewardship.

This alternative partially meets the project and BMP objectives of protecting wilderness resources and enhancing visitor enjoyment. It does not achieve the goal of making the three ranger stations fully operational for wilderness stewardship. It does not provide a sustainable solution for long-term wilderness administration and resource management.

ALTERNATIVE 3: REPLACE RANGER STATIONS WITH NEW STRUCTURES (PREFERRED ALTERNATIVE)

Construction would have a short-term adverse effect on wilderness operations and visitor services, since rangers would be operating out of tent stations during construction, which requires more time to properly secure food from wildlife and to secure equipment from possible vandalism when away from the station.

Compared to the no-action alternative and assuming historic staffing levels of one ranger per patrol area, the presence of wilderness ranger stations allow rangers to be in the wilderness approximately 98 days out of a 98-day patrol season in their primary patrol area. Depending on the station, each ranger would contact and educate between 1,100 and 4,200 visitors per season. Each ranger would patrol approximately 600 to 1,000 miles of trail in their primary patrol area. Trail patrols allow rangers to carry out the parks' wilderness stewardship mandate by contacting visitors, cleaning camps, and reporting on resource and safety conditions.

A station that would have less need for continued repair efforts would have a moderate and long-term beneficial effect on the parks' ability to more effectively carry out their mandate for wilderness stewardship actions and appropriate visitor services. This alternative would allow rangers to spend less than 1 week per season on maintenance tasks and to contact and educate approximately 210 to 700 more visitors per season compared to the no-action alternative, as well as patrolling approximately 40 to 70 more miles of trail from each station. Trail patrols allow rangers to carry out the parks' wilderness stewardship mandate by contacting visitors, cleaning camps, and reporting on resource and safety conditions.

Cumulative Impacts

The impacts of this alternative, including the replacement and the continued use of wilderness ranger stations, would result in beneficial effects on wilderness operations and stewardship activities from the continued existence of wilderness ranger patrols in those areas. The use of helicopters during the removal operation would in the short term add to the overall adverse effects from the use of helicopters for ongoing park operations, but this impact would be short term. This alternative would maintain a ranger

presence in these areas, and would result in increased patrol time due to decreased maintenance on the stations. Overall, the cumulative effects to ongoing park operations in wilderness would be long-term and beneficial.

Conclusion

Under this alternative, there would be helicopter and stock use to replace the ranger stations at Le Conte, Rae Lakes, and Crabtree. Compared to the no-action alternative, there would be fewer repairs needed on the three ranger stations and more time devoted to wilderness administration and protection. Such actions would have a long-term and beneficial effect on the parks' ability to carry out their mandate for wilderness stewardship.

Wilderness resource management objectives are met by this alternative, since rangers would continue patrols from within the wilderness, allowing them to patrol more effectively, report on resource issues, and carry out maintenance of campsites and trails more efficiently. This alternative fully meets the objectives of the project and the parks' BMP. It provides a long-term and sustainable solution to providing necessary support for wilderness stewardship, administration, and resource management.

ALTERNATIVE 4: REMOVE RANGER STATIONS

Removal of the three wilderness ranger stations would mean that ranger patrols for the patrol areas around Le Conte, Rae Lakes, and Crabtree would begin at the nearest trailhead and would not be based in the wilderness. All supplies and equipment that the rangers need for the patrols would be carried by backpack or stock. When the rangers need supplies or equipment, they would return to the frontcountry. The patrol area of each station is a minimum of 1 day's hike into the wilderness. As such, a significant amount of a 7- to 10-day patrol period would be spent travelling to and returning from the patrol area, rather than hiking in the ranger's primary area of responsibility. Assuming historic staffing levels of one ranger for each patrol area, under this alternative, rangers' ability to effectively patrol, educate visitors, and manage, maintain, and evaluate resources would be severely limited.

Compared to the no-action alternative and assuming historic staffing levels of one ranger per patrol area, under this alternative it is estimated that rangers would be present 41 days of a total 98-day patrol season in their primary patrol areas. Depending on the station, each ranger would contact between 500 and 1,600 visitors per season and patrol approximately 250 to 410 miles of trail in their primary patrol area. Trail patrols allow rangers to carry out the parks' wilderness stewardship mandate by contacting visitors, cleaning camps, and reporting on resource and safety conditions.

Removing stations would mean there would be no contact point for visitors in the event of questions about weather or trail conditions, or if a visitor needed emergency assistance. From the center of each patrol area, visitors would travel 16 to 18 miles (8 to 9 hours) to the nearest trailhead to report incidents requiring a ranger. Removing the Crabtree Ranger Station would increase the danger to winter snow survey personnel and would violate an agreement with the State of California to allow a station in that area for snow survey use. Removing the Crabtree and Le Conte ranger stations would compromise the parks' ability to carry out winter management and patrol activities.

Cumulative Impacts

Existing facilities, trails, park operations, and periodic flights result in adverse and beneficial minor to moderate cumulative effects on wilderness operations. The impacts of this alternative, including the short-term demolition project and the removal of the structures, would result in adverse effects on wilderness operations and stewardship activities from the reduction of wilderness ranger patrols in those areas. The

use of helicopters during the removal operation would in the short term add to the overall adverse effects from the use of helicopters for ongoing park operations, but this impact would be short term. In the long term there would be no helicopters required to support the three stations, since they would be removed. Therefore, this alternative would not contribute to the overall cumulative effects from ongoing park activities and existing structures in wilderness and there would be no cumulative effects.

Conclusion

This alternative would result in a moderate and long-term adverse effect on the parks' ability to preserve wilderness resources around the Le Conte, Crabtree, and Rae Lakes patrol areas. There are no cumulative effects.

This alternative does not meet the project objectives or the BMP objectives of protecting wilderness resources and enhancing visitor enjoyment. It does not achieve the goal of making ranger stations fully operational for wilderness stewardship (i.e., resource protection, visitor protection, and education).

SCENIC RESOURCES

METHODOLOGY

It is NPS policy to preserve, to the greatest extent possible, the natural landscapes and visual qualities of parks. Sequoia and Kings Canyon National Parks have developed aesthetic guidelines for park buildings. The parks' *Architectural Character Guidelines* for building design stipulate that

...new construction must be sensitive to its context. It must defer to and respect the natural setting. It should not be overly sophisticated nor should it create a sense of human domination over the landscape.

National parks are responsible for preserving the lightscape of a park as a scenic value. In accordance with *Management Policies 2006* (NPS 2006a) the NPS will preserve, to the greatest extent possible, the natural lightscape of parks, which are natural resources and values that exist in the absence of human-caused light. The stars, planets, and the moon, which are visible during clear nights, influence humans and many other species of animals, such as birds that navigate by the stars or prey animals that reduce their activities during moonlit nights.

The NPS will restrict the use of artificial lighting in parks to those areas where security, basic human safety, and specific cultural resource requirements must be met; use minimal-impact lighting techniques; and shield artificial lighting where necessary to prevent the disruption of the night sky, natural cave processes, physiological processes of living organisms, and other similar natural processes.

Impact analysis for scenery and structures evaluated the distance and viewing conditions under which changes would be visible and the number of viewers that would be affected, the landscape character and any changes to the existing visual character and lightscape, important or historical viewpoints, and aesthetics of a structure in a wilderness location and how it blends in with its environment according to the *Architectural Character Guidelines* of Sequoia and Kings Canyon National Parks. This is difficult to analyze, as individuals may have differing opinions on the level of visual intrusions and what structures are appropriate in wilderness and park areas, so many of the effects are qualitative and dependent on visitor expectations (see Table 11).

Table 12. Scenic Resources Impact and Intensity Descriptions

Impact Intensity	Intensity Description
Negligible	No changes to existing scenic resources from the alternative would occur or effects would be below or at the lower levels of detection. Any effects would be considered slight and short term.
Minor	Effects on scenic resources would be detectable to some visitors, but they would be localized and would not affect landscape character or important viewpoints.
Moderate	Effects on scenic resources would be readily detectable, long term, and localized. These effects would result in a change noticeable to many visitors but would not result in substantial changes to landscape character or important viewpoints.
Major	The effects on visual resources would be readily apparent to a large number of visitors, they would be long term, and they would result in substantial changes to landscape character or important viewpoints.

Short-term—occurs only during project construction.

Long-term—continues after project construction.

ALTERNATIVE 1: NO ACTION

There would be no new impacts on the visual landscape character or important viewpoints. However, wilderness stations would continue to deteriorate and would not be in compliance with the parks' *Architectural Character Guidelines*. All of the stations are at least partially visible to thousands of park users on the JMT/PCT. The Le Conte and Crabtree ranger stations are visible up to about 100 feet away on the John Muir Trail and to visitors who camp nearby, or those who specifically seek out the stations. The stations would continue to have a localized moderate and long-term impact on the natural scenery. At Le Conte Ranger Station and Crabtree Ranger Station, no important or historic viewpoints would be affected by the continued present of ranger stations.

The Rae Lakes Ranger Station would continue to be offensive to visual aesthetics with its green tarp, exterior storage boxes, and rodent-chewed exterior. The green tarp of the Rae Lakes station is distinctly visible from Glen Pass, about 1.75 miles away. When the tent is lighted at night, the glow has a short-term minor adverse effect on night sky pollution. It is visible from Glen Pass and many points above the station. Eventually, as the ranger station at Rae Lakes deteriorates and is closed to park operations, the station would likely molder in the long term, creating adverse visual impacts on some visitors and positive visual impacts on others, depending on their individual perceptions and opinions.

By the nature of their purpose, ranger stations are sought out by visitors seeking information and aid. While visitors may detect the stations, it is likely that there would be a mixed reaction to the stations, and some effects would be beneficial and some adverse.

Cumulative Impacts

Wilderness travelers in Sequoia and Kings Canyon National Parks are likely to expect views of pristine landscapes on the horizon with little evidence of human-constructed facilities. Within the parks' wilderness, structures that have the potential to impact scenic resources include existing ranger stations, cultural structures, and radio antennas to support law enforcement and emergency operations. An additional assumption is that trail facilities, abundant in the parks, having existed for many years, are expected by visitors. Since there would be no change to existing scenic resources under this alternative, there would be no cumulative impacts.

Conclusion

There would be no change to the existing scenic resources. Ranger stations would continue to be present at Le Conte, Rae Lakes, and Crabtree, resulting in long-term minor to moderate adverse effects on scenic resources. There would be no cumulative effects. There would be no impairment of or unacceptable impacts on the parks' scenic resources or values under this alternative.

ALTERNATIVE 2: REPAIR AND REHABILITATE EXISTING RANGER STATIONS AT EXISTING SITES

No rehabilitation of the Le Conte Ranger station would take place under this alternative and the environmental consequences would be the same as under the no-action alternative.

At Rae Lakes Ranger Station, a new tent frame covered by a canvas tent would continue to be a local aesthetic intrusion on visual resources because it would not comply with the parks' *Architectural Character Guidelines* for rustic structures. The Rae Lakes Ranger Station is visible from the John Muir Trail and the Pacific Crest Trail about 100 feet away. In addition, it is visible from Glen Pass, about 1.75 miles away. Attempts have been made in the past to find a supplier of canvas with a color more compatible with wilderness aesthetics, but no better colors (than green) have been found.

At Crabtree Ranger Station, the structure would be sided with natural log materials and colors that blend with the environment as per the *Architectural Character Guidelines* for rustic structures. There would be localized long-term beneficial impacts on scenic resources for some viewers, as the station would blend in better with the natural environment. However, regardless of the improvements, some visitors may still view the station as a visible eyesore. The Crabtree station is visible up to about 100 feet away on the John Muir Trail and is also visible to visitors who camp nearby, and those who specifically seek out the station. At Crabtree, no important or historic viewpoints would be affected by the continued present of the ranger station.

By the nature of their purpose, ranger stations are sought out by visitors seeking information and aid. While visitors may detect the stations, it is likely that there would be a mixed reaction to the stations, and some effects would be beneficial and some adverse.

Cumulative Impacts

Since there would be only minimal changes to existing scenic resources under this alternative, there would be no cumulative impacts.

Conclusion

There would be minimal changes to the existing scenic resources related to a slight improvement to the aesthetic qualities of the Crabtree Ranger Station. Ranger stations would continue to be present at Le Conte, Rae Lakes, and Crabtree, resulting in long-term minor to moderate adverse effects on scenic resources. There would be no cumulative effects. There would be no impairment of or unacceptable impacts on the parks' scenic resources or values under this alternative.

ALTERNATIVE 3: REPLACE RANGER STATIONS WITH NEW STRUCTURES (PREFERRED ALTERNATIVE)

The new ranger stations would be designed of natural log materials and colors that blend with the environment to meet the park *Architectural Character Guidelines* and wilderness aesthetics. The

construction style would be specifically designed to blend in with the wilderness environment. There would be localized long-term beneficial impacts on scenic resources to some viewers, as the stations would blend in better with the natural environment. However, regardless of the improvements, some visitors may still view the stations as visible eyesores.

Le Conte Ranger Station and Crabtree Ranger Station are visible up to about 100 feet away on the John Muir Trail. Those stations would be briefly visible to visitors who camp nearby, and those who seek out the station for information. At Le Conte and Crabtree ranger stations, no important or historic viewpoints would be affected. The Rae Lakes Ranger Station is also visible from the John Muir Trail about 100 feet away, and it is visible from Glen Pass, about 1.75 miles away. While visitors may detect the stations, it is likely that there would be a mixed reaction to the stations, and some effects would be beneficial and some adverse.

Cumulative Impacts

The new stations would be designed to blend in with the wilderness setting, resulting in a beneficial effect on scenic resources (depending on visitor expectations). However, because the structures would continue to exist and there would be only minimal changes to existing scenic resources under this alternative, there would be no cumulative impacts.

Conclusion

There would be minimal changes to the existing scenic resources related to a slight improvement to the aesthetic qualities of the three ranger stations. Ranger stations would continue to be present at Le Conte, Rae Lakes, and Crabtree, resulting in long-term minor to moderate adverse effects on scenic resources. There would be no cumulative effects. There would be no impairment of or unacceptable impacts on the parks' scenic resources or values under this alternative.

ALTERNATIVE 4: REMOVE RANGER STATIONS

There would be localized moderate long-term beneficial impacts on scenic resources in the several hundred feet where the stations are visible from the John Muir Trail and the Pacific Crest Trail because the stations would be removed and the sites would be rehabilitated. Site rehabilitation efforts would result in minor and short-term visual impacts until the area becomes naturalized over time. As the area is restored, the resulting effects on visual resources would be long term and beneficial. The Rae Lakes Ranger Station would no longer be visible from the view at the top of Glen Pass.

Cumulative Impacts

Since there would be only beneficial effects on existing scenic resources under this alternative, there would be no adverse cumulative impacts.

Conclusion

There would be long-term beneficial effects on the existing scenic resources related to the removal of the three ranger stations and the site restoration. There would be no cumulative effects. There would be no impairment of or unacceptable impacts on the parks' scenic resources or values under this alternative.

NATURAL SOUNDSCAPES

METHODOLOGY

NPS *Management Policies 2006* (NPS 2006a), state that “the National Park Service will preserve, to the greatest extent possible, the natural soundscapes of parks.” The policies require the restoration of degraded soundscapes to the natural condition whenever possible, and the protection of natural soundscapes from degradation due to unnatural sounds (noise). The NPS is specifically directed to “take action to prevent or minimize all noise that, through frequency, magnitude, or duration, adversely affects the natural soundscape or other park resources or values, or that exceeds levels that have been identified as being acceptable to, or appropriate for, visitor uses at the sites being monitored.” Overriding all of this is the fundamental purpose of the national park system, established in law (e.g., 16 U.S.C. 1 et seq.), which is to conserve park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adverse impacts on park resources and values.

Noise can adversely affect park resources by modifying or intruding upon the natural soundscape, and can also interfere with sounds important for animal communication, navigation, mating, nurturing, predation, and foraging functions. Noise can also adversely affect park visitor experiences by intruding upon or disrupting experiences of solitude, serenity, tranquility, contemplation, or a completely natural or historical environment. The methodology used to assess noise impacts in this document is consistent with NPS *Management Policies 2006* (NPS 2006a) and *Director’s Order 47: Soundscape Preservation and Noise Management* (NPS 2000).

Context, time, and intensity together determine the level of impact for an activity. It is usually necessary to evaluate all three factors together to determine the level of noise impact. In some cases an analysis of one or more factors may indicate one impact level, while an analysis of another factor may indicate a different impact level, according to the criteria below (Table 12). In such cases, best professional judgment based on a documented rationale must be used to determine which impact level best applies to the situation being evaluated.

Table 13. Soundscapes Impact and Intensity Descriptions

Impact Intensity	Intensity Description
Negligible	Natural sounds would prevail. Effects on the natural sound environment would be at or below the level of detection and such changes would be so slight that they would not be of any measurable or perceptible consequence to the visitor experience or to biological resources.
Minor	Natural sounds would prevail. Effects on natural sound would be localized and short term and would be small and of little consequence to the visitor experience or to biological resources. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Natural sounds would prevail, but activity noise could occasionally be present at low to moderate levels. Effects on the natural sound environment would be readily detectable, localized, and short term or long term, with consequences at the regional or population level. Human-generated noise would be occasionally heard during the day. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
Major	Natural sounds would be impacted by activity noise frequently for extended periods of time. Effects on the natural sound environment would be obvious and long term, and would have substantial consequences to the visitor experience or to biological resources in the region. Extensive mitigation measures would be needed to offset any adverse effects and success would not be guaranteed.

Short-term—effects would only be evident during project work.

Long-term—effects would occur after project work ends.

National literature was used to estimate the average decibel levels of the activity. Areas of use by visitors were identified in relation to where the activity is proposed. Personal observations from park staff and monthly use reports were used to identify these areas. Other considerations, such as topography and prevailing winds, were then used to identify areas where noise levels could be exacerbated or minimized. The thresholds of change for the intensity of an impact on soundscapes are defined below (Table 12).

ALTERNATIVE 1: NO ACTION

There would be a slight change to existing conditions as a result of this alternative. As the stations deteriorate, more materials would need to be brought in infrequently in the future to maintain them structurally, and increased maintenance would be required. Some of these materials would be too large for stock transport and would require an occasional helicopter flight. Generally Type III helicopters would be used for any delivery of supplies and materials too heavy to be transported by pack or stock. There would be infrequent use of power tools when they are determined to be the minimum tool for the project work.

The resulting disturbance to the natural soundscape would be minor, short term, and adverse in and adjacent to the flight path to the project site and in the areas around the ranger stations from the helicopter and from the use of mechanized tools.

Cumulative Impacts

From May through October the park has a helicopter based at park headquarters for use in fire management activities, SAR, and support of park wilderness management activities. Except for SARs, most helicopter operations are completed in less than 30 minutes at the operation site. The helicopter normally based at Sequoia and Kings Canyon National Parks is classified as a light helicopter (Type 3). There is an average of 288 hours of planned and unplanned hours of helicopter flight time per year within and outside wilderness.

Other park operations that produce human-generated noise in the wilderness include trail maintenance activities, where mechanized and non-mechanized tools may be used depending on the circumstances. Rarely does blasting occur in the park, but it is possible when conditions warrant. The noise of crews working and talking can adversely impact the natural soundscape.

Outside sources of noise include military and commercial overflights, which occur periodically over the parks. Rangers are responsible for reporting violations of military aircraft flying below 3,000 feet above ground level over the wilderness areas of the park. The parks work closely with command staff at Edwards Air Force Base to reduce and eliminate such violations of military regulations. The noise created by these low-level flights is an intrusion on the natural soundscapes.

As patrol time is reduced under this alternative, noise violations might increase as a result. Rangers also routinely speak to large groups and emphasize the importance of traveling and camping quietly in wilderness. They also respond to noise complaints by visitors who are disturbed by boisterous noise often made by youth groups. As patrol time is reduced, enforcement of noise violations would be reduced, resulting in short- and long-term minor adverse cumulative effects.

Overall cumulative effects from existing activities are short term and long term, minor to moderate, and adverse. This alternative would not add to the cumulative effects.

Conclusion

Under this alternative, natural soundscapes would continue to be adversely affected by helicopter use and the use of mechanized tools at the ranger station. The infrequent use of helicopter and mechanized tools would result in minor short-term adverse impacts in and adjacent to the flight paths to the project sites and in the areas around the ranger stations. Decreased visitor education could result in additional noise violations, resulting in long-term minor adverse cumulative effects. Overall, natural sounds would continue to prevail in the majority of the parks' wilderness, and the no-action alternative would be of little consequence to park visitors or biological resources, resulting in short- and long-term negligible to minor adverse effects on the natural soundscape.

Because the impacts would be minor and short term, there would be no impairment of or unacceptable impacts on the parks' resources or values under this alternative.

ALTERNATIVE 2: REPAIR AND REHABILITATE EXISTING RANGER STATIONS AT EXISTING SITES

No rehabilitation of the Le Conte Ranger Station would take place under this alternative. Le Conte Ranger Station would remain unchanged, and the environmental consequences would be the same as under the no-action alternative.

At Rae Lakes and Crabtree during the construction period of approximately 10 to 12 weeks, there would be additional work crews at the project sites, and the voices of the construction crew might be heard nearby throughout the duration of the project. During the project, human-generated noise would be heard periodically for about 2 weeks total, including the use of a generator, compressor, and power tools. Noise would be generated for about a week by the use of a cement mixer running, powered by the generator and occasional use of pneumatic tools. Several hours of infrequent chainsaw use is likely to occur during project work.

Delivery of material by helicopter would have a minor to moderate short-term adverse effect on park soundscapes during travel, takeoff, and landing. Material delivery flights are expected to be done in a 1-week operational period and to be last a total of 40 minutes per flight. This would result in minor to moderate short-term adverse impacts on natural soundscapes in the area. In the long term, as the number of flights for ranger station maintenance at these locations decreases, there would be minor long-term beneficial impacts as less equipment use and fewer helicopter flights are necessary for maintaining these facilities.

Cumulative Impacts

This project would add human-generated noise to the natural soundscape in a limited portion of the parks' wilderness during project work. Other human-generated noise could occur as a result of park projects, park visitors, and military and commercial overflights. The existing and future human-generated noise would result in minor to moderate adverse cumulative effects. This project would add human-generated noise in the short term, but in the long term would result in decreased flights and would not add to the overall cumulative effects.

Conclusion

Although there would be short-term adverse minor impacts associated with construction noise and helicopter flights in the project area, natural sounds would continue to prevail throughout most of the parks' wilderness area.

Because the impacts would be minor and short term, there would be no impairment of or unacceptable impacts on the parks' resources or values.

ALTERNATIVE 3: REPLACE RANGER STATIONS WITH NEW STRUCTURES (PREFERRED ALTERNATIVE)

During the construction period of approximately 7 to 9 weeks, there would be additional work crews at the project sites, and the voices of the construction crew might be heard close to the project site throughout the duration of the project. During the project, human-generated noise would be heard periodically for about 2 weeks total, including the use of a generator, compressor, and power tools. Noise would be generated for about a week by the use of a cement mixer running, powered by the generator, and occasional use of pneumatic tools. Several hours of infrequent chainsaw use is likely to occur during project work.

Delivery of material by helicopter would have a minor to moderate short-term adverse effect on park soundscapes during travel, takeoff, and landing. Material delivery flights are expected to be done in a 1-week operational period and to last about 40 minutes per flight. This would result in minor to moderate short-term adverse impacts on natural soundscapes in the area. In the long term, as the number of flights for ranger station maintenance at these locations decreases, there would be long-term beneficial impacts as less equipment use and fewer helicopter flights are necessary for maintaining these facilities.

Cumulative Impacts

This project would add human-generated noise to the natural soundscape in a limited portion of the parks' wilderness during project work. Other human-generated noise could occur as a result of park projects, park visitors, and military and commercial overflights. The existing and future human-generated noise would result in minor to moderate adverse cumulative effects. This project would add human-generated noise in the short term, but in the long term would result in decreased flights and less equipment needed to maintain the structures, and would not add to the overall cumulative effects.

Conclusion

Although there would be short-term adverse minor impacts associated with construction noise and helicopter flights in the project area, natural sounds would continue to prevail throughout most of the parks' wilderness area.

Because the impacts would be minor and short term, there would be no impairment of or unacceptable impacts on the parks' resources or values.

ALTERNATIVE 4: REMOVE RANGER STATIONS

Under this alternative, there would be additional work crews at the project sites, and the voices of the construction crew might be heard in and adjacent to the project areas throughout the 3-week duration of the project per site. During the project, human-generated noise would be heard from the tools and equipment necessary for demolition, and from the use of helicopters. Under this alternative, noise would be limited to voices, hand tools, a cordless drill, and the sound of demolition. It is also possible that a generator would be needed sporadically during the demolition period to deliver power to some corded tools.

Delivery of supplies and removal of demolition debris by helicopter would have a minor short-term adverse effect on soundscapes during travel, takeoff, and landing. This would result in a minor short-term

adverse impact on area natural soundscapes. Once the stations are removed, there would be long-term beneficial effects on natural soundscapes from the removal of focal points of visitor activity and human-generated noise. As supplies would no longer be delivered by helicopter or packstock to these ranger stations, and periodic maintenance would no longer be necessary, there would be long-term beneficial effects on the natural soundscapes in the project areas.

Cumulative Impacts

This project would add human-generated noise to the natural soundscape in a limited portion of the parks' wilderness during project work, but would remove a source of noise in the long term, resulting in beneficial effects on the park soundscape. Other human-generated noise could occur as a result of park projects, park visitors, and military and commercial overflights. The existing and future human-generated noise would result in minor to moderate adverse cumulative effects. This project would remove human-generated noise in the long term and would not add to the cumulative effects.

Conclusion

Although there would be short-term adverse minor impacts associated with construction noise and helicopter flights in the project area, long-term beneficial effects will result from removing a source of human-generated noise, resulting in improved conditions. Natural sounds would continue to prevail throughout most of the parks' wilderness area.

Because the impacts would be minor and short term, there would be no impairment of or unacceptable impacts on the parks' resources or values.

CULTURAL RESOURCES

METHODOLOGY

The NPS *Management Policies 2006* (NPS 2006a), section 5.3.1 states that the NPS 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. The NPS will provide for the long-term preservation of, public access to, and appreciation of the features, materials, and qualities contributing to the significance of cultural resources (NPS 2006a, 5.3.5).

The NHPA and its implementing regulations (*Protection of Historic Properties*, 36 CFR 800) require federal agencies to address impacts on "significant" cultural resources only. Significant cultural resources are those that meet one of the criteria found at 36 CFR 60.4, stated as:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and

- a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
- b) that are associated with the lives of persons significant in our past; or
- c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic

values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

- d) that have yielded, or may be likely to yield, information important in prehistory or history.

The application of the criteria is done through a Determination of Eligibility, with significant sites, buildings, structures, etc. being identified as eligible for listing in the *National Register of Historic Places* (NRHP). Ideally, the NRHP nomination process leads to an actual listing in the NRHP. Resources that have been formally determined eligible but that are not yet listed are nevertheless managed the same as are listed resources. Similarly, cultural resources that have not yet been evaluated for NRHP eligibility are treated as “potentially eligible” pending their evaluation. No further efforts are required for those cultural resources that do not meet any of the significance criteria.

The NHPA requires agencies to take into account the effects of their actions on properties listed or eligible for listing in the NRHP. The process begins with identification and evaluation of cultural resources for NRHP eligibility, followed by an assessment of effects on eligible resources. In California, this process includes consultation with the state historic preservation officer. If an action could change in any way the characteristics that qualify the resource for inclusion in the NRHP, it is considered to have an effect. *No adverse effect* means there could be an effect, but the effect would not be harmful to the characteristics that qualify the resource for inclusion in the NRHP. *Adverse effect* means the action could diminish the integrity of the characteristics that qualify the resource for the NRHP.

Mitigation options are addressed according to the pertinent laws and policies governing cultural resources, using management methods that are consistent with the preservation of historic character and values. These laws include the *Antiquities Act of 1906* (16 U.S.C. 431–433) and the *Historic Sites Act of 1935* (as amended, 16 U.S.C. 461–467), as well as subsequent historic preservation legislation (e.g., NHPA, the *Archaeological Resources Protection Act of 1979*, 16 U.S.C. 470aa-mm; P.L. 96-95 and the *Native American Graves Protection and Repatriation Act of 1990*, 25 U.S.C. 3001–3013; P.L. 101-601).

The information used in this assessment was obtained from relevant literature and documentation, maps, consultation with park archeologists, and site visits. For the purposes of this analysis, the intensity of impacts on cultural resources is defined below.

Crabtree and Rae Lakes Ranger Stations

Previous cultural resource surveys done at the areas around the Crabtree and Rae Lakes Ranger Stations have not found any evidence of prehistoric or historic use within 300 feet of those structures. Neither of the two structures is potentially historic because they are less than 50 years of age. Therefore, there would be no impacts on archeological resources from any of the alternatives at Crabtree or Rae Lakes ranger stations, and these areas will not be further evaluated.

Le Conte Ranger Station

The Le Conte structure is less than 50 years old and is not potentially historic. However, the parks’ archeologist has determined that the immediate area under and around the Le Conte Ranger Station is a potentially significant prehistoric site (T. Burge, pers. comm.). As such, the Le Conte Ranger Station is the only site considered for the detailed analysis of impacts on archeological and historic resources.

Table 14. Cultural Resources Impact and Intensity Descriptions

Impact Intensity	Intensity Description
Negligible	The effects on cultural resources would be at the lowest levels of detection, barely measurable without any perceptible consequences, and either beneficial or adverse to cultural landscape resources, historic buildings or structures, or archeological resources. For the purposes of section 106 of the NHPA, the determination of effect would be <i>no adverse effect</i> .
Minor	The effects on cultural resources would be perceptible or measurable, but would be slight and localized within a relatively small area. The action would not affect the character or diminish the features of an NRHP eligible or listed cultural landscape, historic structure, or archeological site, and it would not have a permanent effect on the integrity of any such resources. For the purposes of section 106 of the NHPA, the determination of effect would be <i>no adverse effect</i> .
Moderate	The effects would be perceptible and measurable. The action would change one or more character-defining features of a cultural resource, but would not diminish the integrity of the resource to the extent that its NRHP eligibility would be entirely lost. For the purposes of section 106 of the NHPA, the cultural resource's NRHP eligibility would be threatened; the determination of effect would be <i>adverse effect</i> . An MOA would be executed between the NPS and the applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b). Measures identified in the agreement to minimize or mitigate adverse impacts would reduce the intensity of impact under NEPA from major to moderate.
Major	The effects on cultural resources would be substantial, discernible, measurable, and permanent. For NRHP eligible or listed cultural landscapes, historic structures, or archeological sites, the action would change one or more character-defining features, diminishing the integrity of the resource to the extent that it would no longer be eligible for listing in the NRHP. For purposes of section 106, NRHP eligibility would be lost; the determination of effect would be <i>adverse effect</i> . The NPS and the applicable state or tribal historic preservation officer and/or the Advisory Council are unable to negotiate and execute an MOA in accordance with 36 CFR 800.6(b).

The park archeologist has determined that this site contains midden deposits, as well as a variety of different stone tool types and raw materials. Given its diverse assemblage of cultural material, this site contains elements consistent with inclusion on the NRHP under criterion “d.” All areas surveyed are of sufficient cultural resource significance that mitigation measures would have to be taken in conjunction with any ground disturbance in the area. Because there is the potential for ground disturbance in all of the alternatives, including the no-action alternative, mitigation measures have been developed for each one.

ALTERNATIVE 1: NO ACTION

There would be no new impacts at Le Conte as a result of this alternative. However, there could be ongoing impacts on the site from continued use of the ranger station. The ranger would continue to walk through the site to access the patrol cabin, access the outhouse, pile and use firewood, and generally perform the duties associated with wilderness patrols. Visitors are often in the area of the patrol cabin in order to obtain assistance from the patrol ranger. These actions would continue to have ongoing impacts through trampling on the lithic scatter surrounding the existing patrol cabin.

In the case of these archeological resources, mitigation measures to prevent further degradation of these artifacts would be necessary. These would include the following:

Keep all current impacts (e.g., informal pathways, firewood piles, stock use) to existing areas.

Prevent digging and ground disturbance within a 100-foot radius of the existing station. The parks' archeologist would be consulted if any new ground disturbance is proposed within the 100-foot radius.

Provide employees assigned to the station a briefing from the parks' archeologist regarding the known limits of the site, the need to prevent impacts on the site, and the associated cultural resource management regulations.

In the event that previously unknown cultural resources are encountered, the parks' archeologist would be contacted immediately.

With these mitigation measures, the impact level from the no-action alternative would be reduced to long term, minor, and adverse. The NHPA section 106 determination would be *no adverse effect*.

Cumulative Impacts

There are no known or reasonably foreseeable other actions that would impact cultural resources in the area.

Conclusion

The no-action alternative would result in long-term minor and adverse effects. The NHPA section 106 determination would be *no adverse effect*. There would be no impairment of or unacceptable impacts on the parks' resources or values under this alternative.

ALTERNATIVE 2: REPAIR AND REHABILITATE EXISTING RANGER STATIONS AT EXISTING SITES

Under this alternative, no rehabilitation of the existing ranger station at Le Conte would take place with respect to any foundation work or other ground-disturbing activity within the station's current footprint. Le Conte Ranger Station would remain largely unchanged, and the environmental consequences would be the same as under the no-action alternative discussed above. There would continue to be a ranger and visitors working in and walking on the site, causing ongoing impacts to the artifacts. The same mitigation measures that were listed for the no-action alternative would be applied to this alternative. With mitigation, the impact level would be long term, minor, and adverse. The NHPA section 106 determination would be *no adverse effect*.

Cumulative Impacts

There are no known or reasonably foreseeable other actions that would impact cultural resources in the area.

Conclusion

This alternative would result in long-term minor adverse effects. The NHPA section 106 determination would be *no adverse effect*. There would be no impairment of or unacceptable impacts on the parks' resources or values under this alternative.

ALTERNATIVE 3: REPLACE RANGER STATIONS WITH NEW STRUCTURES (PREFERRED ALTERNATIVE)

The existing Le Conte station would be removed and a new station would be constructed at a location approximately 100 feet south of the cultural site. At the new Le Conte site, a foundation wall would be dug that would require a trench about 2 feet deep and 14 inches wide beneath the approximately 12 × 16-foot perimeter of the station, removing no more than 15 cubic yards of fill. An archeologist would be on site during all ground-disturbing activities to monitor for the presence of buried archeological materials. All ground-disturbing activities would be stopped immediately upon the discovery of buried archeological materials and appropriate actions would be undertaken to protect and evaluate such finds. Additionally, the construction crew would be briefed on the presence and recognition of archeological materials.

The camp and access routes (paths) used by the construction crew would be surveyed for the presence of cultural resources and, if necessary, these potentially adverse impacts would be moved to avoid disturbing potentially significant sites or features. Once the construction phase is finished, there would be no new ground disturbances as a result of this alternative.

Cumulative Impacts

There are no known or reasonably foreseeable other actions that would impact cultural resources in the area.

Conclusion

Removing the ranger station and public use from the cultural site would result in long-term beneficial effects. In the short term, during project work, this alternative would result in minor adverse effects. The NHPA section 106 determination would be *no adverse effect*. There would be no impairment of or unacceptable impacts on the parks' resources or values under this alternative.

ALTERNATIVE 4: REMOVE RANGER STATIONS

Under this alternative, the existing ranger station at Le Conte would be removed and the area rehabilitated. An acceptable mitigation plan would be prepared in consultation with the SHPO to assure adequate protection of the prehistoric site during the operation. The plan would likely include the on-site presence of an archeologist during removal of the station and site rehabilitation. This alternative would have short-term minor adverse effects on a potentially significant cultural resource at Le Conte. However, removing the ranger station and public use from the area would result in long-term beneficial effects.

Cumulative Impacts

There are no known or reasonably foreseeable other actions that would impact cultural resources in the area.

Conclusion

Removing the ranger station and public use from the cultural site would result in long-term beneficial effects. In the short term, during project work, this alternative would result in minor adverse effects. The NHPA section 106 determination would be *no adverse effect*. There would be no impairment of or unacceptable impacts on the parks' resources or values under this alternative.

HEALTH AND SAFETY

METHODOLOGY

NPS *Management Policies 2006* (NPS 2006a) state that although there are limitations on the NPS ability to totally eliminate all hazards, the NPS will strive to provide a safe and healthful environment for visitors and employees, to protect human life and to provide for injury-free visits. Safety, for the purposes of this analysis, refers to the potential for each alternative to directly or indirectly inflict injury on park visitors and staff. The project alternatives have the potential to affect safety in two ways:

The availability of rangers in the wilderness could have an effect on staff and visitor safety.

There are inherent, direct risks associated with the use of helicopters for transport of materials, equipment, and supplies. Mitigation measures and compliance with required policies serve to reduce these risks; however, they can never be completely eliminated. Therefore, there is the potential for injury and loss of human life during these operations (see Table 14).

Table 15. Health and Safety Impact and Intensity Descriptions

Impact Intensity	Impact Description
Negligible	The impacts on visitor or staff safety would not be measurable or perceptible.
Minor	The effect would be detectable but short term, would be limited to a relatively small number of visitors or park staff at a localized area, and would not have an appreciable effect on public health and safety.
Moderate	The effects would be sufficient to cause a permanent change in forecasting accuracy or would be readily apparent and would result in substantial, noticeable effects on safety on a local scale on a short- or long-term basis.
Major	The impact on visitor or staff safety would be substantial. Effects would be readily apparent and would result in substantial, noticeable effects on safety on a regional scale and on a long-term basis.

Short-term—effects last one year or less.

Long-term—effects last more than one year.

ALTERNATIVE 1: NO ACTION

This alternative would not result in any change to visitor and staff health and safety in the short term. Rangers would continue to operate from the stations as they have done in the past. The tent frame at Rae Lakes Ranger Station would continue to present a hazard for personnel. Putting up and taking down the tent canvas in the spring and fall requires climbing on the tent frame. The wood is not structurally sound and nails protrude from many areas. The operation is hazardous to rangers. The sleeping loft at the rear apex of the tent has no ladder access, and rangers get to it by climbing onto a table and pulling themselves up into the sleeping area. The plywood platform and supports have been gnawed by rodents and are not structurally sound. Putting up and taking down the tent and moving equipment and supplies in and out for the season takes about 3 to 5 days at each end of the season. This reduces the time rangers have for

patrolling to assess environmental hazards, especially early in the season when snow and high water are most hazardous. The station would continue to be open to access from bears, allowing them the potential of getting food rewards and becoming human-dependent. Also, mice and other wildlife would continue to get in, exposing personnel to rodent-borne diseases. In the long term, the Rae Lakes station would deteriorate beyond repair and would be closed.

The Le Conte and Crabtree ranger stations would continue to exist and be maintained in the future. However, the stations would be structurally unsound and would not have adequate emergency entry or egress in the winter. The stations would not provide optimally safe conditions for California State Snow Survey personnel and rangers on winter patrols or SAR operations.

At the Le Conte and Crabtree stations, existing conditions create safety concerns year-round. Propane lines and tank locations do not meet health and safety codes, resulting in a moderate short- and long-term hazard to personnel.

Without major repairs, the stations would continue to deteriorate beyond the abilities of rangers to make small repairs, which may result in station closures and abandonment. Increasing time devoted to securing the stations would result in reduced patrol time to educate the public about area hazards. It would also affect the rangers' ability to respond to emergencies, resulting in a long-term minor to moderate adverse effect on park staff and public safety.

Cumulative Impacts

There are no known or reasonably foreseeable other actions that would result in cumulative impacts on health and safety when combined with this alternative.

Conclusion

The no-action alternative would result in short- and long-term moderate adverse effects on health and safety for park personnel and the public at Rae Lakes. At Crabtree and Le Conte, there would continue to be short- and long-term minor adverse effects on park personnel and public safety.

ALTERNATIVE 2: REPAIR AND REHABILITATE EXISTING RANGER STATIONS AT EXISTING SITES

Under this alternative, the Le Conte Ranger Station would receive only routine repair work similar to the no-action alternative. The environmental consequences would be the same as under the no-action alternative discussed above.

The Rae Lakes Ranger Station would be reconstructed with a tent frame designed with safer access to the sleeping loft. Area staff would still be required to climb the structure twice yearly to place and remove the canvas tent at the top of the structure. The lumber would be more structurally sound with a rebuilt tent frame, but it would still be a hazardous operation and would take time away from ranger patrols. The use of a tent-frame structure requires additional time for seasonal mobilization and demobilization, taking about 3 to 5 days at each end of the season. This reduces the time rangers have for patrolling to assess environmental hazards, especially early in the season when snow and high water are most hazardous. The station would still not be secure from bears, mice, and other wildlife, potentially exposing personnel to rodent-borne diseases. The propane line would be secured and the tank enclosed to comply with health and safety standards. However, because bears and other large mammals could still gain access to the inside of the station, the lines would still be subject to damage.

The Crabtree Ranger Station would be structurally retrofitted and rehabilitated to secure the station and comply with the parks' *Architectural Character Guidelines*. The propane line would be secured and the tank enclosed to comply with health and safety standards. This would result in less short- and long-term maintenance required at the station, resulting in increased patrol time by area rangers to educate the public about area hazards.

None of the stations would be improved for safer winter emergency exit or access. While the Crabtree Ranger Station would be structurally retrofitted to support snow loads, emergency entry and egress would not meet health and safety standards in winter conditions.

There would be short-term construction-related hazards to park personnel lifting large timbers and using power tools and helicopters. These hazards would be mitigated by strict supervision, experienced and trained personnel, and adherence to the Job Hazard Analysis (park reviews safety standards and policies) for wilderness construction and maintenance.

Cumulative Impacts

There are no known or reasonably foreseeable other actions that would result in cumulative impacts on health and safety when combined with this alternative.

Conclusion

Under this alternative, conditions at Le Conte Ranger Station would remain the same and would continue to deteriorate over time, resulting in short- and long-term minor to moderate adverse effects on health and public safety within that patrol area.

The safety of park personnel would be improved in summer and fall at Rae Lakes and Crabtree. In general, repairing the Rae Lakes and Crabtree stations would result in reduced time spent by rangers on ranger station maintenance and repairs, more effective ranger operations, and improved food storage. However, at Rae Lakes, rangers would continue to spend time each season mobilizing and demobilizing the tent structure, taking time away from their patrol duties. Rangers would generally be able to spend more time patrolling trails throughout the summer because of reduced maintenance needs at the stations, noting area hazards and educating the public about hazards, resulting in short- and long-term beneficial effects on health and safety in those patrol areas.

ALTERNATIVE 3: REPLACE RANGER STATIONS WITH NEW STRUCTURES (PREFERRED ALTERNATIVE)

This alternative would provide structurally sound ranger stations engineered for a subalpine environment and designed specifically for effective ranger operations in both winter and summer at Le Conte, Rae Lakes, and Crabtree. At all of the stations, this would result in more time for ranger patrols and educating the public about area hazards.

The design would allow for more efficient and secure food storage, protected from bears and other wildlife. The new stations would be sealed to prevent rodent entry. The properly engineered stations would not be subject to collapse as a result of snow load and propping of the roof beams would not be necessary. A properly sized snow door at the apex of the roof line would allow for safe entry and egress in winter in the event of an emergency. The propane line would be secured and the tank enclosed to comply with health and safety standards.

There would be short-term construction-related hazards to park personnel lifting large timbers and using power tools and helicopters. These hazards would be mitigated by strict supervision, experienced and trained personnel, and adherence to the Job Hazard Analysis for wilderness construction and maintenance.

Cumulative Impacts

There are no known or reasonably foreseeable other actions that would result in cumulative impacts on health and safety when combined with this alternative.

Conclusion

Under this alternative, the safety of park personnel would be improved throughout the year due to improved conditions at the ranger stations. Overall, this alternative would result in long-term beneficial effects on the health and safety of park personnel and the public due to increased patrol times and education.

ALTERNATIVE 4: REMOVE RANGER STATIONS

Under this alternative, there would be fewer and shorter ranger patrols in the station patrol areas because there would be no base of operations. Rangers would not contact as many visitors as they do with a station as a base of operations. Rangers would not be able to assess and report on environmental hazards as frequently or in as timely a manner. Rangers would not be able to respond as quickly to emergencies. Visitors would have no marked and accessible contact point in the wilderness in the event of a medical or other emergency. Because a ranger station serves as a known point of contact and a link to trained medical personnel, it is estimated that rangers save one to three lives per season (combined) at the ranger stations under consideration. Alternative 4 would result in a higher probability of delayed treatment of injury, and could increase the likelihood of fatalities for park visitors.

Rangers hike between 400 and 800 miles per season. A ranger station serving as a base of operations allows them a place to recuperate from strenuous patrols and have access to the increased food needed to maintain health and efficiency.

Removing the Crabtree Ranger Station would greatly increase the danger to California State Snow Surveyors. The station is central to their winter data collection operation, and the distance between the other two outlying stations is too great to be skied safely without a shelter in between. Removing the Le Conte Ranger Station would expose rangers on winter patrols or SAR operations to greater risk.

Cumulative Impacts

There are no known or reasonably foreseeable other actions that would result in cumulative impacts on health and safety when combined with this alternative.

Conclusion

Under this alternative, the removal of ranger stations at these three locations would result in reduced patrol time, reduced ranger and emergency services, and less public education about risks in the patrol areas around the stations. In addition, there would be increased hazards associated with winter snow survey operations and the general patrol function related to increased distance and weight of patrols. This alternative would result in short- and long-term moderate adverse effects on park staff and public health and safety.

VISITOR EXPERIENCE AND RECREATION

METHODOLOGY

NPS *Management Policies 2006* (NPS 2006a) state that the enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks and that the NPS is committed to providing appropriate high-quality opportunities for visitors to enjoy the parks. Part of the purpose of the parks is to offer opportunities for recreation, education, inspiration, and enjoyment. Consequently, one of the parks' goals is to ensure that visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities.

The Sequoia and Kings Canyon BMP (NPS 1986a) states that the management objective for backcountry visitor recreation is to provide recreation featuring the opportunity for pastimes for which it is important that there be solitude, physical and mental challenges, and an environment where one depends on one's own abilities and knowledge. Use is managed to keep impacts on the resource and visitors at an acceptable level.

Each alternative was examined to determine its effect on visitor enjoyment of park resources and opportunities for recreation. Public scoping input and observation of visitation patterns, combined with assessment of what is available to visitors under current park management, were used to estimate the effects of the alternatives. The impact on the ability of the visitor to experience a full range of park resources was analyzed by examining resources and objectives presented in the park significance statements, as derived from its enabling legislation. The potential for change in visitor experience proposed by the alternatives was evaluated by identifying projected increases or decreases in access and other visitor uses, and determining whether or how these projected changes would affect the desired visitor experience, to what degree, and for how long (see Table 15).

Table 16. Visitor Experience and Recreational Opportunities Impact and Intensity Descriptions

Impact Intensity	Intensity Description
Negligible	Changes in visitor experience and recreational opportunities would be below or at the level of detection. The visitor would not likely be aware of the effects associated with the alternative.
Minor	Changes in visitor experience and recreational opportunities would be detectable, although the changes would be slight. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.
Moderate	Changes in visitor experience and opportunities would be readily apparent. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.
Major	Changes in visitor experience and opportunities would be readily apparent and severely adverse or exceptionally beneficial. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.

Short-term—occurs only during project work.

Long-term—continues after project work.

Analysis was based on whether there would be a loss of a recreation opportunity, a change in access to or availability of a recreation opportunity, or a change in the aggregate of recreation opportunities for the visitor and the degree to which each alternative affects those opportunities.

ALTERNATIVE 1: NO ACTION

In the short term, there would be no changes in recreational opportunities under the no-action alternative. As the stations continue to deteriorate and rangers spend more time maintaining them, rangers would not be able to devote as much time to visitor education and resource protection. Eventually the Rae Lakes station would become unusable. It is likely that visitors would be aware of reduced ranger contacts, but the effects would be slight, resulting in minor long-term adverse effects on visitor recreational experience and opportunities.

Cumulative Impacts

At any given time, there may be several projects underway in the park wilderness and in the vicinity of the ranger stations. Past projects include construction and periodic maintenance to existing wilderness ranger stations. There are also periodic trail maintenance projects that occurred in the past and are likely to occur in the future. Other wilderness activities include ranger patrols, research, and SAR operations. These types of activities generally do not affect park visitor experience and recreational opportunities unless there are closures associated with these activities, or the visitor's expectations of a wilderness experience are not met (see "Wilderness and Wilderness Operations"). There are no future foreseeable actions that would result in adverse effects on the visitor experience or recreational opportunities. Since there would be little noticeable change to visitor experience and recreational opportunities, there would be no cumulative effects associated with this alternative.

Conclusion

Under this alternative, the stations would continue to deteriorate, resulting in increased time spent by rangers for maintenance and repairs and decreased time spent on patrol and resource management activities, resulting in minor long-term adverse effects on visitors' recreational experience and opportunities. There would be no cumulative effects.

ALTERNATIVE 2: REPAIR AND REHABILITATE EXISTING RANGER STATIONS AT EXISTING SITES

No rehabilitation of the Le Conte station would take place in the event that alternative 2 is chosen. Le Conte Ranger Station would remain unchanged, and the environmental consequences would be the same as under the no-action alternative.

At Rae Lakes and Crabtree, in the short term there would be impacts on visitor use and recreational opportunities from construction-related activities. Access to the ranger stations would be restricted during the 10- to 12-week construction period, resulting in a noticeable change in public use of the area. Noise from the use of equipment and helicopters during the project would adversely impact some visitor experiences, while some visitors may not notice. The level of impact depends on visitor expectations, but since these ranger stations are located in wilderness, it is assumed that visitors to these areas have an expectation of finding solitude and an absence of human-generated noise. While visitors would be notified in advance of the potential for impacts on their recreational experience, some visitors may not learn of the project until they are on site. This could result in visitor dissatisfaction with their recreational experience. Therefore, the overall impact would be short term, moderate, and adverse.

In the long term, once the stations are rehabilitated, opportunities for recreation would be maintained or enhanced for visitors. Rangers would be able to devote more time to trail patrols, resource protection, and communicating with visitors. There would be minor long-term beneficial effects on visitor experience and recreation as rangers more effectively serve visitors' needs.

Cumulative Impacts

There are no known or reasonably foreseeable other actions that would result in cumulative impacts on visitor experience and recreational opportunities when combined with this alternative.

Conclusion

This alternative would result in short-term moderate adverse effects on visitor experience and recreational opportunities during the rehabilitation project work at Rae Lakes and Crabtree ranger stations. There would be long-term minor adverse effects in the Le Conte patrol area as additional repairs on the ranger station remove the rangers from their normal patrol functions. In the long term, after the rehabilitation is completed at Rae Lakes and Crabtree, normal patrol functions would resume, resulting in increased contact with visitors, improved resource protection, and an overall minor long-term beneficial effect on visitor experience and recreational opportunities. There would be no cumulative effects.

ALTERNATIVE 3: REPLACE RANGER STATIONS WITH NEW STRUCTURES (PREFERRED ALTERNATIVE)

At Le Conte, Rae Lakes, and Crabtree, in the short term there would be impacts on visitor use and recreational opportunities from construction-related activities. Public access to the ranger stations would be restricted during the 7- to 9-week construction period, resulting in a noticeable but short-term change in public use of the area. Noise from the use of equipment and helicopters during the project would adversely impact some visitor experiences, while some visitors may not notice. The level of impact depends on visitor expectations, but since the ranger stations are located in wilderness, it is assumed that visitors have an expectation of finding solitude and an absence of human-generated noise. While visitors would be notified in advance of the potential for impacts on their recreational experience, some visitors may not learn of the project until they are on site. This could result in visitor dissatisfaction with their recreational experience. Therefore, the overall impact from construction would be short term and long term, moderate, and adverse.

In the long term, once the stations are rehabilitated, opportunities for recreation would be maintained at their current levels or enhanced for visitors. Rangers would be able to devote more time to trail patrols, resource protection, and communicating with visitors. There would be long-term minor beneficial effects on visitor experience and recreational opportunities as rangers more effectively serve visitors' needs.

Cumulative Impacts

There are no known or reasonably foreseeable other actions that would result in cumulative impacts on visitor experience and recreational opportunities when combined with this alternative.

Conclusion

This alternative would result in short-term moderate adverse effects on visitor experience and recreation during the project work at Le Conte, Rae Lakes, and Crabtree ranger stations. In the long term, after the new stations are completed normal patrol functions would resume, resulting in increased contact with visitors, improved resource protection, and an overall minor long-term beneficial effect on visitor experience and recreation. There would be no cumulative effects.

ALTERNATIVE 4: REMOVE RANGER STATIONS

Under this alternative, patrol functions normally based out of the three ranger stations would no longer occur. Instead, rangers would travel from the trailheads to accomplish their duties, requiring at least 2 extra days of travel per tour of duty (normally 10 days). This would result in reduced visitor contacts in the patrol areas around the ranger stations. Rangers would be less able to contact and educate visitors, maintain wilderness camps, and patrol and report on resource conditions in the more remote sections of their patrol areas. Visitors would not have a known location to contact rangers for advice, emergency services, or other needs.

Visitors who require ranger services and have expectations of ranger patrols and stations in the wilderness would be adversely affected by the removal of the three ranger stations. However, wilderness users who have no expectations of such services and patrols would not be affected, and those who deem these structures and patrol functions unnecessary would be positively affected by the reduction in ranger stations and ranger services. The level of effect varies with the expectations and needs of the visitor. Overall, the effect would be noticeable, long term, minor to moderate, and adverse and beneficial.

Cumulative Impacts

There are no known or reasonably foreseeable other actions that would result in cumulative impacts on visitor experience and recreational opportunities when combined with this alternative.

Conclusion

Depending on visitor expectations and needs, the removal of the three ranger stations would result in long-term minor to moderate adverse and beneficial effects on park visitor experience and recreational opportunities. There would be no cumulative effects.

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CONSULTATION AND COORDINATION

PUBLIC SCOPING

Public scoping occurred for this project starting on February 22, 2006, when Sequoia and Kings Canyon National Parks sent out a general press release (appendix C) to approximately 50 agencies, organizations, media representatives, and individuals on the parks' mailing list. Five comments were received during the 30-day public scoping period, which ended on March 24, 2006. All of the comments were generally in support of replacing or rehabilitating the existing ranger stations. In addition, Wilderness Watch forwarded the collected comments from an Internet discussion forum after the topic of the wilderness ranger stations was introduced on their website. Some commenters expressed concern about structures in wilderness, while others recognized the need, citing the importance of the ranger stations in SAR operations and protecting wilderness resources.

In addition, from 2005 to 2008, park staff discussed the project with several representatives from interest groups at various events to gain additional information on the project. While some organizations have philosophical issues with having ranger stations and structures in wilderness, some representatives stated that they generally understood the structures' value in improving the parks' ability to provide effective wilderness preservation and management.

Internal and interagency scoping was also conducted. This included park managers, ranger supervisors, and resource specialists in the park, as well as the USFS, USFWS, the California SHPO, the CDFG, and the California DWR.

CONSULTATION AND PERMITTING REQUIREMENTS

The NPS reviewed the special-status species list on the USFWS website in 2006 and 2009 (appendix F). The USFWS reviewed the preferred alternative pursuant to the ESA for possible impacts on the endangered Sierra Nevada bighorn sheep and the bald eagle (since delisted) and how they would be affected by the preferred alternative. They concurred with the parks' determination that the project *may affect, but would likely not adversely affect* either species.

No permits are required for any of the alternatives under consideration.

AGENCIES, ORGANIZATIONS, AND INDIVIDUALS CONSULTED

Agencies and organizations contacted to assist in identifying issues and provided with an opportunity to review or comment on this EA include, but are not limited to, the following.

FEDERAL AGENCIES

U.S. Fish and Wildlife Service

U.S. Geological Survey, Biological Resources Division, Western Ecological Research Center

USDA Forest Service: Inyo, Sequoia, and Sierra National Forests

CONGRESSIONAL REPRESENTATIVES

Senator Barbara Boxer

Senator Dianne Feinstein

The Honorable Cal Dooley

The Honorable Devin Nunes
Senator William J. “Pete” Knight
Senator Charles Poochigian
Assemblyman Mike Briggs

STATE AND LOCAL AGENCIES AND INDIVIDUALS OF CALIFORNIA

California State Historic Preservation Officer
California Department of Fish and Game
California Department of Forestry
California Department of Forestry and Fire Protection
Fresno County Board of Supervisors
Tulare County Board of Supervisors
Mr. Allen Ishida, District One Supervisor, Tulare County

AMERICAN INDIAN TRIBES, ORGANIZATIONS, AND INDIVIDUALS

Big Pine Paiute Tribe of the Owens Valley
Big Sandy Rancheria of Mono Indians
California Native American Heritage Commission
Cold Springs Rancheria of Mono Indians
Dunlap Band of Mono Indians
Fort Independence Indian Community of Paiute Indians
Kern Valley Indian Community
North Fork Rancheria of Mono Indians
Paiute–Shoshone Indians of the Bishop Community
Santa Rosa Rancheria
Sierra Foothill Waksachi Tribe
Sierra Nevada Native American Coalition
Table Mountain Rancheria
Tule River Indian Reservation
Wukchumni Tribal Council

OTHER GROUPS AND ORGANIZATIONS

California Preservation Foundation
Center for Biological Diversity, California and Pacific Office
Fresno Audubon Society
Friends of the Earth
High Sierra Hiker’s Association
Mineral King District Association
National Audubon Society
National Parks and Conservation Association
The Nature Conservancy, California Field Office
Sequoia Forest Alliance
Sierra Club
 Kern–Kaweah Chapter
 Sacramento Field Office
Sierra Forest Products
Tulare County Audubon Society
The Wilderness Society

Wilderness Watch
The Wildlife Society, San Joaquin Valley Chapter

AREA LIBRARIES

Tulare County Libraries
 Exeter Branch Library
 Lindsay Branch Library
Tulare County Law Library
Fresno County Libraries
 Central Branch Library
 Sunnyside Branch Library
 Fowler Branch Library
 Kingsburg Branch Library
 Orange Cove Branch Library
 Parlier Branch Library
 Reedley Branch Library
 Sanger Branch Library
 Selma Branch Library

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