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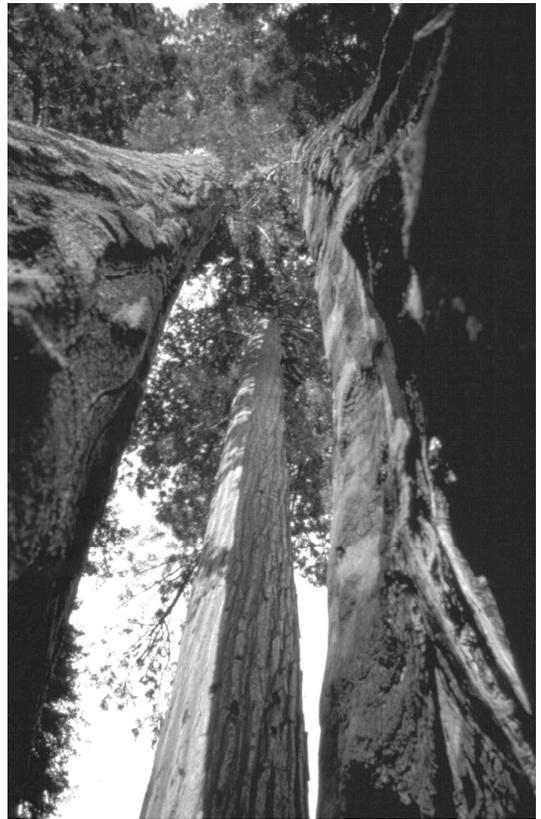
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# *Environmental Consequences*



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# Introduction

This part of the document analyzes the potential effects of the five management alternatives on natural resources, wild and scenic rivers, wilderness, cultural resources, transportation, visitor experiences, private land and special use permits, park operations, and the socioeconomic environment. These effects provide a basis for comparing the advantages and disadvantages of the alternatives.

The alternatives provide broad management directions; therefore, the environmental consequences can only be analyzed in qualitative terms. Thus, this environmental impact statement should be considered a programmatic analysis. Prior to undertaking specific developments or other actions as a result of the approved general management plan, park managers will have to determine the need to prepare more detailed environmental documents, consistent with the provisions of the National Environmental Policy Act.

The methodologies used in the impact analysis are described, including the definition of terms. The alternatives are then analyzed in the order they appear in the “Alternatives” chapter. Each impact topic describes the beneficial and adverse effects of the alternatives, as well as cumulative effects, if any. For the analysis of impacts, the planning team assumed that mitigating measures described in the alternatives, such as implementing measures to protect sensitive cave resources, would already have been taken.

At the end of the impact analysis is a discussion of unavoidable adverse effects, effects from short-term uses and long-term productivity, and irreversible and irretrievable commitments of resources. (The matrix at the end of the “Alternatives” chapter compares and summarizes the impacts of each alternative.)

## GENERAL METHODOLOGY FOR ANALYZING IMPACTS

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The following definitions were used to evaluate the context, intensity, duration, and cumulative nature of impacts associated with project alternatives:

- *Context* — Context is the setting within which an impact is analyzed. In this environmental impact statement the intensity of impacts is evaluated within a local and parkwide context, while the intensity of the contribution of effects to cumulative impacts are evaluated in a regional context (i.e., for the Sierra Nevada region).
- *Impact Intensity* — The impact intensity is the degree to which a resource is positively or negatively affected. Specific thresholds are defined for each impact topic. Unless otherwise stated in the impact analysis, all impacts are assumed to be adverse.
- *Impact Duration* — Impact duration describes how long an impact would last. For the purposes of this document, the planning team used the following terms to evaluate the natural resource, visitor experience, and socioeconomic topics in the alternatives:

Short term — The impact would last less than one year, or it would be transitional, such as impacts associated with construction.

Long term — The impact would last more than one year and could be permanent, such as loss of soils and vegetation within the footprint of a building.

## CUMULATIVE IMPACTS

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Cumulative impacts on the environment result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes such actions. Cumulative impacts

can result from individually minor but collectively significant actions taking place over a period of time. The purpose of this analysis is to evaluate (1) whether the resources and human community have already been affected by past or present activities, and (2) whether other agencies or the public have plans that could affect resources in the future.

For this planning effort, actions within the parks or by others that have occurred within the region or that would occur in the foreseeable future were identified. For natural resources, findings from the Sierra Nevada Ecosystem Project were used to provide the overall regional context for cumulative effects. Specific actions that could affect natural resources within the parks and in their vicinity were also considered. For example, air quality impacts affecting the parks result from actions throughout the entire airshed, so the cumulative impact area for this topic is the airshed including the San Joaquin Valley.

Likely future actions in the park and surrounding lands were determined by reviewing the plans and activities of local counties and communities, federal agencies such as the U.S. Forest Service, and the Bureau of Land Management, and the National Park Service within Sequoia and Kings Canyon National Parks. From these, a list of projects and plans was developed for consideration in determining cumulative impacts.

## NPS Plans and Programs

**Giant Forest.** A 1980 *Development Concept Plan* (NPS 1980a) and the 1996 *Interim Management Plan* (NPS 1996a) called for removing concession and NPS facilities from the Giant Forest and relocating them to Wuksachi so the sequoia forest could be restored to more natural conditions. During 1998–99 hundreds of structures in two historic districts were removed in accordance with an agreement with the California state historic preservation officer. The project has also included removal of hundreds of concession lodging buildings, roads, and 18 parking lots. Historic buildings that are being adaptively reused include the market which is now the Giant Forest museum (opened in 2002)

and the Beetle Rock assembly hall, which is being reused as a community building. Other historic buildings (ranger residence and restrooms) have been rehabilitated. Museum exhibits, waysides, and trail centers have been built. Area trails are being improved, and comfort stations replaced. Replacement parking is located outside the grove, and visitation to the area will depend on a shuttle system to be developed over the next several years.

**Grant Grove Lodging.** Concession facilities include the 30-room John Muir Lodge, which was constructed in the 1990s. Contractual obligations allow the replacement of 28 cabins with bath, the replacement of the bathhouse, and the construction of employee housing and a maintenance facility. Work will take place in previously disturbed areas.

**Wuksachi Village / Red Fir.** Facilities were constructed in the 1980s and 1990s in a red fir forest to replace those removed from Giant Forest, based on the 1980 *Development Concept Plan* (NPS 1980a). Recent NPS facilities include the Red Fir maintenance building, wastewater treatment plant, seasonal housing, bathhouse for concession use, road system, utilities, permanent staff housing, parking lots, propane fuel area / distribution system, and a firehouse. Concession facilities already built include three lodges with 102 rooms, a restaurant/store/administration building, a bathhouse, and staff cabins. Concession contracts call for 312 additional lodging units plus employee housing.

**Wolverton.** A water treatment plant to support the Wuksachi development was constructed. Visitor parking for Giant Forest is being built nearby, and the shuttle system light maintenance facility will be located at the site of a stable.

**Generals Highway.** The reconstruction of the historic Generals Highway has been going on since the 1980s, starting near Three Rivers. This project is being phased over many years; work has been completed from Ash Mountain to Big Fern Springs.

**Campgrounds.** Campgrounds are being gradually renovated throughout the parks. Dorst Creek was completely redeveloped by 1990. At Lodgepole campsites are being renovated in phases, sites within the 100-year floodplain are being relocated out of the floodplain, and an internal circulation system is likely to be redesigned. The Cedar Grove campgrounds are also being redeveloped, and sites are being moved out of the floodplain. The Buckeye campground has been recently renovated.

**Small Projects.** New exhibits have been installed at the Foothills visitor center and are being planned for Grant Grove and Cedar Grove.

Utility system replacements have occurred throughout the parks (Cedar Grove, Ash Mountain, Giant Forest) to bring aging systems up to state standards.

### Private Land within the Parks

**Wilsonia.** Some seasonal cabins in the historic district are being remodeled and converted for year-round use. The county has zoned the land as residential, and the NPS *Land Protection Plan* (NPS 1984) limits expansion to no more than 25% based on square footage. There are small lots and individual water and wastewater systems. Wilsonia is a historic district on the National Register of Historic Places, with a majority of the cabins as contributing elements. Sale prices on cabins have been increasing.

**Silver City.** Silver City is essentially built out, with almost all privately owned lots now occupied by summer residences. Little change is expected in this area in the near future.

**Kaweah Han.** The Kaweah Han property was purchased in 2002 and will remain as a private residence for the foreseeable future.

**Oriole Lake.** Four private properties and a number of facilities have been removed. The area is surrounded by wilderness.

### Plans and Programs of Other Federal Agencies

**Wilderness Management Plans.** Adjacent wilderness areas include John Muir, Monarch, Jennie Lakes, and Golden Trout. These areas will remain in an undeveloped state.

**Lake Kaweah (Terminus Reservoir).** The Army Corps of Engineers raised the reservoir on the lower Kaweah River west of Three Rivers by 20 feet, increasing storage by 42,000 acre-feet. NPS staff are not aware that this project will have any direct effect on the parks.

**Sierra Nevada Framework for Conservation and Collaboration.** The Sierra Framework provides general guidance for all national forest lands in the Sierra Nevada. All USFS land that immediately adjoins Sequoia and Kings Canyon is either designated wilderness or is part of Giant Sequoia National Monument.

**Giant Sequoia National Monument.** Giant Sequoia National Monument now surrounds the entire Grant Grove section of Kings Canyon National Park, including both sides of the Redwood Canyon / Redwood Mountain parklands corridor that connects Grant Grove to Sequoia National Park. Generals Highway passes through national monument lands between the two parks. California Highway 180 east of Grant Grove passes through monument lands on its way to Cedar Grove and Kings Canyon National Park. National monument lands also adjoin Sequoia National Park in the Stony Creek area and south of Sequoia National Park.

There are a number of visitor destinations and facilities in Giant Sequoia National Monument — Montecito-Sequoia Resort (provides year-round programs), Hume Lake Christian Camp, Stony Creek Lodge, Kings Canyon Lodge, and Boyden Cave. Portions of California 180 will be rehabilitated in the area, improving access to the Hume Lake and the Cedar Grove area. Giant Sequoia National Monument and Kings Canyon National Park are both entered by way of California 180, with impacts on Grant Grove village.

In January 2004 the Forest Service issued the *Sierra Nevada Forest Plan Amendment* to improve the protection of old forests, wildlife habitats, watersheds, and communities in the Sierra Nevada and the Modoc Plateau (USFS 2004). The new plan will reduce the number of acres burned by severe wildfires by more than 30% within the next 50 years. It will double the acres of large old-growth trees and California spotted owl nesting habitat over the next 50 years. Around communities, fuels will be reduced on about 700,000 acres over the next 20 years, helping to protect them from severe wildfires.

### Local Plans and Programs

**Three Rivers.** The current local planning document for Three Rivers is the 1981 *Community Plan*. This plan forecast that the community would grow from 1,645 persons in 1980 to 3,445 in 2000; however, the 2000 census reported that Three River's population was only 2,248. As an unincorporated community, Three River's growth has been incremental, consisting of many small projects, each with its own utility infrastructure, since there are no community water or wastewater systems. In recent years, one large (100+ rooms) national chain motel has been constructed, adding to the dozen or so motels that provide visitor lodging. Otherwise, commercial development within the community remains small-scale. Most development is in the form of upscale residential homes, with new residences occupying multi-acre tracts. Generally, Three Rivers is one of the most prestigious and expensive places to live in Tulare County. A spa has been under development for several years, a local winery has been established, and there is a golf course. Seasonal river rafting has been introduced, diversifying recreational opportunities.

A new community plan is being drafted by a volunteer group of Three Rivers residents, but it will not be approved until the Tulare County plan has been finished. A preliminary draft has been released for public review, and it envisions Three Rivers as an amenity-based residential community, with the natural environment as the

primary amenity. Before it becomes official, however, the plan will need to be approved by the Tulare County Planning Department and the Board of Supervisors. This process has yet to be completed, and no date for completion has been made public.

**Squaw Valley.** Squaw Valley in Fresno County is the most clearly defined community along California 180 as it approaches Kings Canyon National Park from the west, but it is less clearly defined than Three Rivers. According to the 2000 census, it had a population of 2,691, but the level of commercial development is much less than Three Rivers. There is no significant tourist development in the Squaw Valley area, and it appears that the community does not depend on tourist traffic for its livelihood.

**Fresno and Tulare Counties.** Regional growth continues to be very strong in both Fresno and Tulare counties, growing at rates exceeding 10% per decade, with resulting demands on roads and services. According to the 2000 census, Fresno County had a population of 799,407, and Tulare County, 368,021. The current planning document for the foothills area of Tulare County is the 1981 *Foothills Growth Management Plan*.

**California Department of Transportation (Caltrans)** The November 2002 *California State Transportation Improvement Plan* proposes a number of projects that are related to the future of Sequoia and Kings Canyon National Parks:

- California Highway 180, which leads to the Big Stump entrance in Kings Canyon National Park, is slated for improvement. The project will widen the highway to a six-lane freeway to Centerville and to a four-lane expressway to the foot of the Sierra east of Minkler. At this time the following four segments have been funded: (1) Chestnut Avenue to Clovis Avenue, scheduled for the summer of 2005; (2) Clovis Avenue to Temperance Avenue (which would connect the freeway to Kings Canyon Road), summer 2007; (3) Temperance Avenue to Academy Avenue, summer 2008; and (4) Academy Avenue to Trimmer Springs Road (four lanes), summer 2008. The

segment from Trimmer Springs Road to Frankwood has not yet been funded, but could occur in 2010.

- California Highway 65 from Bakersfield is slated for improvements to divert traffic from California 99. Caltrans has held scoping meetings about extending California 65 to the north along the foothills as far as Madera County. This “Sierra Foothill Freeway” could greatly increase access and development west of the parks.
- Increased train service has been proposed between central California, Los Angeles, and the San Francisco Bay area (Caltrans 2002a). High-speed rail transit service would connect central California with both San Francisco and Los Angeles. A *Final Environmental Impact Report / Environmental Impact Statement* for the project was released in August 2005 (California High-Speed Rail Authority and the Federal Railroad Administration 2005).

## IMPAIRMENT OF PARK RESOURCES OR VALUES

The National Park Service is prohibited from impairing park resources and values by its Organic Act. The NPS *Management Policies 2001* (section 1.4.5) state “an impairment . . . is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values.” In addition, the *Management Policies* state “whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.”

The determination of impairment is closely tied to the outcome of the resource impact analysis. This determination is also made with a parallel consideration of the park’s legislative mandates (purpose and significance), and resource man-

agement objectives as defined in its general management plan or other relevant plans.

NPS managers must always seek ways to avoid or minimize to the greatest degree practicable adverse impacts on park resources and values. However, the laws do give NPS managers discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute an impairment of the affected resource and value. However, the authority given to NPS managers is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would 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 to any park resource or value may constitute an impairment. However, as stated in the *Management Policies*, an impact would more likely constitute an impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the parks’ general management plan or other relevant NPS planning documents.

Impairment may result from NPS activities in managing park resources, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. A determination of impairment is made for each impact topic for natural and cultural resources, because these are the resources and values that could be impaired for future generations.

# Natural Resources

## CAVE RESOURCES

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### Context

The two parks contain some of the most extensive and least impacted caves in the western United States. Many caves are in isolated areas and are not well known to the general public. Crystal Cave is the only cave now open to guided cave tours, and improvements have been made to facilitate visitation and resource protection (e.g., paved walkways, lighting, railings). Crystal Cave tours are the only opportunities for the general public to experience and learn firsthand about cave environments. Present management programs control visitor-related impacts, localizing effects such as dust and lint accumulation. Several caves, including Clough Cave (which was formerly used commercially), have been affected by past use. However, rubble removal and other restoration efforts are underway.

### Impacts of the No-Action Alternative

**Analysis.** Public access to Crystal Cave would continue, and the development that supports cave tours would remain. Long-term alterations of the natural cave environment in the portion that is developed for visitor use would continue. Existing management programs to control impacts (e.g., designated trails, visitor education on the fragility of caves, guided/supervised tours) would help avoid or minimize additional impacts that could occur, such as trampling or the breaking or touching of speleothems (NPS 1992a).

Public use of a limited number of other caves would continue. The potential for impacts from trampling or disturbance to fauna and habitat, destruction or damage of cave formations, deposition of dust and lint, and degradation of water quality would be minimal. Most of the parks' other caves are not well known and are not visited by the general public, and existing cave management plans and protective measures would help protect the integrity of these cave

### *Impact Thresholds for Cave Resources*

*Negligible* — The impact would be at the lower levels of detection or not measurable.

*Minor* — A cave feature or environment might suffer some slight alteration that would be noticeable.

*Moderate* — Cave features or the environment would be obviously altered, or a number of features would show changes.

*Major* — Impacts on cave features or the environment would result in the permanent loss of an important cave feature or in highly noticeable, widespread changes in many cave features or the environment.

### *Criteria for Determining Impairment*

An impact would more likely constitute an impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the parks' enabling legislation,
- key to the natural or cultural integrity of the parks or to opportunities for enjoyment of the parks, or
- identified as a goal in this general management plan or other relevant NPS planning documents.

resources. Restricting access to many features, including bat colonies, invertebrate populations, delicate cave formations, archeological sites, and paleontological materials, would help protect these resources. Set numbers of permits and requirements for qualified trip leaders would limit access to caves with delicate features, and caves with particularly sensitive features and fauna would remain closed to recreational use. Other existing management provisions to protect resources include (1) no camping, removal of cave features, or depositing of human wastes; (2) guidelines to minimize disturbance to cave-

dwelling animals; (3) inventorying and monitoring of resource conditions, along with identifying impacts and mitigation; and (4) gating of entrances. Consequently, most caves would remain unaffected; a few caves could sustain localized negligible to minor, adverse, long-term impacts from limited and highly regulated recreational use.

**Cumulative Impacts.** Most caves in the parks retain their natural character and have not been altered. Varying degrees of disturbance from past use have occurred in some caves, particularly the larger and more accessible caves, such as Crystal, Clough, White Chief, and Soldiers. Past damage includes broken speleothems, trampled invertebrates, compacted soils, sediment transport on clothes, litter, deposits of toxic spent carbide, and the alteration of airflow and microclimates due to digging. Crystal Cave and the formerly commercialized Clough Cave contain extensive areas of disturbance from past trail construction and blasting. Rubble deposits from blasting create unnatural habitats and alter microclimates, and fragile cave features have been broken. Management provisions to maintain and improve conditions over the long term would continue (e.g., removing rubble, cleaning dispersed sediments, gating). No future development of caves is proposed. Most caves would remain unaffected and in good condition, and restoration efforts would continue, so the cumulative impacts for all caves in the parks would be beneficial, minor to moderate, and long term.

**Conclusion.** At Crystal Cave limiting use and pursuing existing management programs to control impacts would not result in any additional long-term impacts, which would remain negligible. A few caves could sustain localized negligible to minor, adverse, long-term impacts from limited recreational use. Most of the parks' other caves, including those with particularly sensitive resources, would remain unaffected.

Most caves in the parks retain their natural character and have not been altered. The cumulative effects on all park caves (including those that would be open to recreational use) would be minor to moderate, beneficial, and long term.

In accordance with the criteria for impairment of resources, the no-action alternative would not impair park resources or values associated with caves.

## Impacts of the Preferred Alternative

**Analysis.** As described for the no-action alternative, the vast majority of caves within the parks would remain in good condition and would retain their natural integrity, protected by their isolation and existing cave management plans. Permitted use in a few caves would be limited, but it could result in long-term damage to cave resources as described for the no-action alternative (such as trampling or disturbing of fauna and habitat, destroying or damaging cave formations, depositing dust and lint, and degrading water quality). With continued implementation of management provisions to protect resources, such as access restrictions and requirements for qualified trip leaders, any adverse impacts to caves where limited recreational use was allowed would be localized and negligible to minor in extent.

As described for the no-action alternative, the long-term alteration of the natural cave environment in the portion of Crystal Cave developed for visitor use would continue. Existing management programs to control impacts (e.g., designated trails, visitor education on the fragility of caves, guided/supervised tours) would help to avoid or minimize additional impacts that could occur, such as trampling, breaking, or touching speleothems.

**Cumulative Impacts.** As described under the no-action alternative, varying degrees of disturbance from past use have occurred in some caves (for example, Crystal, Clough, White Chief, and Soldiers). Management programs to minimize and repair damage would continue, resulting in improved conditions over the long term. However, most caves in the parks retain their natural character and have not been altered. No future development affecting caves within the parks is proposed, most caves would remain unaffected and in good condition, and restoration efforts would continue, so the cumulative

impacts for all caves in the parks would be minor to moderate, beneficial, and long term.

**Conclusion.** The preferred alternative would provide a high degree of protection for the vast majority of high-quality caves in the parks, with a standard of visitor use for the others that would ensure protection of their natural integrity. Most caves, including those with particularly sensitive resources, would remain unaffected. Limiting use and undertaking management programs to control impacts would continue in Crystal Cave, and any additional long-term impacts would be negligible. In other caves where limited recreational use was allowed, impacts would be localized, negligible to minor, and long term.

Most caves in the parks retain their natural character and have not been altered. The cumulative effects on all park caves would be minor to moderate, beneficial, and long term. The preferred alternative would contribute a localized minor, adverse impact to the overall cumulative effects in only a few select caves.

The preferred alternative would not impair park resources or values associated with caves.

### **Impacts of Alternative A**

**Analysis.** The vast majority of the parks' caves would continue to remain in good condition and retain their natural integrity, protected by their isolation and more restrictive access provisions. Use in a limited number of caves would be restricted to specialists, which would help reduce some long-term damage to cave resources (such as trampling or disturbance to fauna and habitat, destruction or damage of cave formations, deposition of dust and lint, and degradation of water quality). Compared to the no-action alternative, impacts would be reduced and would be negligible to minor, beneficial, and long term.

While the portion of Crystal Cave developed for public tours would continue to be open to visitors under alternative A, present programs and measures would ensure that any future impacts were negligible.

**Cumulative Impacts.** While some caves have varying degrees of disturbance from past use, management programs to minimize and repair damage would improve conditions over the long term. Most caves retain their natural character and have not been altered. No future projects affecting caves within the parks are proposed. The overall cumulative effect would be minor to moderate, beneficial, and long term for caves in the parks.

**Conclusion.** Impacts would be similar to the no-action alternative. Limiting use and undertaking management programs to control impacts would continue at Crystal Cave, and any additional long-term impacts would be negligible. In other caves where use would be restricted to specialists, impacts would be reduced compared to the no-action alternative and would be localized, negligible to minor, adverse, and long term. Most of the parks' caves, including those with particularly sensitive resources, would remain unaffected.

Most caves in the parks retain their natural character and have not been altered. The cumulative effects on all park caves would be minor to moderate, beneficial, and long term. Alternative A would contribute a minor beneficial effect to the overall cumulative effects.

There would be no impairment of park resources or values associated with caves.

### **Impacts of Alternative C**

**Analysis.** As under the no-action alternative, long-term alteration of the natural cave environment in the portion of Crystal Cave developed for visitor use would continue. As a result of continued management actions to limit the potential for additional impacts (e.g., designated trails, visitor education on the fragility of caves, guided/supervised tours), any additional long-term impacts would be negligible.

Providing guided public tours of additional caves under this alternative would increase the potential for adverse impacts. As under the no-action alternative, recreational use in other caves

could result in long-term damage to cave resources (e.g., trampling or disturbing fauna and habitat, destroying cave formations, depositing dust and lint, and degrading water quality). To minimize impacts, additional tours would occur only after an evaluation of cave resources, an analysis of the impacts of such access, and the identification of protective measures. Only more resilient caves (those with less sensitive or unique features and fauna) would be considered for tours.

In general, the parks' caves would remain in good condition and would retain their natural integrity, protected by their isolation and existing cave management plans and protective measures. Consequently, most caves would remain unaffected, although a few could sustain localized, negligible to minor, adverse, long-term impacts from increased recreational use.

**Cumulative Impacts.** As described under the no-action alternative, varying degrees of disturbance from past use have occurred in some caves, particularly in the larger, more accessible ones (Crystal, Clough, White Chief, and Soldiers). Programs to minimize and repair damage would improve conditions over the long term. However, most caves in the parks retain their natural character and have not been altered. No future projects affecting caves within the parks are proposed. Even though increased recreational use in a few caves could result in negligible to minor, adverse impacts, the overall cumulative effect would be minor to moderate, beneficial, and long term.

**Conclusion.** Limiting use and controlling impacts at Crystal Cave would ensure that any additional long-term impacts would be negligible. Providing guided public tours of additional caves would increase the potential for adverse impacts, but a careful selection process would ensure that only the more resilient caves (those with less sensitive or unique features and fauna) would be candidates for tours, resulting in minor, long-term impacts. Most of the parks' other caves, including those with particularly sensitive resources, would remain unaffected. Impacts would be negligible to minor, adverse,

and long term from limited recreational use, including guided tours.

Most caves in the parks retain their natural character and have not been altered. The cumulative effects on all park caves would be minor to moderate, beneficial, and long term. Alternative C would contribute a localized, minor, adverse impact to the overall cumulative effects.

There would be no impairment of park resources or values associated with caves.

### Impacts of Alternative D

**Analysis.** This alternative would allow more tours within the developed portion of Crystal Cave. However, existing management programs to control impacts (e.g., designated trails, visitor education on the fragility of caves, guided/supervised tours) should avoid or minimize additional impacts, such as trampling, breaking, or touching speleothems. Consequently, long-term adverse impacts would be negligible.

Providing guided public tours of additional caves as proposed under this alternative would increase the potential for adverse impacts, such as trampling or disturbing fauna and habitat, destroying or damaging cave formations, depositing dust and lint, and degrading water quality. To minimize impacts, additional tours would occur only after cave resources were evaluated, impacts of increased access analyzed, and protective measures identified so that only the more resilient caves, those with less sensitive or unique features and fauna, would be selected.

Most of the parks' caves would remain in good condition and would retain their natural integrity because they are isolated and because existing cave management plans and protective measures would minimize further impacts.

**Cumulative Impacts.** As described under the no-action alternative, varying degrees of disturbance from past use have occurred in some caves, particularly in the larger, more accessible caves (Crystal, Clough, White Chief, and Soldiers). Programs to minimize and repair damage

would improve conditions over the long term. However, most caves in the parks retain their natural character and have not been altered. No future projects affecting park caves are proposed. Even though providing guided tours of additional caves could result in minor, adverse impacts to cave resources, the overall cumulative effect would be minor to moderate, beneficial, and long term.

**Conclusion.** At Crystal Cave use would continue to be limited and impacts controlled; any additional long-term impacts as a result of increased use would be negligible. Providing guided public tours of more caves would increase the potential for adverse impacts, but a careful selection process would ensure that only the more resilient caves would be opened for tours, with minor, long-term impacts. Most of the parks' other caves, including those with particularly sensitive resources, would remain unaffected. Impacts from limited recreational use, including guided tours, would be negligible to minor, adverse, and long term.

Most caves in the parks retain their natural character and have not been altered. The cumulative effects on all park caves would be minor to moderate, beneficial, and long term. Alternative D would contribute a localized, minor, adverse impact to the overall cumulative effects.

There would be no impairment of park resources or values associated with caves.

## **WATER RESOURCES**

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### **Regional Context**

Water quality in the Sierra Nevada region has been adversely affected downstream from urban centers, mines, and intensive land-use zones. Other impacts include the accumulation of near-toxic levels of mercury in low and middle elevation reservoirs of the western Sierra Nevada; widespread biological contamination by human pathogens; increased salinity in eastside lakes; and widespread excessive sediment yield into streams. Water quality impacts from regional development include increased contaminants,

such as heavy metals, pesticides, and petroleum products from larger impervious surfaces and runoff and higher risk of ground and surface water contamination from septic effluent disposal. Water diversions and dams have also highly altered natural water flows and hydrology, indirectly changing the biological resources. Beneficial effects are expected from some actions to address ecosystem management issues on lands adjacent to the parks (including the Sierra Nevada Framework for Conservation and Collaboration, as well as management plans for adjacent wilderness areas and for Giant Sequoia National Monument).

### **Park Context**

Within the parks the primary threat to water quality is air pollution from external sources. Surface waters within the parks are quite pure and may be at risk if air pollution and acidic deposition increased in the future, particularly the highly oligotrophic, poorly buffered, higher elevation waterbodies. Loss of natural fire has also affected water characteristics such as nutrients and sediments. The parks' fire management program has reestablished fire as a natural component of the ecosystem.

Localized effects within the parks are associated with park facilities and the use and operation of hydroelectric facilities. Infrastructure that supports park facilities includes the withdrawal of water and the discharge of treated effluent that locally affects hydrology, biology, and nutrient levels immediately downstream. Kaweah hydroelectric plant no. 3 on the Middle Fork of the Kaweah River just outside Sequoia National Park draws water from the Middle and Marble Forks by means of a diversion dam on each fork and flumes. Seasonal minimum release requirements have been established for each fork to prevent diversions when flows decrease below seasonal minimum levels. The Kaweah no. 1 generating facility draws its water below the park but uses four storage dams above Mineral King.

**Impact Thresholds for Water Resources**

**Negligible** — The impact would be at the lower levels of detection or not measurable.

**Minor** — Changes in water resources would be measurable and localized to specific stream reaches, and they would involve sources of pollution that do not persist in the environment.

**Moderate** — Changes in water resources would be clearly detectable, would cause an appreciable change in water resources in a localized area, and would involve sources of pollution that are persistent in the environment.

**Major** — Changes in water resources would occur on a regional or watershed scale and would involve sources of pollution that are persistent in the environment.

**Criteria for Determining Impairment**

An impact would more likely constitute an impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the parks’ enabling legislation;
- key to the natural or cultural integrity of the parks or to opportunities for enjoyment of the parks; or
- identified as a goal in this general management plan or other relevant NPS planning documents.

**Impacts Common to All Alternatives**

Small-scale, historic hydroelectric facilities on the Marble and Middle Forks of the Kaweah River and four dams in Mineral King that feed the East Fork of the Kaweah River will continue, if permitted by the secretary of the interior, to operate in accordance with the conditions imposed by Congress in Public Law 108-447, with no additional effects on water resources.

Requiring Mineral King permit cabin owners to meet state and local wastewater regulations when special use permits are renewed would

eliminate possible localized sources of pollution, thus decreasing potential impacts to water quality and biological communities. This would be a minor, beneficial, long-term effect.

**Impacts of the No-Action Alternative**

**Analysis.** Slight increases in levels of sediment, fuels, turbidity, and nutrients in park waters from greater use of facilities, parking areas, roads, picnic areas, and trails would result in localized, indirect effects on water quality. Vehicle use along roads and parking areas would deposit petroleum products that could be washed into nearby waters. Increased soil compaction, vegetation trampling, and loss of vegetation in some areas could lead to greater erosion and the addition of sediment to nearby waters. Water pollution (e.g., elevated nutrient or bacterial levels or reduction in biological oxygen demand) would also occur from trash or human/stock wastes deposited in or near streams. With increased use along some streams, particularly more popular day use areas associated with river access (e.g., the Middle Fork of the Kaweah River), some localized decreases in water quality would likely occur as a result of visitors causing soils to erode and disturbing stream bottom sediments. Mitigation would help minimize visitor impacts (e.g., visitor education programs, placement of sanitation facilities, setbacks from water for camping, washing, and human waste disposal). Impacts on water quality would be localized, minor, and adverse over the long term.

Beneficial effects on water quality would result from redesigning some developed areas (e.g., rebuilding portions of the Lodgepole campground, redesigning/relocating bridges over the South Fork of the Kings River) and removing facilities (e.g., structures on inholdings that were purchased from willing sellers). Beneficial effects would result from reduced understory trampling and compaction and subsequent soil erosion, and from more opportunities to revegetate disturbed areas and to restore more natural conditions. The operating status of private septic systems (Wilsonia, Mineral King) are unknown; however, eliminating septic systems associated with the private inholdings acquired from will-

ing sellers in the Mineral King area and Wilsonia would eliminate a potential localized source of pollution. These actions would affect a few, relatively small sites within the parks, reducing but not eliminating use and development in the areas and resulting in localized, minor, beneficial effects to water quality over the long term. Moderate, localized, adverse effects might occur if private waste disposal did not meet state water quality standards.

Park wastewater treatment facilities need to be upgraded to minimize potential impacts and to meet new state effluent disposal regulations. Environmental constraints such as adequate soils, slopes, and distance to waterbodies may preclude the expansion of some disposal operations. Even with proper waste disposal, elevated nutrient levels and conductivity above natural background levels would continue within the immediate downstream reaches. A minor increase in these effects might occur if disposal operations were expanded because of increased visitor use within the parks.

Based on existing floodplain information, relocating campsites more than 100 feet from the river would leave only a small portion of the Cedar Grove and Cold Spring campgrounds within the 100-year floodplains. Localized impacts to floodplain characteristics such as water recharge capacity and flood dissipation would be negligible. The redesign or relocation of bridges over the South Fork of the Kings River would have localized, minor to moderate, benefits on hydrological processes, increasing the free-flowing condition of the river. Additional minor alterations to natural hydrology and biological communities of some streams would occur as water diversions increased over time with more visitation. Moderate, adverse impacts could occur to some river reaches during drought periods. Water conservation actions would still be implemented during drought or low-flow periods to minimize withdrawals and impacts. Downstream impacts would decrease because more tributaries augment streamflow below the point of withdrawal.

**Cumulative Impacts.** Cumulative effects on water resources are based on an analysis of past, present, and reasonably foreseeable actions in the Sierra Nevada region, in combination with the potential effects of this alternative. Whereas widespread, more intensive impacts have occurred on a regional scale, this alternative's contribution to those effects would be incremental and localized.

As described in the "Context" section, there have been major water quality impacts in the Sierra Nevada region from various causes. Within the parks some ongoing and future restoration projects (e.g., the Giant Forest development area) and proposed development projects (e.g., expanded visitor facilities at Grant Grove and Wuksachi village per the concession a contract, and construction related to the Giant Forest transit system) would contribute to both beneficial and adverse effects. Water usage would be substantially reduced as a result of removing development at Giant Forest, more than offsetting expected increases in water use from future development at Wuksachi. Some localized, minor impacts such as erosion or sedimentation from construction would be mitigated by using best management practices (such as sediment fences and revegetation). Also, actions by the U.S. Forest Service that would address ecosystem management issues on adjacent lands could have cumulative beneficial effects by reducing water resource impacts from such activities as logging (e.g., the Sierra Nevada Framework for Conservation and Collaboration, management plans for adjacent wilderness areas, and a Giant Sequoia National Monument management plan).

Even though some actions would have beneficial, long-term effects in the parks and region, there would continue to be major, adverse, cumulative water resource impacts in the Sierra Nevada region from various causes, with the greatest impact to waters within the park posed by regional air pollution. The no-action alternative would contribute a minor to moderate, adverse increment to these effects over the long term as a result of accommodating increased use, but it would contribute a minor to moderate,

beneficial, long-term impact because some facilities would be removed or redesigned.

**Conclusion.** The no-action alternative would have minor to moderate, beneficial effects as a result of removing and redesigning facilities. Continued use and development, along with increased visitation, would have localized, minor to possibly moderate, adverse, long-term impacts on water quality, hydrologic processes, and biological communities.

On a cumulative basis, even though the no-action alternative would result in localized, minor to moderate, beneficial effects, and some minor adverse impacts, the net major impact on regional water resources would be adverse and long term, primarily because of impacts from land use and development outside the parks.

In accordance with the criteria for determining impairment, there would be no impairment of park resources or values.

### Impacts of the Preferred Alternative

**Analysis.** Under the preferred alternative no increase would be allowed in existing net average water withdrawals during the low-flow season to support park development and use. Facilities would be limited in some areas to those that can be sustained by current water supply (e.g., Grant Grove and Ash Mountain), and water conservation programs would be expanded to limit and reduce water demand. Compared to the no-action alternative, the preferred alternative would have minor to moderate beneficial effects to the natural hydrology and biological communities of some streams, depending on the extent that water flow diversions would be reduced.

Providing better located and designed trails and defining river access points, particularly along the South Fork, Marble Fork, and Middle Fork of the Kaweah River near major developed areas, along with concentrating use in specific areas, would have localized, minor, beneficial effects on water quality. The intent would be to decrease impacts such as soil compaction, vege-

tation trampling, and loss of vegetation that leads to erosion and the addition of sediment to nearby waters. In addition, a number of actions would reduce the localized indirect effects from runoff containing sediments, fuels, or nutrients. Actions would include limiting backcountry use in some areas, relocating facilities such as the Mineral King pack station to improve resource conditions, and possibly expanding the shuttle system and reducing private vehicle use. These actions would result in minor, beneficial, long-term, primarily localized effects on water quality.

As under the no-action alternative, increased use of facilities, parking areas, roads, picnic areas, and both frontcountry and backcountry trails would continue to have localized, minor, adverse effects from sediment, fuels, turbidity, and nutrients. However, under the preferred alternative actions such as modifying backcountry use and relocating facilities like the Mineral King pack station to improve resource conditions, as well as possibly expanding shuttle systems to reduce vehicle use, would reduce those impacts, resulting in a minor, beneficial effect compared to that under the no-action alternative. New facility construction would affect vegetation and soils in the vicinity, resulting in temporary water quality impacts (e.g., erosion-induced sedimentation and turbidity). Mitigation would help minimize visitor impacts (e.g., visitor education programs, placement of sanitation facilities, setbacks from water for camping, washing, and human waste disposal). Impacts would be localized and negligible to minor in intensity after mitigation.

The operating status of private septic systems in Wilsonia is unknown. Eliminating septic systems associated with private inholdings acquired from willing sellers would eliminate possible localized sources of pollution, thus decreasing potential impacts to water quality and biological communities. This would be a minor, beneficial, long-term effect, although moderate beneficial effects would result if water quality standards were exceeded. The possibility of water pollution is related to a number of environmental constraints such as adequate soils, slopes, and

distance to waterbodies, as well as to the adequacy of the design, operation, and maintenance of the septic or other disposal systems.

As described for the no-action alternative, park wastewater treatment facilities need to be upgraded to meet new state effluent disposal regulations and expanded to process increased wastewater loads under this alternative. Environmental constraints (adequate soils, slopes, and distance to waterbodies) could preclude expanding some disposal operations. Even with proper waste disposal, elevated nutrient levels and conductivity above natural background levels would continue within the immediate downstream reaches. A minor increase in the extent of this effect could occur due to the disposal of additional treated wastewater.

No new or relocated facilities would be placed within currently mapped 100-year floodplains, and no impacts to floodplains are expected. More detailed floodplain analyses would be completed prior to any new construction or property acquisition to confirm that facilities were sited outside the floodplains. Redesigning or relocating bridges over the South Fork of the Kings River would have localized, minor benefits on hydrological processes, with resulting benefits to biological communities. Adverse impacts from facility removal would result in short-term, minor, adverse impacts, such as bank disturbance and increased erosion potential. The extent and duration of these impacts would be minimized by careful design and timing of facility removal, temporary erosion control measures, and follow-up restoration efforts.

**Cumulative Impacts.** Cumulative effects on water resources are based on an analysis of past, present, and reasonably foreseeable actions in the Sierra Nevada region in combination with the potential effects of this alternative. Whereas widespread, more intensive impacts have occurred on the regional level, this alternative's contribution to those effects would be incremental and localized.

As described in the "Regional Context" section, there have been various causes of major water

quality impacts in the region. Within the parks some ongoing and future restoration projects (e.g., the Giant Forest development area) would contribute beneficial effects. Water usage has been substantially reduced by removing development at Giant Forest, more than offsetting an expected increase in water use from future development at Wuksachi. Proposed projects (e.g., expanding visitor facilities at Grant Grove and Wuksachi village, and constructing the Giant Forest transit system and associated facilities) would cause localized, short-term impacts such as erosion or sedimentation during construction, which would be mitigated by using best management practices such as sediment fences and revegetation. Also, actions by the U.S. Forest Service that would address ecosystem management issues on adjacent lands could have cumulative beneficial effects by reducing water resource impacts from such activities as logging (e.g., the Sierra Nevada Framework for Conservation and Collaboration, management plans for adjacent wilderness areas, and a Giant Sequoia National Monument management plan).

Even though some actions would have beneficial, long-term effects in the parks and region, there would continue to be major, cumulative water resource impacts in the greater Sierra Nevada region, with the greatest impact to waters within the park posed by regional air pollution. The preferred alternative would contribute minor to moderate, beneficial, long-term effects as a result of limiting, replacing, or redesigning facilities, and precluding increased water withdrawals. It would also contribute negligible to minor, short-term, adverse effects as a result of limited new development.

**Conclusion.** The preferred alternative would result in minor to moderate, beneficial effects to water quality, the free-flowing condition of the South Fork of the Kings River, floodplains, and biological communities. Contributing factors include no increased water withdrawals, better located and designed trails and river access points, improved backcountry conditions, and redesigned or relocated facilities. Site-specific, construction-related impacts would be minor, adverse, and short term.

On a cumulative basis, this alternative would primarily contribute minor to moderate, beneficial cumulative effects. Adverse cumulative impacts within the parks would be localized, short term, and minor. In conjunction with past, present, and reasonably foreseeable actions, there would continue to be major, adverse, long-term impacts on water resources in the region, primarily from land use and development outside the parks.

Similar to the no-action alternative, there would be no impairment of park resources or values.

### Impacts of Alternative A

**Analysis.** In general, overall reductions in use and development and the elimination of stock use and pack stations would reduce erosion, sedimentation, nutrients, bacteria, and turbidity associated with human and stock use. As a result, opportunities for revegetation and stream-bank restoration would be increased. Lower use levels and concentrating trails and campsites throughout the backcountry would reduce the risk of changes to water quality resulting from sediment transport or improper waste disposal and would reduce impacts to sensitive shoreline resources, including herbaceous meadow communities and amphibian populations.

Reduced use and fewer access points along rivers (South Fork, Marble Fork, and Middle Fork,) near major developed areas would help reduce the extent of visitor degradation of stream-banks and channels, which in turn affects water quality and habitat for biological communities.

Elevated nutrient levels and conductivity of nearby streams below existing wastewater sprayfields should be reduced in extent. These actions would result in localized, minor, beneficial, long-term effects on water quality and biological communities, particularly where facilities or high-use areas near streams were reduced or eliminated (e.g., campgrounds at Lodgepole and Cedar Grove, and the Mineral King pack station).

Expanding the Cold Spring campground would add to visitor-related impacts such as erosion and sedimentation, although the campground would remain relatively small and use low. Impacts would likely be negligible to minor.

Temporary adverse effects on water quality (e.g., erosion, sedimentation, turbidity) and biological communities would occur within the parks as a result of removing facilities, constructing limited new facilities, or expanding existing facilities, and outside the parks as a result of relocating facilities. These effects would be localized and would be mitigated to the extent possible. Impacts would be minor and short term.

A small portion of the Cedar Grove campground would be reduced or removed from within the 100-year floodplain, a localized negligible benefit to floodplain characteristics like water recharge capacity and flood dissipation. Redesigning or relocating bridges over the South Fork of the Kings River, and incrementally decreasing water diversions would have localized, minor to moderate benefits on hydrological processes and biological communities because free-flowing conditions would be reestablished on some rivers and tributaries.

**Cumulative Impacts.** Cumulative impacts on water resources are based on an analysis of past, present, and reasonably foreseeable actions in the Sierra Nevada region in combination with the potential effects of this alternative. This alternative's contribution to those effects would be incremental and localized.

As described in the "Regional Context" section, there have been various causes of major water quality impacts in the Sierra Nevada region. Within the parks ongoing and future restoration projects (e.g., the Giant Forest development area) would contribute beneficial effects. Water usage would be substantially reduced by removing development at Giant Forest, more than offsetting expected increased water use as a result of future development at Wuksachi.

Proposed development projects (e.g., expanded visitor facilities at Grant Grove and Wuksachi village, and construction of the Giant Forest transit system) would cause some localized, short-term impacts during construction, such as erosion or sedimentation, which would be mitigated by using best management practices (e.g., sediment fences and revegetation). Also, actions by the U.S. Forest Service to address ecosystem management issues on adjacent lands could have cumulative beneficial effects by reducing water resource impacts from such activities as logging (e.g., the Sierra Nevada Framework for Conservation and Collaboration, management plans for adjacent wilderness areas, and a Giant Sequoia National Monument management plan).

Even though some actions would have beneficial, long-term effects in the parks and region, there would continue to be major, cumulative water resource impacts in the greater Sierra Nevada region, with the greatest impact to waters within the park posed by regional air pollution. Alternative A would contribute a minor to moderate, beneficial, long-term effect as a result of limiting, replacing, or redesigning facilities, and precluding increased water withdrawals. It would also contribute a negligible to minor, adverse, short-term increment to these effects as a result of limited new development.

**Conclusion.** Alternative A would result in minor to moderate, beneficial, long-term effects on water quality, floodplains, biological communities, and hydrological processes as a result of removing facilities, and reducing high-use areas near streams or lakes. Adverse impacts from limited new development and facility removal would be minor and short term.

On a cumulative basis, even though alternative A would result in an incremental beneficial impact, when combined with past, present, and reasonably foreseeable actions, there would be a net major, adverse, long-term impact on regional water resources, primarily from land use and development outside the parks. This alternative would contribute minor to moderate beneficial effects to the overall cumulative impact. Ad-

verse incremental impacts in the parks would be localized, minor, and short term.

As described for the no-action alternative, there would be no impairment of park resources or values.

## Impacts of Alternative C

**Analysis.** Increased levels of sediment, fuels, turbidity, and nutrients would be associated with the increased use of facilities, parking areas, roads, picnic areas, and trails, with continued indirect, localized effects on water quality. Vehicle-related petroleum deposits on roads and parking areas could be washed into nearby waters. Increased soil compaction, vegetation trampling, and loss of vegetation in some areas could lead to greater erosion and addition of sediment to nearby waters. Water pollution would also occur from trash or human/stock wastes deposited in or near streams. Mitigating measures (e.g., visitor education, placement of sanitation facilities, setbacks from water for camping, washing, and human waste disposal) would help minimize visitor-related impacts. New facility construction would result in site-specific impacts to vegetation and soils, with temporary adverse effects on water quality (e.g., erosion, sedimentation, turbidity). In general, increased use and new development in the parks would result in localized, minor, adverse impacts on water quality over the long term.

Alternative C would also have negligible to minor localized benefits to water quality. The expansion of shuttle services would decrease private motor vehicle use on some park roads, potentially decreasing the deposition of petroleum products and potential pollutant runoff. Better locating and designing trails and river access points, particularly along the South Fork, Marble Fork, and Middle Fork near major developed areas, would concentrate use in specific areas. This would decrease the current extent of impacts such as soil compaction, vegetation trampling, and loss of vegetation that lead to erosion and the addition of sediment to nearby waters. Dispersing use and reducing the extent of areas that allow more concentrated human and

stock use in the backcountry would pose less risk of water quality changes due to sediment transport or improper waste disposal and would reduce impacts to sensitive resources, including herbaceous meadow communities and amphibian populations.

As described for the no-action alternative, park wastewater treatment facilities need to be upgraded to meet new state effluent disposal regulations and expanded to process increased wastewater loads generated under this alternative. Environmental constraints such as adequate soils, slopes, and distance to waterbodies could preclude the expansion of some disposal operations. Even with proper waste disposal, elevated nutrient levels and conductivity above natural background levels would continue within the immediate downstream reaches. The extent of this effect could increase incrementally with the disposal of additional treated wastewater.

Based on floodplain information, no new or relocated facilities would be located within 100-year floodplains, and no impacts to floodplains are expected. More detailed floodplain analyses would be completed prior to new construction or property acquisition to confirm that facilities were outside floodplains. Redesigning or relocating bridges over the South Fork of the Kings River would have a minor to moderate, localized benefit on hydrological processes and biological communities as a result of increasing free-flowing conditions. Minor, incremental effects to the natural hydrology and biological communities of some streams would continue due to increased water diversions. Downstream impacts would decrease as more tributaries augmented streamflow below the point of withdrawal.

**Cumulative Impacts.** As described in the “Regional Context” section, major water quality impacts in the Sierra Nevada region have various causes. Within the parks some ongoing and future restoration projects (e.g., the Giant Forest development area) would contribute beneficial effects by reducing water usage, more than offsetting an expected increase in water use from future development at Wuksachi.

Proposed development projects (e.g., expanded visitor facilities at Grant Grove and Wuksachi village, and the construction of the Giant Forest transit system) would contribute some localized, short-term impacts from erosion or sedimentation, which would be mitigated by using best management practices (e.g., sediment fences and revegetation). Also, ecosystem management actions by the U.S. Forest Service could have cumulative beneficial effects by reducing water resource impacts from such activities as logging.

Even though some actions would have beneficial, long-term effects in the parks and region, major, cumulative water resource impacts in the greater Sierra Nevada region would continue, with the greatest impact to waters within the park posed by regional air pollution. Alternative C would contribute a long-term, minor to moderate, beneficial effect as a result of limiting, replacing, or redesigning facilities, and precluding increased water withdrawals. It would also contribute a negligible to minor, adverse increment over the short term to these effects as a result of limited new development.

**Conclusion.** Alternative C would result in minor beneficial effects on water quality, the free-flowing condition of the South Fork of the Kings River, and biological communities as a result of providing better located and designed trails and river access points, expanded shuttle systems, and less concentrated backcountry use. Increased use and development over the long term would have localized, minor, adverse impacts on water quality and biological habitat. Minor, short-term, site-specific impacts would occur from construction activities. Minor, incremental adverse effects to the natural hydrology and biological communities of some streams would occur due to increased water diversions.

On a cumulative basis, alternative C would contribute minor to moderate, beneficial impacts; adverse impacts within the parks would be minor, localized, and short term. In conjunction with past, present, and reasonably foreseeable actions, there would be major, adverse, long-term, cumulative impacts on water resources in the region, primarily from land use and develop-

ment outside the parks, similar to the no-action alternative.

There would be no impairment of park resources or values.

### **Impacts of Alternative D**

**Analysis.** Increased levels of sediment, fuels, turbidity, and nutrients would be associated with greater visitor use of facilities, parking areas, roads, picnic areas, and trails, resulting in indirect, localized effects on water quality and biological communities. Petroleum products deposited on the surfaces of roads and parking areas by vehicles could be washed into nearby waters. Increased soil compaction, and vegetation trampling and loss in some areas could lead to greater erosion and the addition of sediment to nearby waters. Water pollution would also occur from trash or human/stock wastes deposited in or near streams. In general, increased front-country use and new development in the parks would result in localized, minor, adverse, long-term impacts on water quality.

In popular backcountry areas alternative D could have minor to moderate, adverse, long-term impacts to localized water quality and sensitive shoreline resources as a result of concentrating use and expanding the extent of use areas. In areas of more intensive use, the risk of impacts to water quality would be greater as a result of sediment transport or improper waste disposal, and herbaceous meadow communities and amphibian populations could be affected by trampling. Mitigating measures (e.g., visitor education, placement of sanitation facilities / backcountry toilets, setbacks from water for camping, washing, and human waste disposal) would help minimize impacts.

Facility construction would result in impacts to nearby vegetation, soils, and aquatic resources, with temporary adverse effects on water quality (e.g., erosion, sedimentation, turbidity) and biological communities. Impacts would be mitigated to the extent possible, and the effects would be minor, localized, and short term.

Alternative D would have negligible to minor localized benefits to water quality. Expanding shuttle services would decrease private motor vehicle use on some park roads, potentially decreasing the deposition of petroleum products and pollutant runoff. Providing better located and designed trails and river access points, particularly along the South Fork, Marble Fork, and Middle Fork near major developed areas would concentrate use in specific areas. This would decrease the current extent of impacts (such as soil compaction, vegetation trampling, and loss of vegetation) that lead to erosion and the addition of sediment to nearby waters.

As described for the no-action alternative, park wastewater treatment facilities need to be upgraded to meet new state effluent disposal regulations and expanded to process greater volumes of wastewater loads under this alternative. Environmental constraints such as adequate soils, slopes, and distance to waterbodies could preclude the expansion of some disposal operations. Even with proper waste disposal, elevated nutrient levels and conductivity above natural background levels would continue within the immediate downstream reaches. The extent of this effect could increase incrementally with the disposal of additional treated wastewater.

Based on floodplain information, no new or relocated facilities would occur within 100-year floodplains, and no impacts to floodplains are expected. More detailed analyses would be completed before any construction or property acquisition to confirm that facilities were outside floodplains. Redesigning or relocating bridges over the South Fork of the Kings River would increase free-flowing conditions, resulting in minor, localized benefits on hydrological processes and biological communities. Minor, incremental effects to the natural hydrology and biological communities of some streams would continue due to increased water diversions. Downstream impacts would decrease as more tributaries augmented streamflow below the point of withdrawal.

**Cumulative Impacts.** As described in the “Regional Context” section, major water quality

impacts have been caused throughout the Sierra Nevada region. Within the parks some ongoing and future restoration projects (e.g., Giant Forest) would contribute beneficial effects by reducing water usage, more than offsetting expected increased water use from future development at Wuksachi. Proposed developments (concession facilities at Grant Grove and Wuksachi village, the Giant Forest transit system) would contribute some localized, short-term, construction-related impacts such as erosion and sedimentation. Also, U.S. Forest Service actions to address ecosystem management issues on adjacent lands could have cumulative beneficial effects by reducing water resource impacts from activities such as logging.

Long-term impacts under alternative D would be minor to moderate and both adverse and beneficial. In conjunction with past, present, and reasonably foreseeable actions throughout the region, there would continue to be major, adverse, long-term, cumulative impacts to regional water quality, hydrology, and biological communities.

**Conclusion.** Alternative D would result in minor to moderate beneficial effects to water quality, the free-flowing condition of the South Fork of the Kings River, and biological communities as a result of providing better located and designed trails and river access points, and expanded shuttle systems. Increased front-country use and development and more concentrated backcountry use would have minor, adverse, long-term impacts on water quality and biological habitat in localized areas, while construction activities would have minor, short-term, site-specific impacts. Minor, incremental adverse effects to the natural hydrology and biological communities of some streams would occur due to increased water diversions.

On a cumulative basis, long-term impacts within the parks under alternative D would be minor and both adverse and beneficial. In combination with past, present, and reasonably foreseeable actions, there would be major, adverse, long-term, cumulative impacts on water resources in the region. This would primarily be a result of development actions outside the parks.

Similar to the no-action alternative, there would be no impairment of park resources or values.

## GENERAL VEGETATION AND SOILS

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### Regional Context

Regional vegetation and soil resources have been historically altered by timber harvest, grazing, agriculture, mining, development, water diversions, loss of fire regime, and recreational use. Regional population growth, development, air pollution, and possibly global warming, have also adversely affected vegetation communities. However, beneficial effects are expected from some actions to address ecosystem management issues on lands adjacent to the parks (including those taken in conjunction with the Sierra Nevada Framework for Conservation and Collaboration, as well as management plans for adjacent wilderness areas and for Giant Sequoia National Monument).

### Park Context

While many of the parks' native vegetation communities are considered to be intact (with the exception of the foothills herbaceous component), most have been altered to some degree by post-settlement disturbance. This includes logging in some areas in the 1800s, domestic sheep and cattle grazing in all areas during the same period, and cattle grazing into the 1970s in a few areas. Soils and vegetation have been locally altered or lost at various locations as a result of development and concentrated visitor use, including a number of abandoned sites where soils have been disturbed.

Air pollution, historic loss of natural fire regimes, and invasion by exotic pathogens and plant species have also altered and shaped the parks' native vegetation at the landscape scale (see "Ecosystem Stressors" at the beginning of "The Affected Environment" chapter). In more recent times, vegetation and fire management efforts within the parks are restoring more natural vegetation patterns and processes. The parks have been leaders in aggressive fire man-

<p style="text-align: center;"><i>Impact Thresholds for Vegetation</i></p> <p><b>Negligible</b> — The impact would be at the lower levels of detection or not measurable.</p> <p><b>Minor</b> — The impact would be detectable and could affect the abundance or distribution of individuals in a localized area, but it would not affect the viability of the local population or overall community size, structure, or composition.</p> <p><b>Moderate</b> — The impact would be clearly detectable and could have an appreciable effect on the resource. This would include impacts that affect the abundance or distribution of local populations, but not the viability of the regional population. Localized changes to community size, structure, or composition and ecological processes could occur.</p> <p><b>Major</b> — The impact would be severely adverse or exceptionally beneficial. Impacts would have a substantial, highly noticeable, or widespread influence, affecting the abundance or distribution of a local or regional population to the extent that the population would not be likely to recover (adverse) or would return to a sustainable level (beneficial). Community size, structure, or composition and ecological processes would be highly altered, and landscape level changes could be expected.</p> <p style="text-align: center;"><i>Impact Thresholds for Soils</i></p> <p><b>Negligible</b> — The impact would be at the lower levels of detection or not measurable.</p>	<p><b>Minor</b> — The impact would be detectable, and there could be changes in soil characteristics (e.g., soil profile, productivity) in a relatively small area, but the change would not increase the potential for erosion of additional soil.</p> <p><b>Moderate</b> — The impact would be clearly detectable and could have an appreciable effect on the resource. Topsoil characteristics in a small area could be lost or altered. The change would increase the potential for erosion to remove small quantities of additional soil.</p> <p><b>Major</b> — The impact would be severely adverse or exceptionally beneficial. Impacts would have a substantial, highly noticeable, or widespread influence. The action would result in a permanent loss or alteration of soils in a relatively large area.</p> <p style="text-align: center;"><i>Criteria for Determining Impairment</i></p> <p>An impact would more likely constitute an impairment to the extent that it affects a resource or value whose conservation is</p> <ul style="list-style-type: none"> <li>• necessary to fulfill specific purposes identified in the parks’ enabling legislation,</li> <li>• key to the natural or cultural integrity of the parks or to opportunities for enjoyment of the parks, or</li> <li>• identified as a goal in this general management plan or other relevant NPS planning documents.</li> </ul>
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agement and reestablishing fire as a natural component within the parks’ ecosystems.

**Impacts of the No-Action Alternative**

**Analysis.** Increased visitor use such as hiking, camping, and horseback riding would contribute to adverse impacts on park soils and vegetation (such as soil compaction, erosion, trampling and loss of vegetative cover, and introduction and spread of nonnative species). However, increased use would most likely occur in areas that already experience high to moderate levels of activity. Limits on overnight backcountry use would not change. Because management pro-

grams to minimize impacts would continue to be used (e.g., visitor education on the impacts of off-trail use, site hardening, trail paving, placement of fences to direct visitor use, designated trails and campsites, higher standard trails where stock use is prevalent, and restoration of impacted sites), any additional impacts from increased use would likely be negligible to minor. These impacts would become more extensive or moderate in intensity if use increased in lightly used or undisturbed areas or where trails were in poor condition or not clearly defined.

Trampling of vegetation could lead to the development of informal trails, resulting in vegetation

loss and soil compaction and erosion, particularly in areas where soils are on slopes or are easily erodible or saturated, or in areas where vegetation is less resistant or resilient. Increased use could also spread exotic species from seeds carried in on vehicles, clothing, or stock, affecting local plant populations. However, most park areas would remain undeveloped and without trails; they would receive little, if any, use.

Developed areas would total about 1,745 acres (0.2% of total park acreage) under the no-action alternative. Some developed areas would be redesigned or reduced in scale (e.g., rebuilding portions of the Lodgepole campground, potentially removing structures on inholdings that were purchased from willing sellers). Such actions would reduce understory trampling, compaction, and soil erosion associated with the use of these facilities, allowing for the revegetation and restoration of more natural conditions. These actions would affect a limited number of sites within the parks, reducing but not eliminating use and development in larger developed areas, with minor, beneficial, long-term effects to vegetation and soils within the montane forest and chaparral communities.

**Cumulative Impacts.** Cumulative effects on vegetation and soils are based on an analysis of past, present, and reasonably foreseeable actions in the Sierra Nevada region, in combination with the potential effects of this alternative. Whereas widespread, more intensive impacts have occurred throughout the region, this alternative's contribution to those effects would be incremental and localized.

As described in the "Regional Context" section, lands within the greater Sierra Nevada region have been and will likely continue to be altered by timber harvest, grazing, agriculture, mining, development, water diversions, loss of fire regime, and recreational use, as well as regional population growth and air pollution. Impacts on regional native vegetation patterns and soils have been long term, major, and adverse because of displaced vegetation, reduced plant species diversity and density, introduced exotic species,

fragmented habitats, and widespread erosion and sedimentation.

Within the parks some ongoing and future restoration (e.g., the Giant Forest area), as well as continued vegetation and fire management programs, would benefit resources by restoring more natural vegetation patterns and processes. Proposed development (e.g., expanded concession facilities at Grant Grove and Wuksachi village, the Giant Forest transit system) would have minor, short-term impacts related to construction that would be mitigated through best management practices (e.g., erosion and sediment controls and revegetation). Other beneficial effects are expected from some actions to address ecosystem management issues on lands adjacent to the parks (including the Sierra Nevada Framework for Conservation and Collaboration, as well as management plans for adjacent wilderness areas and for Giant Sequoia National Monument).

Even though some actions in and around the parks could have beneficial effects, long-term cumulative impacts on regional vegetation and soils would continue to be major and adverse because the regional ecosystems in the greater Sierra Nevada have been highly impacted by past and continuing land use and development. The no-action alternative would contribute both beneficial and adverse localized and primarily minor impacts to the cumulative impacts.

**Conclusion.** The no-action alternative would continue to have negligible to possibly moderate, localized, adverse, long-term impacts on vegetation and soils, primarily in existing areas of concentrated use and development.

On a cumulative basis, the no-action alternative would contribute localized, incremental, minor to moderate, adverse effects and minor beneficial effects on vegetation and soils. In conjunction with past, present, and reasonably foreseeable future actions, there would be major, adverse, long-term, cumulative impacts to vegetation and soils throughout the region because of vegetation displacement, reduced plant species diversity and density, exotic species, habitat

fragmentation, and widespread erosion and sedimentation.

In accordance with the criteria for determining impairment, there would be no impairment of park resources or values.

### **Impacts of the Preferred Alternative**

**Analysis.** Under the preferred alternative there would be increased visitation and some additional development, primarily in the parks' frontcountry. Development zones would increase by 142 acres, to a total of 1,887 acres, an 8% parkwide increase compared to the no-action alternative, but only about 0.2% of the total park acreage. The construction and use of new facilities would result in the compaction and displacement of soil and the loss of vegetation at the proposed construction sites. Short- and long-term adverse impacts would likely be minor because these developments would affect limited areas, would be located primarily within existing developed areas or previously disturbed sites, and would be mitigated to the extent possible through the use of best management practices.

Increased use would most likely occur in developed areas, along existing higher use trails, and on the expanded frontcountry trail system. Resulting use impacts would be localized and would include soil compaction, erosion, and trampling, resulting in vegetation loss. Because most of these areas already receive high to moderate levels of use, and because measures to minimize impacts (e.g., site hardening, fencing, designated trails and campsites, higher standard trails where stock use is prevalent, and visitor education) would continue to be taken, additional impacts would likely be negligible to minor and primarily associated with an expanded trail system.

Limiting overnight backcountry use as needed to protect resources, along with refining the commercial stock use permit system, should result in fewer impacts to soils and vegetation. Localized benefits to soils and vegetation would be negligible to moderate; the most improved conditions would occur in more heavily impacted areas

where use was curtailed. An additional high Sierra tent camp would be assessed. If added to the Hockett Plateau area, it would likely result in localized, moderate, long-term impacts in the camp area, but related additional use on the plateau would be widely dispersed, with minor, adverse impacts.

**Cumulative Impacts.** Whereas widespread, more intensive impacts have occurred regionally, this alternative's contribution to those effects would be incremental and localized.

As described in the "Regional Context" section, lands in the greater Sierra Nevada region have been and will likely continue to be altered by timber harvest, grazing, agriculture, mining, development, water diversions, loss of fire regime, and recreational use, as well as regional population growth and air pollution. Impacts on regional native vegetation patterns and soils have been major, adverse, and long term because of vegetation displacement, reduced plant species diversity and density, exotic species, habitat fragmentation, and widespread erosion and sedimentation.

Within the parks some ongoing and future restoration (e.g., the Giant Forest area), as well as continued vegetation and fire management programs, would benefit resources by restoring more natural vegetation patterns and processes. Proposed development projects (e.g., expanded concession facilities at Grant Grove and Wuksachi, and the Giant Forest transit system) would have minor, site-specific, short-term, construction-related impacts that would be mitigated through best management practices (e.g., erosion and sediment controls and revegetation). Beneficial impacts are also expected from some actions to address ecosystem management issues on lands adjacent to the parks (including the Sierra Nevada Framework for Conservation and Collaboration, as well as management plans for adjacent wilderness areas and for Giant Sequoia National Monument).

While some actions in the parks and region could have beneficial, long-term effects, overall impacts of past, present, and reasonably foresee-

able actions throughout the region in conjunction with the impacts of the preferred alternative would result in major, adverse, long-term cumulative impacts. Over the long term the preferred alternative would contribute a minor to moderate, beneficial effect by limiting, replacing, or redesigning facilities, and by precluding increased water withdrawals. It would also contribute a negligible to minor, adverse, short-term increment to these effects as a result of limited new development. Increased development and dispersal of backcountry use under the preferred alternative would have a minor, adverse, long-term contribution to cumulative effects, while improving the trail system and reducing the extent of high-use backcountry areas would have a minor, beneficial, long-term effect.

**Conclusion.** Limiting backcountry use to improve resource conditions would result in minor to moderate, localized, beneficial, long-term effects. The construction and use of new facilities would result in minor, site-specific, adverse, short- and long-term impacts. The development zone would increase by 142 acres, an 8% increase, compared to the no-action alternative.

On a cumulative basis, the preferred alternative would contribute minor to moderate beneficial effects from improved conditions within the parks, as well as some site-specific, minor, facility-related adverse impacts. In conjunction with past, present, and reasonably foreseeable actions, there would be a continuation of major, adverse, long-term, cumulative impacts throughout the region because of displaced vegetation, reduced plant species diversity and density, exotic species, habitat fragmentation, and widespread erosion and sedimentation.

As described for the no-action alternative, there would be no impairment of park resources or values.

## Impacts of Alternative A

**Analysis.** Alternative A would reduce use and development within the parks, as developed zones would decrease by approximately 435 acres, for a total of 1,310 acres (0.15% of total

park acreage); this decrease would represent approximately a 25% decrease in development compared to the no-action alternative. The removal of some facilities, along with reduced trampling of understory vegetation, and less soil compaction and erosion associated with facility use and maintenance, would allow for the restoration of landforms, soils, and vegetation in site-specific areas (primarily montane forest and foothills communities and to a lesser extent alpine vegetation communities). Redesigning most campgrounds and some parking areas would result in similar benefits. Compared to the no-action alternative, these actions would have minor to moderate, long-term benefits to soils and vegetation in localized areas. Because these benefits would be limited in extent, they would be negligible.

Facility removal, as well as limited new construction on previously disturbed sites, would disturb vegetation and soils in localized areas, but with mitigating measures as described in the “Alternatives” chapter, impacts would be minor and short term.

The extent and intensity of impacts from relocating NPS and concession operational facilities outside the parks would depend on site-specific conditions and project design, but with careful siting and facility design, along with mitigating measures to minimize long-term impacts, impacts would be site-specific and minor to moderate in intensity. Further environmental analysis would be completed prior to construction.

Reduced use and fewer trails in developed areas and in the backcountry would result in fewer impacts to soils and vegetation compared to the no-action alternative. Banning firewood gathering and campfires in the backcountry would increase sparse woody material, benefiting high-elevation soils and plant communities through increased soil nutrients and microhabitats for plants. Localized benefits to soils and vegetation would be negligible to minor, with some of the most improved conditions occurring where high-use trails and use were removed.

Stock use would be prohibited under this alternative. The use of horses and mules causes

relatively more impacts on trails and campsites than comparable use by humans — for example wider trails, much larger campsites, and greater exposures of bare mineral soils, greater compaction and loss of organic matter, and slower infiltration rates (Cole 1989; McClaran and Cole 1993). Consequently, the extent of impacts such as trampling, root shearing, compaction, and erosion would be reduced where stock campsites were removed. The introduction of invasive plants from animal feed, pack equipment, and the animals themselves would also be eliminated. Minor, beneficial, long-term impacts would result primarily at pack stations, corrals, areas popular with stock users (such as the Hockett Plateau, the floor of the Kern Canyon, Rock Creek, Crabtree Meadows, Roaring River, Bubbs Creek, Monarch Divide, Evolution Basin, and LeConte Canyon), and administrative stock use areas (such as Lewis Camp, Hockett Plateau, Horseshoe Meadow, Kern Bridge Camp, and upper Rattlesnake Canyon).

**Cumulative Impacts.** As described in the “Regional Context” section, lands within the greater Sierra Nevada region have been and will likely continue to be altered by timber harvest, grazing, agriculture, mining, development, water diversions, loss of fire regime, and recreational use, as well as regional population growth and air pollution. Impacts on regional native vegetation patterns and soils have been major, adverse, and long term because of displaced vegetation, reduced plant species diversity and density, exotic species, fragmented habitats, and widespread erosion and sedimentation. Beneficial impacts are expected from some actions to address ecosystem management issues on lands adjacent to the parks (including the Sierra Nevada Framework for Conservation and Collaboration, as well as management plans for adjacent wilderness areas and for Giant Sequoia National Monument).

Even though the actions of this alternative in conjunction with other actions outside the parks would contribute beneficial, long-term effects in the region, overall there would be a net major, adverse, long-term, cumulative impact on vegetation and soil resources.

**Conclusion.** Alternative A would result in localized, minor to moderate, beneficial, long-term impacts from a reduction in use and development within the parks. The development zone would be reduced by 435 acres (25%). Facility removal and limited new development would result in minor to moderate, adverse, short-term impacts.

With regard to cumulative impacts, alternative A would result in incremental beneficial impacts within the parks. Regionwide, however, there would continue to be major, adverse, long-term, cumulative impacts on vegetation and soil resources.

Similar to the no-action alternative, there would be no impairment of park resources or values.

### Impacts of Alternative C

**Analysis.** Alternative C would expand overnight use and associated development, primarily within the parks’ frontcountry developed areas, resulting in increased use. Development zones would increase by 241 acres, encompassing approximately 1,986 acres (approximately 0.23% of the total park acreage); this would be a 14% increase in the development zone compared to the no-action alternative. New facility construction and use would cause soil compaction and displacement, as well as vegetation loss. However, short- and long-term adverse impacts would likely be minor because limited areas would be affected, present developed areas or previously disturbed sites would be used, and mitigating measures would be taken.

Soil compaction and erosion, along with vegetation trampling and loss, would likely increase in developed areas and to a lesser extent along other frontcountry trails and easily accessible backcountry areas. However, there would be a greater focus under this alternative on improving existing trail conditions, including measures to minimize impacts (e.g., site hardening, fencing, designated trails and campsites, higher standard trails where stock use is prevalent, visitor education, and restoration of disturbed areas). Localized impacts and the potential for social trails to

form would be slightly reduced compared to the no-action alternative, a negligible to minor benefit.

In the backcountry alternative C would reduce the amount of major trail corridors that allow higher, more concentrated human and stock use. This would reduce long-term, site-specific, adverse effects such as trampling, compaction, and erosion that are associated with these uses, a minor localized benefit. This alternative would also disperse use, which would likely result in more widely dispersed impacts of lower intensity over a larger portion of the backcountry. Dispersed use would result in the creation of new campsites, accompanied by soil loss, compaction, and erosion. More cross-country travel could also result in the unintended development of new user-created trails. However, low use levels, smaller party size, emphasis on low-impact practices, educating visitors to select resistant camping surfaces, or other possible management techniques would help minimize impacts. It is likely that new sites would not have more than minor, adverse, localized impacts, and that disturbance at existing sites would not increase beyond what is present now. Parkwide impacts to vegetation and soils from backcountry use would be negligible.

**Cumulative Impacts.** As described in the “Regional Context” section, lands within the greater Sierra Nevada region have been and will likely continue to be altered by timber harvest, grazing, agriculture, mining, development, water diversions, loss of fire regime, and recreational use, as well as regional population growth and air pollution. Impacts on regional native vegetation patterns and soils have been long term, major, and adverse because of displacement of vegetation, reduction in plant species diversity and density, introduction of exotic species, fragmentation of habitats, and widespread erosion and sedimentation. Beneficial effects are expected from some actions to address ecosystem management issues on lands adjacent to the parks (including the Sierra Nevada Framework for Conservation and Collaboration, as well as management plans for adjacent wilderness areas and for Giant Sequoia National Monument).

Alternative C would contribute a minor, beneficial, long-term impact by improving the existing trail system and reducing the extent of high-use backcountry areas. Increased development and dispersal of backcountry use would contribute a minor, adverse, long-term increment to cumulative effects. In conjunction with past, present, and reasonably foreseeable future actions, there would continue to be long-term, major, adverse impacts on regional vegetation and soils.

**Conclusion.** Some negligible to minor, beneficial, long-term impacts would occur as a result of improving the frontcountry trail system. Reducing the extent of high-use backcountry areas would result in minor to moderate, localized, long-term benefits. New facilities, as well as increased frontcountry use and dispersed backcountry use, would result in minor, site-specific, long-term impacts. The development zone would increase by 241 acres, or 14%, compared to the no-action alternative.

On a cumulative basis, alternative C would contribute a long-term, minor, beneficial effect by improving the existing trail system and reducing the extent of high-use backcountry areas. Increased development and dispersal of backcountry use would contribute a minor, adverse, long-term increment to cumulative effects. Combined with past, present, and reasonably foreseeable actions, there would continue to be major, adverse, long-term impacts on regional vegetation and soil resources.

Similar to the no-action alternative, there would be no impairment of park resources or values.

## Impacts of Alternative D

**Analysis.** Alternative D would expand development within the parks, primarily within frontcountry developed areas. Development zones would increase by approximately 388 acres, for a total of approximately 2,133 acres (approximately 0.25% of total park acreage); this would be a 22% increase in development compared to the no-action alternative. New facility construction and use would cause localized soil compaction and displacement and loss of vegetation.

Because new development would be located primarily within existing developed areas and at previously disturbed sites, and because impacts would be mitigated to the extent possible, short- and long-term adverse impacts would be minor.

Constructing a Grant Grove bypass would likely require extensive cut-and-fill earthwork and vegetation removal. The degree of impact would be related to the location of the roadway alignment and the site-specific conditions along the road corridor. The extent of adverse impacts would be minimized through careful design (e.g., siting to avoid sensitive plant communities and to follow existing road corridors wherever possible) and the application of mitigating measures during construction (e.g., slope stabilization / erosion control measures, revegetation). Adverse short-term impacts (during construction) and long-term impacts (direct displacement of resources by pavement) would likely be minor to moderate in intensity along the road corridor. Further environmental analysis would be completed prior to construction. The construction of a bypass within Giant Sequoia National Monument could be incompatible with the presidential proclamation establishing the national monument.

More visitors in developed areas, along higher use trails (including an expanded frontcountry trail system), and at additional pulloffs on Generals Highway would result in increased localized soil compaction and erosion, plus vegetation trampling and loss. Most of these areas already experience moderate to high levels of use, and measures to minimize impacts (e.g., site hardening, fencing, designated trails and campsites, higher standard trails for stock use, visitor education) would continue to be employed, so additional impacts would likely be negligible to minor. Most additional impacts would be associated with an expanded trail system and pulloffs on Generals Highway.

Greater use in the backcountry due to allowing more concentrated human and stock use (i.e., on major trail corridors), as well as allowing larger groups in these high-use areas, would not substantially increase impacts on soils and vegeta-

tion because most campsite impacts occur at low levels of use (Cole 1989). However, larger parties in general increase resource impacts since the rate and extent of impacts tends to increase with party size (Hammitt and Cole 1998). It is likely that backcountry impacts would increase to a negligible to minor degree. Establishing new high-use trail corridors and campsites to disperse use, educating users about more resistant camping surfaces, maintaining higher standard trails, and providing facilities like toilets and fire rings in high-use areas would help minimize and contain impacts, resulting in long-term, minor, adverse localized impacts. Adding a high Sierra camp in the Hockett Plateau area would likely result in long-term, localized, moderate impacts at the camp area; subsequent increased use throughout the plateau would be widely dispersed, with minor to moderate impacts. Separating trails and camping areas for stock and hikers should reduce impacts to a negligible to minor extent because horse and mule parties cause more impacts to soils and vegetation than humans on a per individual basis. Parkwide, impacts to vegetation and soils from backcountry use would be negligible.

**Cumulative Impacts.** As described in the “Regional Context” section, lands within the greater Sierra Nevada region have been and will likely continue to be altered by timber harvest, grazing, agriculture, mining, development, water diversions, loss of fire regime, and recreational use, as well as regional population growth and air pollution. Impacts on regional native vegetation patterns and soils have been long term, major, and adverse because of displacement of vegetation, reduction in plant species diversity and density, introduction of exotic species, fragmentation of habitats, and widespread erosion and sedimentation. Beneficial effects are expected from some actions to address ecosystem management issues on lands adjacent to the parks (including the Sierra Nevada Framework for Conservation and Collaboration, as well as management plans for adjacent wilderness areas and for Giant Sequoia National Monument).

Alternative D would contribute a negligible to moderate, adverse, long-term effect to cumulative

effects on vegetation and soils in the region. Combined with past, present, and reasonably foreseeable actions throughout the region, there would continue to be major, adverse, long-term impacts on vegetation and soils.

**Conclusion.** Constructing new facilities, including trails, would have negligible to minor, site-specific, long-term impacts; however, constructing a Grant Grove bypass road (if allowed) could have moderate impacts, depending on site-specific conditions and project design. The bypass could be incompatible with the purposes of Giant Sequoia National Monument. Concentrating use and allowing higher levels of use in the backcountry would result in an incremental increase in minor, long-term, localized impacts (e.g., compaction, erosion, trampling, loss of vegetation), primarily in new high-use areas. Adding a high Sierra camp in the Hockett Plateau area could result in moderate impacts as use increased. Designating a few trails for foot-traffic only should reduce impacts associated with stock use to a negligible to minor level. The development zone would increase by 388 acres, or 22%, compared to the no-action alternative.

On a cumulative basis, alternative D would contribute negligible to moderate adverse impacts on vegetation and soils. In conjunction with past, present, and reasonably foreseeable actions throughout the region, there would continue to be major, adverse, long-term impacts on vegetation and soil resources.

Similar to the no-action alternative, there would be no impairment of park resources or values.

## GIANT SEQUOIA GROVES

### Regional Context

As a species, giant sequoias have been particularly affected by the loss of the natural fire regime since frequent fire reduces competition for scarce resources and prepares the conditions needed for giant sequoia reproduction. Due to fire suppression over the past century, giant sequoia reproduction has virtually ceased in unburned groves. The ingrowth and accumula-

tion of shade-tolerant, but fire-intolerant species, such as white fir, have resulted in conditions hospitable to widespread, intense, and damaging fire events. The alteration of natural grove conditions in many groves outside the parks (both previously logged and non-logged) are at risk due to the lack of giant sequoia regeneration and hazardous fuel buildup, resulting in a major adverse effect. Management goals to protect, restore, and conserve giant sequoia ecosystems should reduce the threat of intensive fires and improve ecological conditions over the long term.

About 30% of all naturally occurring sequoia groves have been logged, with the heaviest logging (including most or all of the large sequoias) occurring between 1880 and 1920. As the result of recent policy changes, the U.S. Forest Service and the National Park Service, which collectively manage just over three quarters of all sequoia groves, now share similar sequoia management goals to protect, restore, and conserve giant sequoia ecosystems.

Other continuing and future threats to sequoia ecosystems include air pollution, unnatural effects of pathogens, and anthropogenic climate change. These threats have the potential to result in major adverse impacts, such as the decline of several tree species that are part of the giant sequoia grove structure, foliar injury to sequoia seedlings, failure in sequoia reproduction, and increased mortality from prolonged droughts (NPS 1999d; SNEP 1996).

### Park Context

Prior to being added to the parks, the Atwell Mill, Big Stump, Squirrel Creek, Redwood Mountain, and Dillonwood groves were partially logged. Initial NPS efforts to preserve the groves, particularly individual specimen trees, included protection from damage by natural processes such as fire. Since the advent of ecologically based management in the 1960s, the giant sequoia groves have been managed as integral to the ecosystem, and natural processes are allowed to shape the communities. Prescribed fires for both fuel and ecosystem management have led to

*Impact Thresholds for Giant Sequoia Groves*

**Negligible** — The impact would be at the lower levels of detection or not measurable.

**Minor** — The impact would be detectable, but it would not affect the viability of the local population or overall community size, structure, or composition.

**Moderate** — The impact would be clearly detectable and could have an appreciable effect on the resource. This would include impacts that affect the abundance or distribution of local populations, but it would not affect the viability of the regional population. Localized changes to community size, structure, or composition and ecological processes could occur.

**Major** — The impact would be severely adverse or exceptionally beneficial. Impacts would have a substantial, highly noticeable, or widespread influence, affecting the abundance or distribution of a local or regional population to the extent that the population would not be likely to recover (adverse) or would return to a sustainable level (beneficial). Community size, structure, or composition and ecological processes would be highly altered, and landscape level changes could be expected.

*Criteria for Determining Impairment*

An impact would more likely constitute an impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the parks' enabling legislation,
- key to the natural or cultural integrity of the parks or to opportunities for enjoyment of the parks, or
- identified as a goal in this general management plan or other relevant NPS planning documents.

reduced threats from damaging fire, and the condition of giant sequoia groves has been improved where fires have occurred. In the 1980s the National Park Service began the removal of

lodging and other commercial facilities from the Giant Forest grove.

Ground and surface water conditions are critical to the reproduction and maintenance of sequoias, particularly during the late summer and fall (Rundel 1972; NPS 1986a). If stressed by drought, sequoia seedlings along the margins of groves may die, and the crown foliage of mature trees may brown. High mortality rates of first-year seedlings can be attributed to desiccation during the summer. Groundwater investigations have been proposed to determine potential effects of groundwater levels or water withdrawals on sequoia groves. Water withdrawals have been occurring for many decades, and the effects on the viability or failure rates among sequoias are not evident, although effects could be subtle and could take decades or more to become evident.

**Impacts of the No-Action Alternative**

**Analysis.** Giant sequoia groves would continue to be managed as integral to the ecosystem, and natural processes would be allowed to shape the communities. A number of large specimen trees (e.g., the General Grant and General Sherman trees) and other sequoia snags, stumps, and logs (e.g., Tunnel Log, Tharp's Log) would continue to be managed to perpetuate their condition and appearance. To achieve these goals, fire fuels, understory growth, and nearby viewsheds in localized areas would continue to be managed, and there would be no additional impacts.

Roads, parking areas, campgrounds, and trails associated with sequoia groves would not change, except that facilities would continue to be removed from Giant Forest. Prescribed fires would continue to be used to preserve the groves' ecological integrity, to reduce the threat of damaging fires caused by high fuel buildup, and to stimulate giant sequoia reproduction. One campground within a sequoia grove would continue at Atwell Mill. Visitor use would continue to be managed in high-use areas to minimize impacts from trampling and soil compaction (e.g., paved trails, fencing in areas of heavy foot traffic). These impacts have already occurred to varying degrees, with disturbance more preva-

lent in higher use groves (e.g., Giant Forest, Grant Grove, Big Stump). Overall, impacts from increasing use are expected to remain localized and negligible to minor.

Surface and subsurface water withdrawals would continue at Grant Grove and Atwell Mill. As described under the “Context” section, ground and surface water conditions are critical to the reproduction and maintenance of sequoias, particularly during the late summer and fall. Water consumption is relatively low at Atwell Mill (approximately 18,600 gallons/year) and is not expected to change under the no-action alternative. Water withdrawals at Grant Grove average 33,500 gallons per day during the peak season. Withdrawals are from the Sequoia Creek, Mill Flat Creek, and Abbott Creek drainages; the primary water source for the Grant Grove developed area is Round Meadow, which drains into Abbott Creek. There is no verified groundwater connection between Abbott Creek and the Mill Flat and Sequoia Creek drainage systems. However, if these drainage systems were connected, then water withdrawals from Round Meadow could affect groundwater in the Grant Grove and sequoia groves to the south (NPS 1988).

Current programs to minimize impacts to the hydrology at Grant Grove and potential impacts to other groves would continue. Passive conservation measures (e.g., low-flow fixtures) have been installed as facilities have been replaced or constructed. Active conservation measures (e.g., closing public showers and laundry facilities) might have to be employed during drought years. Continued replacement and rehabilitation of leaking water lines would also reduce usage. Based on these factors, peak-season water consumption at Grant Grove under the no-action alternative is not expected to increase.

**Cumulative Impacts.** Cumulative effects on sequoia groves are based on an analysis of past, present, and reasonably foreseeable actions in the Sierra Nevada region. Whereas widespread, more intensive impacts have occurred on the regional level, this alternative’s contribution to those effects would be incremental and localized.

As described in the regional and park context sections, giant sequoia groves in the park as well as the region will continue to be affected by various cumulative impacts. Ongoing threats include air pollution, unnatural effects of pathogens, and anthropogenic climate change. Fire suppression over the past century has especially affected sequoia reproduction and led to an unnatural build-up of forest fuels. Current ecosystem management goals for groves under the jurisdiction of the U.S. Forest Service and the National Park Service should reduce the threat of intensive fires and improve ecological conditions over the long term.

Over 1,800 acres in the Dillonwood Grove were added to the park in 2001, and experimental management techniques would be continued, which would also support expanding knowledge about sequoia management. Also, the creation of Giant Sequoia National Monument under the U.S. Forest Service would further protect sequoia groves and their ecosystem.

In the 1980s the National Park Service began to remove overnight lodging and other commercial facilities from Giant Forest in order to restore more natural conditions. This restoration program, which will continue day use in the area, will continue through about 2005. The result should be a long-term, major benefit to the ecological integrity of Giant Forest.

The expansion of overnight concession facilities at Grant Grove is continuing in accordance with the 1988 *Grant Grove and Redwood Mountain Development Concept Plan and Final Environmental Impact Statement* and subsequent concession contract. The John Muir Lodge was completed and opened in 2000. Full development includes additional rustic cabins and lodges. No construction would occur within the grove; however, projected Grant Grove peak water consumption is expected to increase to approximately 53,650 gallons per day with full buildout. Existing water withdrawals (averaging 33,500 gallons/day during the peak use season), plus 1.2 million gallons of stored water, should be sufficient to meet demand. The storage tank is filled during the peak runoff period (January to April),

thus avoiding increased water withdrawals from Round Meadow during the peak use season. While the storage tank is being filled, water flow into Abbot Creek is reduced by about 10%, with negligible impacts. Water withdrawals would not be increased beyond 35,500 gallons per day, and conservation efforts to minimize consumptive uses would be implemented if water was insufficient to meet demand. Additional active conservation measures would likely be necessary during drought years. Consequently, no additional hydrological impacts are expected during the peak use months (also the dry season).

Overall, past, present, and reasonably foreseeable future actions, in conjunction with the no-action alternative, would have major, beneficial, long-term effects due to reduced fire threats and improved ecological conditions. However, past actions have altered groves throughout the region, making them more prone to intense wildfires and other threats, such as regional air pollution and anthropogenic climate change. The resulting impacts of these actions are long term, major, and adverse. The no-action alternative would contribute a minor, adverse, long-term effect to the overall cumulative impact.

**Conclusion.** Giant sequoia groves would continue to be managed as integral to the ecosystem. Grove conditions within some high-use groves would continue to be manipulated or altered to maintain specimen trees or to accommodate visitor use and development but would not result in additional impacts. Some risk and danger to users of the Atwell Mill campground would continue due to the potential for falling trees and limbs. Impacts associated with future visitor use increases would be mitigated to the extent possible, and impacts would be negligible to minor, localized, long term, and adverse. Present water withdrawals at Atwell Mill, Redwood Mountain, and Grant Grove may be contributing to moisture stress within sequoia groves within affected drainages; however, there is no direct evidence of impacts at present. Water consumption is relatively low at Atwell Mill and Redwood Mountain, and it is not expected to change under the no-action alternative. More day use at Grant

Grove would raise annual water consumption; but water management and conservation measures should preclude higher summer water withdrawals, with no additional impacts.

Because of the uncertainty of the impacts on giant sequoia systems, no increased water withdrawals would occur until future studies had been completed and a monitoring program implemented to determine impacts. Water system modifications or other mitigating measures to reduce or eliminate potential impacts would be investigated.

On a cumulative basis, the addition of the Dillonwood Grove to the park and the creation of Giant Sequoia National Monument under the U.S. Forest Service have increased the overall protection of sequoia groves throughout the region. The no-action alternative would contribute incrementally to minor, adverse, long-term impacts on a cumulative basis because of increased use within some groves. Most of the adverse cumulative impacts to sequoias throughout the region have resulted from past activities, such as logging and fire suppression, that have caused widespread alteration of groves. Consequently, groves are more prone to intense wildfires and other major threats (e.g., regional air pollution and climate change) that could result in major adverse effects. Present programs such as prescribed burning would continue to improve grove conditions.

While the effects that water withdrawals may have on hydrologic systems within sequoia groves and on the trees themselves are not known, there is no current evidence of major effects. There would be no impairment of park resources or values.

### **Impacts of the Preferred Alternative**

**Analysis.** Giant sequoia groves would continue to be managed as integral to the ecosystem; natural processes would be allowed to shape the communities. Because of the uncertainty of water withdrawal impacts on giant sequoia systems, water withdrawals at Grant Grove during the peak season would not be increased,

and additional conservation measures would be implemented to reduce withdrawals if possible. The preferred alternative should not result in any additional impacts and could result in potentially minor benefits depending on the extent of the reduction in water withdrawals.

Use in the Atwell Mill Grove would be reduced and the campground removed, resulting in fewer localized user impacts, such as soil compaction and trampling and displacement of vegetation, a negligible to minor benefit. Removing the campground would also reduce water demand and withdrawals of surface and subsurface water at Atwell Mill. Consistent with actions related to other sequoia groves, converting to day use only would result in less danger of falling trees and limbs injuring people.

In conjunction with the interpretive program at Big Stump, fire fuels, understory growth, and the viewshed would be manipulated at this grove to help maintain the visibility of elements of past logging (e.g., sequoia stumps and mill sawdust piles). This manipulation would be limited in extent, and most of the grove would continue to be managed as part of the ecosystem, with natural processes allowed to shape the communities. Adverse impacts would be localized, minor, and long term.

Increased visitor use at Grant Grove and Big Stump Basin would contribute to trampling and soil compaction. These impacts have already occurred to varying degrees, with disturbance more prevalent in higher use groves like Grant Grove. Visitor use would continue to be managed to minimize impacts to sequoias, with higher use areas requiring more intensive measures (e.g., paved trails and fencing in areas of heavy foot traffic). Impacts would be localized and negligible to minor.

At Dillonwood modest levels of day use and education would be accommodated in addition to research. Experimental sequoia forest management techniques would be continued, and a plan for long-term management would be developed. Grove health would be monitored. Further planning at Dillonwood would identify appro-

priate uses and facilities and mitigation measures to protect grove health. Facilities would not be placed in the grove. Any development and use accommodated at Dillonwood would result in the permanent displacement of soils and vegetation. With mitigation measures, these long-term impacts would be localized and minor.

**Cumulative Impacts.** Cumulative impacts on sequoia groves are based on analyses of past, present, and reasonably foreseeable actions in the Sierra Nevada region, in combination with potential effects of this alternative. Whereas widespread, more intensive impacts have occurred on the regional level, this alternative's contribution to those effects would be incremental and localized.

As described in the regional and park context sections, giant sequoia groves in the park and region will continue to be affected by various impacts on a cumulative basis. Fire suppression over the past century has especially affected sequoia reproduction, leading to an unnatural build-up of forest fuels. Current ecosystem management goals for groves managed by the U.S. Forest Service and the National Park Service should reduce the threat of intensive fires and improve long-term ecological conditions. Other ongoing and future threats include air pollution, the unnatural effects of pathogens, and anthropogenic climate change.

The ongoing restoration of Giant Forest would improve the ecological integrity of this grove, a major, long-term benefit.

The continued expansion of concession facilities at Grant Grove is not expected to have additional hydrological impacts during the drier peak months. Present water withdrawals (average 33,500 gallons/day during the peak use season) and stored water (1.2 million gallons) should provide sufficient supply to meet demand from expanded concession facilities. Water withdrawals would not be increased, and conservation efforts to reduce consumptive uses would be implemented if water was insufficient to meet demand. Additional conservation measures

would be necessary during drought years. While the water storage tank is being filled, water flow into Abbot Creek would be reduced by a maximum of 10%, with a negligible impact, the same as the no-action alternative.

As described under the no-action alternative, the addition of Dillonwood to Sequoia National Park and the creation of Giant Sequoia National Monument have increased the protection of sequoia groves in the region. Experimental sequoia forest management techniques would be continued in the Dillonwood Grove, which would support expanding knowledge about sequoia ecosystem management.

Overall, past, present, and reasonably foreseeable future actions, in conjunction with the preferred alternative, could have major, beneficial, long-term effects due to reduced fire threats and improved ecological conditions. However, past management of giant sequoia groves (e.g., logging, fire suppression) have altered groves throughout the region and made them more prone to intense wildfires and other threats, such as regional air pollution and anthropogenic climate change. The resulting impacts of these actions are major and adverse. The preferred alternative would contribute a minor, beneficial, long-term effect as a result of reduced water withdrawals, visitor use, and development within some groves. The preferred alternative would also contribute additional incremental minor, adverse impacts from increased use within some groves, which would be mitigated.

**Conclusion.** Giant sequoia groves would continue to be managed as integral to the ecosystem. Not allowing development zones in sequoia groves would improve resource conditions. Not increasing peak-season water withdrawals at Grant Grove, and implementing additional conservation measures to reduce withdrawals, could result in beneficial effects, depending on the extent to which withdrawals were decreased. Other actions under the preferred alternative should not result in any additional impacts on giant sequoia groves.

Manipulating or altering grove conditions at Big Stump to maintain site-specific conditions related to historic logging and to accommodate increased visitor use, along with limited new facilities in some groves, would result in negligible to minor, localized, adverse impacts, with intensive visitor management and other measures used to minimize impacts.

On a cumulative basis, the addition of the Dillonwood Grove to the park and the creation of Giant Sequoia National Monument have increased the overall protection of sequoia groves. The preferred alternative would contribute incrementally to minor, beneficial, long-term effects by prohibiting and removing development in all sequoia groves, improving Grant Grove hydrology, and reducing development and use within the Atwell Mill Grove. The preferred alternative would contribute incremental, negligible to minor, localized impacts as a result of increased day use within some groves. As described for the no-action alternative, most major cumulative impacts have resulted from past management activities, such as logging and fire suppression, which have altered sequoia groves throughout the region and made them more prone to intense wildfires and other threats. More recent ongoing programs (such as prescribed burning and restoration efforts) would continue to improve grove conditions.

There would be no impairment of park resources or values.

### **Impacts of Alternative A**

**Analysis.** Alternative A would reduce use and development in some areas of the Grant Grove and Atwell Mill Grove. This would result in fewer user-related impacts such as soil compaction and trampling of vegetation, a negligible to minor benefit. Reducing parking and the trail system at the Grant Tree, removing the Atwell Mill campground from a second-growth portion of the grove, and restoring these areas would result in localized minor benefits.

Reducing facilities and levels of use would reduce water demand and withdrawals of surface

and subsurface water at Grant Grove and Atwell Mill. Reductions could be substantial due to the removal of overnight facilities, which use up to 75% more water than day facilities. Reducing impacts to grove hydrology and potential contributions to moisture stress on the General Grant Grove, sequoia groves south of the Grant Grove, and the Atwell Mill Grove would be a long-term benefit.

Low levels of use and education would be accommodated in the Dillonwood Grove, as well as research. The health of this grove would be protected by continuing experimental sequoia forest management techniques, developing a plan for long-term management, and monitoring the grove's health. Further planning at Dillonwood would identify appropriate uses and facilities and mitigation measures to protect the grove. Any development accommodated at Dillonwood would result in the permanent displacement of soils and vegetation. With mitigation measures, these long-term impacts would be localized and minor.

**Cumulative Impacts.** As described in the regional and park context sections, giant sequoia groves in the park and region will continue to be affected by various impacts on a cumulative basis. Ongoing threats include air pollution, unnatural effects of pathogens, and anthropogenic climate change. Current ecosystem management goals for groves managed by the U.S. Forest Service and the National Park Service should reduce the threat of intensive fires and improve ecological conditions over the long term.

The ongoing restoration of Giant Forest would improve the ecological integrity of the grove, a long-term, major benefit.

The continued expansion of concession facilities at Grant Grove is not expected to cause additional hydrological impacts during the drier peak months because existing water withdrawals (average 33,500 gallons/day) and stored water should meet demand. Water withdrawals would not be increased, and conservation efforts to reduce consumptive uses would be implemented

if water was insufficient to meet demand. Additional active conservation measures would likely be necessary during drought years. While the water storage tank is being filled, water flow into Abbot Creek would be reduced by a maximum of 10%, with a negligible impact, the same as the no-action alternative.

The addition of the Dillonwood Grove to Sequoia National Park and the creation of Giant Sequoia National Monument have increased the regional extent of giant sequoia protection. Experimental sequoia forest management techniques at the Dillonwood Grove would support expanding knowledge about sequoia ecosystem management.

Alternative A would contribute a minor, beneficial, long-term increment to overall cumulative impacts.

**Conclusion.** Giant sequoia groves would continue to be managed as integral to the ecosystem. Alternative A would have localized negligible to minor benefits on the General Grant and Atwell Mill Groves because use and the amount of facilities would be reduced, resulting in less withdrawal of surface and subsurface water. Reductions could be substantial due to the removal of overnight facilities, which use approximately 75% more water than day facilities. Reducing impacts to grove hydrology and potential contributions to moisture stress on Grant Grove, sequoia groves south of Grant Grove, and Atwell Mill Grove would be a long-term benefit.

On a cumulative basis, as described for the no-action alternative, the addition of the Dillonwood Grove to Sequoia National Park and the creation of Giant Sequoia National Monument have increased the overall protection of sequoia groves in the region. Alternative A would contribute incrementally to a minor, long-term benefit to sequoia groves because development and use within some groves would be reduced. Most adverse cumulative impacts to giant sequoias have resulted from past activities, which have altered groves throughout the region and made them more prone to intense wildfires and other threats. Some ongoing programs (such as

prescribed burning) would continue to improve grove conditions.

There would be no impairment of park resources or values.

### **Impacts of Alternative C**

**Analysis.** Actions at Big Stump to support the interpretive program (such as manipulating fire fuels, understory growth, and viewsheds) would be limited in extent, and most of the grove would continue to be managed as integral to the surrounding ecosystem, with natural processes shaping the communities. Adverse, long-term impacts would be localized and minor.

Increased visitor use at Grant Grove, Redwood Mountain Grove, Atwell Mill, Big Stump, and Dillonwood would contribute to trampling and soil compaction. These impacts have already occurred to varying degrees, with disturbance more prevalent in higher use groves like Grant Grove. Visitor use would continue to be managed to minimize impacts to sequoias, with higher use areas requiring more intensive measures (e.g., paved trails, fencing in areas of heavy foot traffic). Continued camping at the Atwell Mill campground would result in some risk of trees and limbs falling in overnight use areas. Impacts would be localized and negligible to minor.

Expanding development within the General Grant Grove (shuttle stops, accessible parking and trails) and the Atwell Mill Grove (a campground), and new development at Dillonwood would all permanently displace soils and vegetation. With mitigation measures, these long-term impacts would be localized and minor.

Increased visitor use and development at Grant Grove and Atwell Mill would increase water consumption. As described under the "Context" section, ground and surface water conditions are critical to the reproduction and maintenance of sequoias. Existing water consumption is relatively low at Atwell Mill (approximately 18,600 gallons/year), and water consumption even with a larger campground would still be relatively

low. Existing water withdrawals at Grant Grove average 33,500 gallons per day during the peak season. Because of the uncertainty of water withdrawal impacts on giant sequoia systems, peak-season water withdrawals within the park would not be increased, and a monitoring program would be implemented. If it was determined that new water sources had to be sought outside the parks, studies would need to be undertaken to ensure that there would be no adverse effects on other sequoia groves. With mitigating measures and no additional peak-season water withdrawals at Grant Grove, alternative C should not result in any additional impacts.

Low levels of use and education would be accommodated in the 1,800-acre Dillonwood Grove, in addition to research. Experimental sequoia forest management techniques would be continued, and a plan for long-term resource management would be developed. Grove health would be monitored. Further planning at Dillonwood would identify appropriate uses, facilities, and mitigation measures to protect grove health. Any development accommodated at Dillonwood would result in the permanent displacement of soils and vegetation. With mitigation measures, these long-term impacts would be localized and minor.

**Cumulative Impacts.** As described under the regional and park context sections, giant sequoia groves in the park and region will continue to be affected by various impacts on a cumulative basis. Ongoing threats include air pollution, unnatural effects of pathogens, and anthropogenic climate change. Current ecosystem management goals for groves managed by the U.S. Forest Service and the National Park Service should reduce the threat of intensive fires and improve ecological conditions over the long term.

The ongoing restoration of Giant Forest would improve the ecological integrity of the grove, a long-term, major benefit.

The expansion of concession facilities at Grant Grove is not expected to have additional hydrological impacts during the drier peak months.

Existing water withdrawals and stored water should meet demand from expanded facilities; additional active conservation measures would likely be necessary during drought years. Water withdrawals would not be increased, and conservation efforts to reduce consumptive uses would be implemented if there was insufficient water to meet demand. During the filling of the water storage tank, water flow into Abbot Creek is decreased by about 10%, with a negligible impact, the same as the no-action alternative.

The addition of the Dillonwood Grove to Sequoia National Park and the creation of Giant Sequoia National Monument have increased the extent of giant sequoia protection in the region. Experimental sequoia forest management techniques at the Dillonwood Grove would support expanding knowledge about sequoia ecosystem management.

Alternative C would contribute incrementally to a minor, adverse, long-term impact on a cumulative basis.

**Conclusion.** Giant sequoia groves would continue to be managed as integral to the ecosystem. Localized manipulation or alteration of grove conditions at Big Stump to maintain conditions related to historic logging, along with limited new facilities within some groves to accommodate increased visitor use, would result in minor, adverse impacts. Increased visitor use and development at Grant Grove and Atwell Mill would increase water consumption. Because of the uncertainty of water withdrawal impacts on giant sequoia systems, no increased peak-season water withdrawals would occur. If new water sources had to be sought outside the parks, studies would need to be undertaken to ensure that there would be no adverse effects on other sequoia groves. With mitigating measures and no peak-season increased water consumption at Grant Grove, alternative C should not result in any additional impacts.

On a cumulative basis, as described for the no-action alternative, the addition of the Dillonwood Grove to Sequoia National Park has increased the overall protection of sequoia

groves. On a cumulative basis alternative C would have a minor, adverse, long-term impact to sequoia groves because of increased development and use within some groves. Most adverse cumulative impacts to giant sequoias have resulted from past activities such as logging and fire suppression, which have altered groves throughout the region and made them more prone to intense wildfires and other threats. Ongoing programs such as prescribed burning would continue to improve grove conditions.

There would be no impairment of park resources or values.

## Impacts of Alternative D

**Analysis.** At Big Stump local conditions (fire fuels, understory growth, and viewsheds) would be manipulated to support the interpretive program. Impacts would be limited in extent, and most of the grove would continue to be managed as integral to the ecosystem, with natural processes shaping the community. Long-term adverse impacts would be localized and minor.

Increased visitor use at Grant Grove, Redwood Mountain, Atwell Mill, Big Stump, Muir, and Dillonwood groves would contribute to trampling and soil compaction. These impacts have already occurred to varying degrees, with disturbance more prevalent in higher use groves like Grant Grove. Visitor use would continue to be managed to minimize impacts to sequoias, with higher use areas requiring more intensive measures (e.g., paved trails, fencing in areas of heavy foot traffic). Continued camping at the Atwell Mill campground would result in some risk of trees and limbs falling in overnight use areas. Impacts would be localized and negligible to minor.

Expanding development within the Grant Grove (shuttle stops, accessible parking and trails) and Atwell Mill Grove (a campground), along with converting or adding facilities at Dillonwood, would permanently displace soils and vegetation. With mitigating measures, the long-term impacts would be localized and minor.

Increased visitor use and development at Grant Grove and Atwell Mill would increase water consumption. Present water consumption is relatively low at Atwell Mill (approximately 18,600 gallons/year), and water consumption with an expanded campground would still be relatively low. Existing water withdrawals at Grant Grove average 33,500 gallons per day during the peak season. Because of the uncertainty of water withdrawal impacts on giant sequoia systems, no increased peak-season water withdrawals would occur, and a monitoring program would be implemented. If it was determined that new water sources had to be sought outside the parks, studies would need to be undertaken to ensure that there would be no adverse effects on other sequoia groves. With mitigating measures and no peak-season water withdrawals at Grant Grove, alternative D should not result in any additional impacts.

Modest levels of day use and education would be accommodated in the Dillonwood Grove, in addition to research. Experimental sequoia forest management techniques would be continued, and a plan for long-term resource management would be developed. Grove health would be monitored. Further planning at Dillonwood would identify appropriate uses, facilities, and mitigation measures to protect grove health. Any development accommodated at Dillonwood would result in the permanent displacement of soils and vegetation. With mitigating measures, these long-term impacts would be localized and minor.

**Cumulative Impacts.** As described in the regional and park context sections, giant sequoia groves in the park and region have been affected, and will continue to be affected, by various impacts on a cumulative basis. Continuing and future threats include air pollution, unnatural effects of pathogens, and anthropogenic climate change. Current ecosystem management goals for groves managed by the U.S. Forest Service and the National Park Service should reduce the threat of intensive fires and improve ecological conditions over the long term.

The ongoing restoration of Giant Forest would improve the ecological integrity of the grove, a major, long-term benefit. No additional hydrological impacts are expected during the drier peak months with the continued expansion of concession facilities at Grant Grove. Present water withdrawals (average 33,500 gallons/day) plus stored water should meet demand from expanded facilities. Water withdrawals would not be increased; if there was insufficient water to meet demand, conservation efforts to reduce consumptive uses would be implemented. Additional active conservation measures would likely be necessary during drought years. When the water storage tank is filled during the peak runoff season, water flow into Abbot Creek is decreased by a maximum of 10%, with a negligible impact, the same as the no-action alternative.

The addition of the Dillonwood Grove to Sequoia National Park and the creation of Giant Sequoia National Monument have increased the extent of giant sequoias being protected in the region. Experimental sequoia forest management techniques at the Dillonwood Grove would support expanding knowledge about sequoia ecosystem management.

Alternative D would contribute to a minor, adverse, long-term impact on a cumulative basis.

**Conclusion.** Giant sequoia groves would continue to be managed as integral to the ecosystem. Manipulating or altering grove conditions at Big Stump to maintain site-specific conditions related to historic logging for interpretive programs, along with limited new development in some groves, would result in minor adverse impacts. Increased visitor use and development at Grant Grove and Atwell Mill would increase water consumption. Because of the uncertainty of water withdrawal impacts on giant sequoia systems, no increased peak-season water withdrawals would occur. If new water sources had to be sought outside the parks, studies would be undertaken to ensure that there would be no adverse effects on other sequoia groves. With mitigating measures, alternative D should not result in any additional impacts.

On a cumulative basis, as described for the no-action alternative, the addition of the Dillonwood Grove to Sequoia National Park and the creation of Giant Sequoia National Monument have increased the overall protection of sequoia groves in the region. Alternative D would contribute incrementally to a minor, adverse, long-term impact to sequoia groves as a result of use increases in some groves. Most adverse cumulative impacts to giant sequoias have resulted from activities such as logging and fire suppression, which have altered groves throughout the region and made them more prone to intense wildfires and other threats. Ongoing programs such as prescribed burning would continue to improve grove conditions.

There would be no impairment of park resources or values.

## MEADOW / RIPARIAN / AQUATIC COMMUNITIES

### Regional Context

As a result of past settlement and development, resource extraction, and human use, riparian / aquatic ecosystems have been affected throughout the Sierra Nevada. Specific aquatic and riparian habitats have been degraded by dams and diversions, mining, forest management, development, introduced organisms, contaminant deposition, and overgrazing. Foothill areas below 3,300 feet appear to have the greatest loss of riparian vegetation of any region in the Sierra Nevada (SNEP 1996). The alteration and continued deterioration of aquatic and riparian habitats have affected native fish, amphibians, and aquatic invertebrates. Many aquatic and riparian dependent species (see “Threatened, Endangered, and Rare Species” in “The Affected Environment”) and communities have suffered local extinctions and are threatened throughout their range.

The suppression of natural fires in historic times is another stressor. Fire affects water quality and

quantity, sediment transport, the availability of woody debris, water temperature, and the structure and composition of riparian vegetation. In short, fire affects the habitat of aquatic fauna, especially in the foothills and in the conifer belt.

### Park Context

Within the parks, historical grazing by sheep and cattle during pre-park periods (1860s through 1940s, depending on the area) altered meadow ecosystems. Some riparian areas were trampled and illegally grazed by trespass cattle. Invasive exotic plant species occur in some montane meadows and riparian corridors. In a few site-specific areas, exotic wetland plants (*Elodea* sp.) have virtually displaced native benthic plants (*Isoetes* sp.) that normally dominate the lake bottoms, altering the structural and floristic characteristics (e.g., Rae Lakes). The primary threats to native aquatic wildlife include competition, predation, and genetic introgression (hybridization) from exotic species. Atmospheric contaminants are another major concern, especially pesticides and pollutants from regional air pollution. Polluted air contributes nutrients and causes episodic acidification of park waters.

Numerous management actions have already been taken to improve conditions within the parks (e.g., rerouting trails away from meadows, prohibiting camping in meadows, closing back-country campsites that are too close to water, revegetating impacted areas, and educating users about their impacts and the use of low-impact practices). A system of residual biomass standards for meadows open to stock grazing has been implemented, and the amount of grazing allowed during a given season is limited. This ensures that adequate residual matter remains at a site each year. Annual grazing programs, including opening dates and total allowable use, are based on monitoring. The implementation of grazing standards has reduced impacts. Allowing more natural fire regimes in the parks in recent years has also helped restore native vegetation patterns and processes.

*Impact Thresholds for Meadow / Riparian /  
Aquatic Communities*

**Negligible** — The impact would be at the lower levels of detection or not measurable.

**Minor** — The impact would be detectable, but it would not affect the viability of the local population or overall community size, structure, or composition.

**Moderate** — The impact would be clearly detectable and could have an appreciable effect on the resource. This would include impacts that affect the abundance or distribution of local populations, but it would not affect the viability of the regional population. Localized changes to community size, structure, or composition and ecological processes could occur.

**Major** — The impact would be severely adverse or exceptionally beneficial. Impacts would have a substantial, highly noticeable, or widespread influence, affecting the abundance or distribution of a local or regional population to the extent that the population would not be likely to recover (adverse) or would return to a sustainable level (beneficial). Community size, structure, or composition and ecological processes would be highly altered, and landscape level changes could be expected.

*Criteria for Determining Impairment*

An impact would more likely constitute an impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the parks' enabling legislation,
- key to the natural or cultural integrity of the parks or to opportunities for enjoyment of the parks, or
- identified as a goal in this general management plan or other relevant NPS planning documents.

## Impacts of the No-Action Alternative

**Analysis.** Meadows, riparian areas, and aquatic communities around popular lakes and streams and at stream crossings that receive more concentrated human use would continue to have localized, minor to moderate, adverse, long-term impacts. Increased use would contribute to the adverse effects. High and even moderate visitation at lakes and along streams would continue to result in localized trampling of vegetation and loss of wetland flora due to social trails that form along their edges and often cut through wetland meadows. The number of user trails and their width could increase with more use, particularly in popular day use areas. Swimmers, waders, and anglers would continue to trample streambank vegetation and disturb lake and stream bottoms.

Continued management actions to reduce impacts from visitor use would include rerouting trails away from meadows, prohibiting camping in meadows, closing backcountry campsites that are too close to water, revegetating impacted areas, and educating users about their impacts and the use of low-impact practices.

Because many of the impacted areas already experience moderate to high levels of use, and because management actions to minimize impacts would continue to be employed, additional impacts from some increased use would likely be negligible to minor. Moderate levels of impact could occur if more use affected lightly used or undisturbed areas, resulted in shorelines becoming denuded and eroded, or intensified present impacts.

Even though most park meadows are open to grazing, some areas would continue to be closed to stock because they are heavily used by backpackers for camping, they are small, they are designated for research purposes, or they are relatively sensitive, including providing breeding habitat for declining amphibian species. In other areas, stock are permitted, but feed must be packed in. All park meadows open to grazing are subject to residual biomass standards that set limits on the amount of grazing allowed during a given season (see "Park Context").

Localized, minor to moderate, long-term impacts to some meadows would continue to be caused by stock use. The severity of impacts and the amount of disturbance would depend on the characteristics of pack stock use, management and handling techniques, and the nature of the areas being used. Since the 1970s and 1980s, conditions in some meadows have generally improved as a result of declining use and greater compliance by stock users with minimum impact guidelines. However, impacts in meadows that continue to receive heavy stock use include persistent hoof prints, streambank shearing, soil pedestals, erosion, and other soil impacts. Vegetation is directly affected through defoliation, trampling, and root shearing, and indirectly through changes in soil structure or nutrient status, shifts in species composition, and the potential introduction of exotic plant species. Meadow animal life is also affected through the removal of vegetative biomass (wildlife cover), crushed rodent burrows, and disturbance by grazing stock. Even when grazed meadows are healthy and productive, the removal of forage by stock diverts nutrients and energy from the natural system, depriving native herbivores and decomposers, and the predators that feed on them.

Surface water would continue to be diverted from natural streams and springs in several areas. Development areas either use water storage and/or multiple sources to reduce the extent of impacts on any one stream. Impacts would likely be moderate and long term, diminishing in intensity as more tributaries augment streamflow below the point of withdrawal.

Ongoing water conservation measures at Grant Grove during the peak visitor use season would maintain the existing water withdrawals by using stored water. No changes in the saturation levels in the meadows adjacent and below the diversions would occur.

Relocating or redesigning bridges over the South Fork of the Kings River in the Cedar Grove area and removing dams in the upper Mineral King basin would provide opportunities to revegetate and restore specific riparian areas, resulting in localized minor to moderate, beneficial effects

over the long term. Adverse impacts from facility removal (such as bank disturbance and increased erosion potential) would be minor to moderate and short term. The extent and duration of these impacts would be minimized by careful design and timing of facility removal, temporary erosion control measures, and follow-up restoration.

**Cumulative Impacts.** Cumulative effects on riparian / aquatic ecosystems are based on analyses of past, present, and reasonably foreseeable actions in the Sierra Nevada region, in combination with potential effects of this alternative. Whereas widespread, more intensive impacts have occurred on the regional level, this alternative's contribution to those effects would be incremental and localized.

Riparian / aquatic ecosystems are among the most impacted habitats in the Sierra Nevada, as described in the "Regional Context" section, with foothill areas below 3,300 feet appearing to have the greatest loss of riparian vegetation of any region in the Sierra Nevada.

However, a number of ongoing and reasonably foreseeable future actions in the parks and surrounding lands could have cumulative beneficial effects on aquatic and riparian ecosystems in the long term. The USFS Sierra Nevada Framework for Conservation and Collaboration and management plans for adjacent wilderness areas and Giant Sequoia National Monument would all address ecosystem management issues of lands adjacent to the parks.

Removing development and restoring the Giant Forest has substantially decreased water demand from Wolverton Creek, resulting in increased streamflows during the summer and helping restore the aquatic community to more natural conditions. While concession development at Wuksachi would increase water withdrawals from Wolverton and Silliman creeks, using multiple water sources would help ensure that minimum flows were maintained in each stream (NPS 1979).

While concession development at Grant Grove would increase, conservation measures during the peak season would ensure that existing water withdrawals were maintained by using stored water to supplement supplies. No changes in the saturation levels in the meadows adjacent and below the diversions would occur.

Even though some actions in and around the parks could have beneficial, long-term, effects because regional meadow / riparian / aquatic communities have been highly impacted by past and continuing land use and development, there would continue to be a net major, adverse, cumulative impact on these communities over the long term. The no-action alternative would contribute localized minor to moderate incremental adverse and beneficial effects.

**Conclusion.** Continued and slightly increased use and facility development would have minor to moderate, adverse, long-term effects on meadow, riparian, and aquatic communities, primarily in developed areas, around popular lakes and streams, at stream crossings, and below water withdrawal diversions. Removing some facilities would likely have minor to moderate adverse, short-term impacts.

On a cumulative basis the no-action alternative would have an incremental, minor to moderate, long-term contribution to overall impacts. The impacts of all other programs within the parks and throughout the region would have a net major, adverse, long-term effect on regional meadow, riparian, and aquatic communities, primarily due to the widespread alteration and loss of these resources because of land use and development outside the parks.

In accordance with the criteria for determining impairment, there would be no impairment of park resources or values.

### **Impacts of the Preferred Alternative**

**Analysis.** Under the preferred alternative actions would be taken to reduce impacts to meadow, riparian, and aquatic communities and to restore damaged areas. Increased frontcountry use of

aquatic and riparian communities is expected to occur predominantly along the Marble Fork of the Kaweah River at Lodgepole, along the Middle Fork near Ash Mountain, and along the South Fork of the Kings River at Cedar Grove and Knapp's cabin. Local areas currently experience high to moderate levels of use, and impacts to specific sites have occurred. Compared to the no-action alternative, restricting river access points and potentially hardening some access points should reduce the extent of impacts and allow for riparian habitat to be restored, a moderate, long-term benefit. Redesigning campgrounds at Cedar Grove and Lodgepole (away from the rivers) and increasing visitor education would also help control impacts.

Expanded facilities such as lodging and camping near the South Fork would be sited outside riparian areas and would not directly impact those resources. Developing access points and launch sites for nonmotorized boats would result in minor, site-specific impacts, such as the trampling and uprooting of small amounts of vegetation and localized erosion and compaction of soil and bottom sediments. However, these designated access points and launch sites would help contain and reduce the extent of the visitor-related impacts noted above.

To a lesser degree, increased frontcountry use would be accommodated along the North Fork near the park boundary, along Shepherd Saddle Road, and along the upper reaches of the East Fork of the Kaweah River (areas that are zoned for high and low use). Increased use could result in additional adverse, long-term impacts to rivers and tributary streams in these areas. However, the extent and intensity of impacts would be limited and minor. Levels of use would still be low (areas zoned as low-use frontcountry), only limited reaches of the rivers and streams would be affected, and management actions to reduce impacts would be employed if necessary (e.g., designated river access points and stream crossings, and signs to direct visitors to areas that can withstand use).

The extent of site-specific, adverse effects such as trampling, compaction, grazing, and erosion

should be reduced in some backcountry meadows and riparian areas where use would be limited to protect resources. This would be a minor to moderate, long-term benefit, particularly if some heavily grazed meadows received substantially less use. Nonnative plant species could be introduced by livestock, but this would be mitigated by switching to weed-free feed and by monitoring and removing introduced species.

Relocating or redesigning bridges over the South Fork of the Kings River in the Cedar Grove area (as described for the no-action alternative) would provide opportunities to revegetate and restore specific riparian areas, resulting in localized, minor, beneficial, long-term impacts. Adverse impacts from facility removal, such as bank disturbance and increased erosion potential, would be minor and short term. The extent and duration of these impacts would be minimized by careful design and timing of facility removal, temporary erosion control measures, and follow-up restoration efforts.

Surface water would continue to be diverted from natural streams and springs in several areas of the parks. However, the amount of water diverted during the low-flow season would not increase. Because conservation would be emphasized in this alternative, withdrawals are expected to be reduced, allowing greater water flows downstream of the diversions. Reduced withdrawals from springs at Grant Grove (Round Meadow and Merritt Spring) would improve local hydrology and could potentially decrease moisture stress within meadows adjacent to and below the diversions during droughts. These actions would result in minor to moderate, beneficial effects that would increase riparian vegetation productivity and habitat for fish and other aquatic organisms in affected stream reaches over the long term.

**Cumulative Impacts.** As described for the no-action alternative, cumulative effects on riparian / aquatic ecosystems are based on analyses of past, present, and reasonably foreseeable actions in the Sierra Nevada region, in combination with potential effects of this alternative. Whereas widespread, more intensive impacts have oc-

curred throughout the region, this alternative's contribution to those effects would be incremental and localized.

As described under the no-action alternative, a number of reasonably foreseeable future actions proposed for the parks and surrounding lands could have beneficial effects. The USFS Sierra Nevada Framework for Conservation and Collaboration, management plans for adjacent wilderness areas and Giant Sequoia National Monument would all address ecosystem management issues of lands near the parks.

Removing development and restoring the Giant Forest have substantially decreased water demand from Wolverton Creek, resulting in increased streamflows during the summer and helping restore the aquatic community to more natural conditions. While a day use staging area for backcountry access at Wolverton and concession development at Wuksachi would increase water withdrawals from Wolverton Creek, using multiple water sources and conservation measures are expected to ensure minimum flows in each stream (NPS 1979). No new water diversion sites would be developed if current multiple sources did not meet demand. Conservation efforts, such as using low-flow fixtures, would be implemented, as well as educating staff and visitors to conserve water.

While concession development at Grant Grove would increase, conservation measures during the peak visitor use season would allow existing water withdrawals to be maintained by using stored water to supplement water supplies. No changes in the saturation levels in the meadows adjacent and below the diversions would occur.

Even though actions in and around the parks could have beneficial, long-term effects, the regional riparian / aquatic ecosystems in the greater Sierra Nevada have been highly impacted by past land use and development. Therefore, there would continue to be a net major, adverse, cumulative impact on regional meadow, riparian, and aquatic communities over the long term. This alternative's contribution to the cumulative impacts would be primarily beneficial

due to improving aquatic and riparian conditions within the parks. This alternative would also contribute some site-specific minor adverse impacts.

**Conclusion.** The preferred alternative would result in minor to moderate, beneficial, long-term impacts to meadow, riparian, and aquatic communities in localized areas, primarily at Lodgepole, Cedar Grove, and Ash Mountain, and where resource conditions were improved in the backcountry. The preferred alternative would also result in localized minor, adverse, long-term impacts such as vegetation trampling due to increased use in some areas. Facility removal would have minor to moderate, adverse, short-term impacts.

The preferred alternative's contribution to the cumulative effects to wetlands and riparian communities would be primarily beneficial. Some minor adverse impacts would occur in localized areas. In conjunction with other actions in and outside the parks, there would be a net major, adverse, long-term, cumulative impact on meadow, riparian, and aquatic communities in the region, principally because of the impacts from land use and development outside the parks.

There would be no impairment of park resources or values.

## Impacts of Alternative A

**Analysis.** Removing facilities, decreasing use, and restoring areas would reduce impacts around some lakes and streams (such as trampled streambank vegetation, disturbance of lake and stream bottoms, loss of wetland flora), compared to the no-action alternative. Specific proposals include removing and restoring the Boy Scout camp along Wolverton Creek; reducing campground sizes along the South Fork of the Kings River at Cedar Grove and along the Marble Fork of the Kaweah River at Lodgepole; removing maintenance and lodging at Grant Grove; and limiting/directing river access along those same areas, as well as along the Middle Fork of the Kaweah. Social trails would likely decrease in number and size with less use. Improving the

condition of the remaining trail system would provide localized benefits, such as where trails cross through meadows. Banning stock use and grazing within the parks would stop impacts to riparian and meadow vegetation and soils, such as root and streambank shearing, defoliation, changes in soil structure or nutrient status, shifts in species composition, potential introduction of exotic plant species, removal of wildlife cover, and wildlife disturbance. Major, long-term benefits could be expected as a result of eliminating potentially irreversible impacts to heavily grazed meadows.

Relocating management facilities outside the parks could result in impacts to wetlands. The extent and intensity of these impacts would depend on site-specific conditions and project design. However, all possible measures would be taken to avoid wetlands or to minimize impacts. If wetlands could not be avoided, mitigating measures, including wetland restoration to compensate for any loss of wetlands, would reduce impacts to negligible to minor.

As described for the no-action alternative, relocating or redesigning bridges over the South Fork in the Cedar Grove area would provide opportunities to revegetate and restore specific riparian areas, resulting in localized minor to moderate, beneficial effects over the long term. Adverse impacts from facility removal (such as bank disturbance and increased erosion potential) would be minor to moderate and short term. The extent and duration of these impacts would be minimized by careful design and timing of facility removal, temporary erosion control measures, and follow-up restoration.

Surface water would continue to be diverted from natural streams and springs in several areas. However, the amount of water diverted would be reduced under this alternative, thus allowing greater water flows downstream of the diversions. Reduced withdrawals in springs at Grant Grove (Round Meadow and Merritt Spring) would improve local hydrology and could potentially decrease moisture stress within meadows adjacent to and below the diversions during droughts. These actions would result in

minor to moderate, beneficial, long-term impacts that would increase riparian vegetation productivity and habitat for fish and other aquatic organisms in affected stream reaches.

**Cumulative Impacts.** As described for the no-action alternative, widespread, more intensive cumulative impacts have occurred on the regional level, and riparian / aquatic ecosystems remain among the most impacted habitats in the Sierra Nevada, as described in the “Context” section. However, this alternative’s contribution to those effects would be incremental and localized.

Individual future construction projects, along with continued regional population growth and development in general, would have site-specific, adverse, short-term effects and would contribute to adverse, long-term effects throughout the region. Similar to the no-action alternative, this alternative’s contribution to those effects would be incremental and localized.

As described under the no-action alternative, a number of reasonably foreseeable future actions proposed for the parks and surrounding lands could have beneficial effects. For example, the USFS Sierra Nevada Framework for Conservation and Collaboration and management plans for adjacent wilderness areas and Giant Sequoia National Monument would all address ecosystem management issues of lands near the parks.

Also as described for the no-action alternative, the restoration of the Giant Forest has substantially decreased water demand from Wolverton Creek, resulting in more natural conditions. While concession development at Wuksachi would increase water withdrawals from Silliman and Wolverton creeks, the use of multiple water sources is expected to ensure that minimum flows would be maintained in each stream (NPS 1979).

While concession development at Grant Grove would increase, water conservation measures and not withdrawing any more water during the peak visitor use season would not change the

saturation levels in meadows adjacent and below the diversions.

Even though actions in and around the parks could have beneficial, long-term effects, the regional riparian / aquatic ecosystems in the greater Sierra Nevada have been highly impacted by past land use and development. Therefore, there would continue to be a net major, adverse, cumulative impact on regional meadow, riparian, and aquatic communities over the long term.

**Conclusion.** Alternative A would result in localized, minor to moderate, beneficial impacts to meadow, riparian, and aquatic communities over the long term, primarily in developed areas, around popular lakes, at streams and stream crossings, and below water withdrawal points. Facility removal would have minor to moderate, adverse, short-term impacts.

Even though long-term effects would generally be beneficial, in conjunction with past, present, and reasonably foreseeable future actions, there would be a net major, adverse, long-term, cumulative effect on regional wetlands and riparian communities, principally because of the impacts from land use and development outside the parks.

There would be no impairment of park resources or values.

## Impacts of Alternative C

**Analysis.** Increased frontcountry use and development would occur primarily along the Marble Fork of the Kaweah River at Lodgepole, along the Middle Fork near Ash Mountain, and along the South Fork of the Kings River at Cedar Grove and Knapp’s cabin. Expanded facilities such as lodging and camping near the South Fork would be sited outside riparian areas and would not directly impact those resources. To accommodate more use and to reduce the extent of impacts from visitors accessing the rivers (e.g., trampled streambanks, disturbed stream bottoms, increased turbidity and sedimentation, loss of wetland flora), specific access points and

trails would be defined. Redesigning campgrounds at Cedar Grove and Lodgepole to move them away from the rivers and increasing visitor education would also help control impacts. Compared to the no-action alternative, restricting the spatial distribution of river users and enhancing site durability would help reduce the extent of impacts and allow riparian habitat to be restored, a long-term, minor benefit.

To a lesser degree, increased frontcountry use would also be accommodated along the North Fork of the Kaweah River near the park boundary, along Shepherd Saddle Road, and along the upper reaches of the East Fork. Because these areas are currently little used, increased use could result in minor, adverse, long-term impacts. These areas would be zoned as low-use frontcountry, and only limited reaches of the rivers and streams would be affected. Management actions would be employed to reduce impacts if necessary (e.g., designating river access points and stream crossings, posting signs to direct visitors to areas that can withstand use).

Reducing the extent of major trail corridors would help decrease the extent of impacts such as trampling, compaction, grazing, and erosion in some backcountry meadows and riparian areas. This would be a minor to moderate, long-term benefit, particularly if some currently heavily grazed meadows received substantially less use. The potential of irreversible impacts to some heavily grazed meadows could also be reduced, a major, long-term benefit. Dispersing use in some meadows and riparian areas in the backcountry to areas of no or light use could result negligible to minor, widely dispersed impacts. Maintaining the desired zone conditions through lower use levels, smaller party sizes, and an emphasis on low-impact practices, along with educating visitors about resource protection, would avoid or minimize long-term impacts from dispersed use. If grazing was dispersed to high-elevation meadows with low productivity, even very low use could result in moderate to major impacts. However, continuing to use residual biomass standards would help protect meadow structure and function, thus precluding major impacts.

As described for the no-action alternative, relocating or redesigning bridges over the South Fork of the Kings River in the Cedar Grove area would provide opportunities to revegetate and restore specific riparian areas, resulting in localized, minor, beneficial effects over the long term. Adverse impacts from facility removal (such as bank disturbance and increased erosion potential) would be short term and minor and would be minimized by careful design and timing of facility removal, temporary erosion control measures, and follow-up restoration efforts.

Additional impacts from increased water demand under this alternative would incrementally reduce aquatic habitat in the currently affected reaches and likely extend farther downstream. Increased water demand associated with overnight use would be limited, day use is not expected to increase greatly, and water conservation measures would be implemented, all of which would help limit additional needs for water. Compared to the no-action alternative, impacts are expected to be minor to moderate and long term.

Water conservation measures at Grant Grove, along with not withdrawing more water during the peak visitor use season, would not change the saturation levels in meadows adjacent and below the diversions.

**Cumulative Impacts.** As described for the no-action alternative, widespread, more intensive impacts have occurred on the regional level, and meadow, riparian, and aquatic communities remain among the most impacted habitats in the Sierra Nevada. However, this alternative's contribution to those effects would be incremental and localized.

Individual future construction projects, along with continued regional population growth and development in general, would have site-specific, adverse, short-term impacts and would contribute to the long-term adverse effects throughout the region.

As described under the no-action alternative, a number of reasonably foreseeable future actions proposed for the parks and surrounding lands could have cumulative beneficial effects. The USFS Sierra Nevada Framework for Conservation and Collaboration, wilderness management plans for adjacent areas, and a management plan for Giant Sequoia National Monument would all address ecosystem management issues of nearby lands.

The restoration of the Giant Forest, as described for the no-action alternative, has substantially decreased water demand from Wolverton Creek, resulting in more natural conditions. While transit support facilities at Lodgepole and concession development at Wuksachi would increase water withdrawals from Silliman and Wolverton creeks, the use of multiple water sources and conservation measures would help ensure minimum flows in each stream (NPS 1979).

Concession development at Grant Grove would also increase water demand. Water conservation measures and not withdrawing any more water during the peak visitor use season would not change the saturation levels in meadows adjacent and below the diversions. Cumulative in-park actions that would affect water withdrawals would not appreciably add to water demands or impacts.

Even though actions in and around the parks could have beneficial, long-term effects, meadow / riparian / aquatic ecosystems in the greater Sierra Nevada have been highly impacted by past land use and development. Therefore, there would continue to be a net major, adverse, long-term impact on the ecosystems regionally.

**Conclusion.** Alternative C would result in localized, minor to moderate, beneficial, long-term effects to meadow, riparian, and aquatic communities in some areas, primarily in the Lodgepole, Cedar Grove, and Ash Mountain developed areas and in the backcountry where use was dispersed. Also, the potential of irreversible impacts to some heavily grazed meadows could be reduced, which would be a major, long-term benefit. However, alternative C would also re-

sult in minor to moderate, adverse, long-term impacts due to incremental increases in water diversions and increased dispersal of visitors in the backcountry.

On a cumulative basis, alternative C would have both beneficial and adverse, localized effects on wetlands and riparian communities within the parks. In conjunction with past, present, and reasonably foreseeable actions, however, there would continue to be a net major, adverse, long-term effect on regional meadow, riparian, and aquatic communities, primarily because of impacts from land use and development outside the parks.

There would be no impairment of resources or values.

## Impacts of Alternative D

**Analysis.** Increased frontcountry use of meadows and riparian communities is expected to occur predominantly along the Marble Fork of the Kaweah River at Lodgepole, along the Middle Fork near Ash Mountain, and along the South Fork of the Kings River between Cedar Grove and the road's end. Expanded facilities, such as lodging and camping near the South Fork, would be outside riparian or meadow areas in order not to directly impact those resources.

As described under alternative C, to accommodate more use and to reduce impacts from visitors accessing the rivers (e.g., trampled streambanks and beds, increased turbidity and sedimentation, loss of wetland flora), specific access points and trails would be defined and possibly hardened. Redesigning the Cedar Grove and Lodgepole campgrounds and moving campsites away from the rivers, along with increasing visitor education, would also help control impacts. Developing access points and launch sites for nonmotorized boats would uproot and trample small amounts of vegetation; these areas would likely remain void of plants due to erosion and compaction of soils and bottom sediments. Erosion would affect turbidity and sedimentation in adjacent areas. Site-specific impacts would be minor. However, these stream reaches currently

experience high to moderate levels of use, and impacts from unconfined and undirected access have already degraded riparian zones. Compared to the no-action alternative, restricting the spatial distribution of river users and enhancing site durability should reduce the extent of impacts and allow riparian habitat to be restored, a long-term, minor benefit.

To a lesser degree, increased frontcountry use would also be accommodated along the North Fork of the Kaweah River near the park boundary and along the upper reaches of the East Fork (areas zoned for low- and high-use frontcountry). Because these areas currently receive relatively little use, more visitors could create additional long-term adverse impacts to the rivers and tributary streams. The extent and intensity of impacts would be limited and minor. Management actions to reduce impacts would be taken if necessary (e.g., designating river access points and stream crossings, or erecting barriers or signs to direct visitors to areas that could better withstand use). Greater management of high use along the East Fork in upper Mineral King would likely be necessary to limit impacts.

A large portion of the backcountry would continue to be managed for lower use and undisturbed conditions. Concentrating use and allowing more use in existing high-use areas would result in an incremental minor increase in long-term impacts (e.g., compaction, erosion, trampling, loss of vegetation) in meadows and riparian areas in these backcountry areas. Because use would be concentrated, limited grazing would be available in popular grazing areas, and supplemental feed would have to be brought in. Using residual biomass standards would allow park managers to limit grazing in particular areas, helping reduce impacts.

A few trails would be designated for foot-traffic only, therefore some additional riparian areas and meadows would no longer be subject to stock grazing and use impacts, resulting in minor to moderate, long-term benefits, depending on what areas were reserved for foot-traffic only.

As described for the no-action alternative, relocating or redesigning bridges over the South Fork of the Kings River in the Cedar Grove area would provide opportunities to revegetate and restore specific riparian areas, resulting in localized, minor, beneficial effects over the long term. Adverse impacts from facility removal (such as bank disturbance and increased erosion potential) would be minor and short term. The extent and duration of these impacts would be minimized by careful design and timing of facility removal, temporary erosion control measures, and follow-up restoration efforts.

Additional impacts from increased water demand under this alternative would incrementally reduce aquatic habitat in the currently affected reaches and farther downstream. Increased water demand is expected to be minimal because additional water demand associated with overnight use would be limited, day use is not expected to increase greatly, and water conservation measures would be implemented. Water conservation measures at Grant Grove, along with not withdrawing more water during the peak season, would not change the saturation levels in the meadow adjacent to and below the diversions. Compared to the no-action alternative, impacts are expected to be minor and long term.

**Cumulative Impacts.** As described for the no-action alternative, cumulative impacts are based on analyses of past, present, and reasonably foreseeable actions in the Sierra Nevada region, in combination with potential effects of this alternative. Whereas widespread, more intensive impacts have occurred on a regional level, this alternative's contribution to those effects would be incremental and localized.

Riparian and aquatic communities remain among the most impacted habitats in the Sierra Nevada, as described in the "Regional Context" section. Individual future construction projects, along with continued regional population growth and development in general, would have site-specific, adverse, short-term effects and would contribute to adverse, long-term effects throughout the region.

As described under the no-action alternative, a number of reasonably foreseeable future actions proposed for the parks and surrounding lands could have cumulative beneficial effects. The USFS Sierra Nevada Framework for Conservation and Collaboration, management plans for adjacent wilderness areas, and a management plan for Giant Sequoia National Monument would all address ecosystem management issues of nearby lands.

As described for the no-action alternative, the restoration of the Giant Forest has substantially decreased water demand from Wolverton Creek, resulting in more natural conditions. While transit support facilities at Wolverton and concession development at Wuksachi would increase water withdrawals from Silliman and Wolverton creeks, the use of multiple water sources is expected to ensure minimum flows in each stream (NPS 1979).

Concession development at Grant Grove would also increase water demand. Water conservation measures and not withdrawing any more water during the peak visitor use season would not change the saturation levels in the meadows adjacent and below the diversions. Cumulative in-park actions that would affect water withdrawals would not appreciably add to water demands or impacts.

Even though actions in and around the parks could have beneficial, long-term effects, the regional riparian / aquatic ecosystems in the greater Sierra Nevada have been highly impacted by past land use and development. Therefore, there would continue to be a net major, adverse, cumulative impact on regional wetlands, riparian, and aquatic ecosystems over the long term.

**Conclusion.** Alternative D would result in minor, localized, long-term benefits to meadow, riparian, and aquatic communities in some areas, primarily in the Lodgepole, Cedar Grove, and Ash Mountain developed areas. Alternative D would result in localized, minor, adverse, long-term impacts where river access points were developed in currently unaffected locations.

Minor, adverse, long-term impacts would also result from greater use in high-use backcountry areas and from an incremental increase in water diversions.

On a cumulative basis, alternative D would result in both beneficial and adverse impacts to wetlands and riparian communities. However, when combined with the effects of actions by others, there would continue to be a net long-term, major, adverse, cumulative effect on regional wetlands and riparian communities, primarily because of impacts from land use and development outside the parks.

There would be no impairment of park resources or values.

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## WILDLIFE AND WILDLIFE HABITAT

### Regional Context

Wildlife habitat within the greater Sierra Nevada region has been and will likely continue to be affected by various land uses, development, altered fire regimes, population growth, recreational use, and air pollution. Adverse wildlife effects include reduced habitat, increased habitat fragmentation and isolation, mortality, harassment or disturbance of wildlife, and competition from exotic species, all of which affect wildlife composition, abundance, and distribution.

### Park Context

Within the parks terrestrial wildlife are also affected by landscape level stressors, primarily ecological impacts from exotic species, changes in species composition and abundance due to the altered fire regime, bioaccumulation of contaminants, and isolation and fragmentation of some species due to differences in land-use practices on adjacent lands. Other effects on wildlife occur from conflicts with visitor use, changes to the natural distribution and abundance of native species due to park developments, and anthropogenic mortality (both accidental and by poaching). The primary threats to native aquatic wildlife include competition and genetic

*Impact Thresholds for Wildlife and Wildlife Habitat*

**Negligible** — The impact would be at the lower levels of detection or not measurable.

**Minor** — The impact would be detectable, but it would not affect the viability of the local population or overall community size, structure, or composition.

**Moderate** — The impact would be clearly detectable and could have an appreciable effect on the resource. This would include impacts that affect the abundance or distribution of local populations, but it would not affect the viability of the regional population. Localized changes to community size, structure, or composition and ecological processes could occur.

**Major** — The impact would be severely adverse or exceptionally beneficial. Impacts would have a substantial, highly noticeable, or widespread influence, affecting the abundance or distribution of a local or regional population to the extent that the population would not be likely to recover (adverse) or would return to a sustainable level (beneficial). Community size, structure, or composition and ecological processes would be highly altered, and landscape level changes could be expected.

*Criteria for Determining Impairment*

An impact would more likely constitute an impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the parks' enabling legislation,
- key to the natural or cultural integrity of the parks or to opportunities for enjoyment of the parks, or
- identified as a goal in this general management plan or other relevant NPS planning documents.

introgression from exotic species, as well as predation.

## Impacts of the No-Action Alternative

**Analysis.** Existing developments and visitor use have affected natural wildlife movements, habitat, and food sources. Individuals, populations, and species vary in their sensitivity to disturbance. Increased use and limited new development might temporarily disturb or displace some individual animals, particularly those sensitive to human disturbance. Certain wildlife, such as small mammals, could also be attracted to the increased food source that visitors represent. Large portions of the parks are undeveloped and receive very little visitor use, and they are expected to continue to provide relatively undisturbed habitats for wildlife. This would particularly benefit species that are intolerant of human intrusions and that require large, unfragmented territories, such as the northern goshawk or the wolverine (see "Threatened, Endangered, or Special Concern Species" for the latter). Increased use is expected to occur primarily in areas already experiencing heavier use, and incremental impacts on wildlife are expected to be negligible to minor. Wildlife sensitive to disturbance probably already avoid these areas, and wildlife that do utilize these areas are likely habituated to human presence. In addition, management actions to avoid or minimize the extent and severity of impacts would continue, such as restricting use in specific areas or by season; confining or directing use by means of barriers, trails, and designated camping areas; and restoring impacted sites as funding became available.

Greater use could result in an increase in improper food storage by visitors. Food and garbage attract wildlife and condition wildlife to associate humans with food, which can lead to human/wildlife conflicts. Continued management practices (such as providing garbage and food storage containers resistant to wildlife, and educating visitors) would continue to be implemented, resulting in negligible to minor impacts.

Occasionally wildlife are killed or injured by motor vehicles on park roads. This impact could increase slightly with additional vehicle use, although the number of incidents would still be low, and impacts would be negligible to minor.

Winter use primarily in and around the major developed areas along Generals Highway would continue. While winter use could increase, it would still be low, with limited disturbance to wildlife. In general snow cover would protect underlying soils and vegetation, and impacts to wildlife habitat would be negligible to minor.

**Cumulative Impacts.** Cumulative impacts on wildlife are based on analyses of past, present, and reasonably foreseeable actions in the Sierra Nevada region, in combination with the potential effects of this alternative. Whereas widespread, more intensive impacts have occurred on the regional level, this alternative's contribution to those effects would be incremental and localized.

As discussed under "Regional Context," adverse wildlife effects within the greater Sierra Nevada region include reduced and fragmented habitat, disturbance of wildlife, and competition from exotic species, all of which affect wildlife composition, abundance, and distribution. Some ongoing and future restoration programs within the parks (e.g., the Giant Forest developed area) and proposed development projects (e.g., expanded visitor facilities at Grant Grove and Wuksachi, and the Giant Forest transit system) would have both beneficial and adverse impacts to wildlife habitat. Impacts would generally be minor because development would be reduced or expanded in areas that would continue to accommodate high-use levels.

Several actions by others could have cumulative beneficial effects. For example, the USFS Sierra Nevada Framework for Conservation and Collaboration, and management plans for adjacent wilderness areas and for Giant Sequoia National Monument, would all address ecosystem management issues on lands adjacent to the parks.

While some cumulative actions would have beneficial, long-term cumulative effects in the parks and region, overall throughout the larger Sierra Nevada region, past, present, and reasonably foreseeable future actions, in combination with actions under this alternative, would have a major, adverse, long-term, cumulative impact on

wildlife. The no-action alternative would contribute a minor, beneficial, long-term component to cumulative effects as a result of removing and redesigning a limited number of facilities, but it would contribute a minor, adverse, long-term increment to cumulative effects through continued use and development.

**Conclusion.** Wildlife populations and habitat would continue to be influenced to varying degrees by existing facilities and visitor use that affect natural movements of wildlife, habitat, and food sources. Increased use would have negligible to minor, adverse, long-term impacts. Impacts would be related to more visitor use displacing or disturbing wildlife, conflicts with animals associating humans with food, and the injury or loss of wildlife from motor vehicle collisions.

On a cumulative basis, the no-action alternative would contribute a negligible to minor, beneficial, long-term effect because a limited number of facilities would be removed or redesigned, but it would contribute a minor, adverse, long-term increment to cumulative effects through continued use and development. In conjunction with past, present, and reasonably foreseeable actions, there would continue to be major, adverse, long-term impacts on wildlife, principally as a result of actions outside the parks.

In accordance with the criteria for determining impairment, there would be no impairment of park resources or values.

### **Impacts of the Preferred Alternative**

**Analysis.** As described for the no-action alternative, increased use, most likely in developed areas and to a lesser extent along other front-country trails and easily accessible backcountry areas, could result in increased localized user impacts, such as trampling and loss of vegetation, which could affect wildlife habitat. However, actions under this alternative to mitigate adverse effects — for example, providing designated river access points and improving trail conditions (including measures to minimize impacts such as site hardening, fencing, design-

nated trails and campsites, higher standard trails for stock use, visitor education, and restoration of disturbed areas) — would reduce impacts in specific areas and increase opportunities for habitat restoration, particularly riparian habitat. Compared to the no-action alternative, these actions would have a minor, long-term benefit.

In the backcountry the preferred alternative would limit use as needed in some areas in order to protect resources, and commercial stock use would be more regulated. These actions would reduce habitat impacts to a minor degree; some meadow and riparian habitats now being heavily grazed could be improved to a moderate degree for wildlife such as rodents or birds. The addition of a high Sierra camp on the Hockett Plateau could create conditions for more interactions between humans and bears. Continued management practices (such as providing wildlife-resistant garbage and food storage containers and educating visitors) would result in negligible to minor impacts.

Impacts from new development could be both short term (e.g., construction-related noise, dust, and visual presence) and long term (e.g., loss of habitat, night lighting, fire suppression in the vicinity of structures, human presence), with effects on the presence and distribution of species within the area. Because these developments would affect limited areas, because they would be primarily within developed areas or at previously disturbed sites, and because impacts would be mitigated to the extent possible, adverse impacts would likely be minor.

Wildlife being killed or injured by motor vehicles on park roads could increase slightly because of additional vehicle use and because some Hume Lake traffic would be redirected to Quail Flat road. Potential shuttle service in high-use areas could help reduce traffic volumes. Overall, the number of incidents would still be low, and impacts would be negligible to minor.

Expanded winter use would occur primarily in and around the major developed areas along Generals Highway. Winter use would still be low, and disturbance to wildlife would be

limited. In general snow cover would protect underlying soils and vegetation from visitor-related impacts, so effects to wildlife habitat would be negligible to minor.

**Cumulative Impacts.** As described for the no-action alternative, cumulative impacts on wildlife are based on analyses of past, present, and reasonably foreseeable actions in the Sierra Nevada region, in combination with potential effects of this alternative. Whereas widespread, more intensive impacts have occurred on the regional level, this alternative's contribution to those effects would be incremental and localized.

As discussed under "Regional Context," adverse wildlife effects within the greater Sierra Nevada region include reduced and fragmented habitat, disturbance of wildlife, and competition from exotic species, all of which affect wildlife composition, abundance, and distribution. Some ongoing and future restoration programs within the parks (e.g., restoring the Giant Forest developed area) and proposed development projects (e.g., expanded visitor facilities at Grant Grove and Wuksachi, and the Giant Forest transit system) would have both beneficial and adverse impacts to wildlife habitat. Impacts would generally be minor because development would be reduced or expanded in areas that would continue to accommodate high-use levels.

Programs and actions outside the parks that could have cumulative beneficial effects include plans by the U.S. Forest Service related to the Sierra Nevada Framework for Conservation and Collaboration, along with management plans for adjacent wilderness areas and Giant Sequoia National Monument, which would all address ecosystem management issues on adjacent lands.

On a cumulative basis, the preferred alternative would contribute minor to moderate, beneficial, long-term impacts and minor adverse impacts. While some actions would have beneficial, long-term, cumulative effects in the parks and region, overall past, present, and reasonably foreseeable actions throughout the Sierra Nevada region, in conjunction with actions under this alternative,

would have long-term, major, adverse impacts on wildlife.

**Conclusion.** Improving the frontcountry trail system would have negligible to minor, beneficial, long-term impacts to wildlife habitat. Limiting backcountry use where necessary for resource protection would result in localized minor to moderate benefits. Constructing new facilities, increasing frontcountry and winter use, and dispersing backcountry use would result in increased potential for conflicts between humans and wildlife. Impacts would range from wildlife learning to associate humans with food sources (leading to more interactions) to injury or loss of wildlife from motor vehicle collisions. These impacts would be negligible to minor, localized, and long term.

The preferred alternative would contribute a negligible to moderate beneficial component to cumulative effects, as well as a minor adverse increment. In conjunction with past, present, and reasonably foreseeable actions, there would continue to be a major, adverse, long-term, cumulative impact on wildlife and wildlife habitat throughout the region, principally as a result of impacts outside the parks.

There would be no impairment of park resources or values.

## Impacts of Alternative A

**Analysis.** Alternative A would result in less development and use throughout the parks, as well as more opportunities to revegetate and restore wildlife habitat. Localized minor benefits to wildlife could result from less altered habitat and human disturbance, possibly fewer road kills, and decreased opportunities for conflicts or interactions with humans. Removing facilities throughout the parks would result in localized, minor, short-term disturbances to wildlife, with beneficial impacts over the long term.

Reducing human use and eliminating stock use in heavily used areas would reduce direct impacts to habitat, such as trampling and soil compaction. Indirect impacts from the introduction

or spread of nonnative species, such as brown-headed cowbirds (a nest parasite that attacks a number of rare native warbler species), would also be reduced. Residential areas and pack stations have created conditions suitable for cowbirds, and reducing development and removing pack stations would no longer favor this species. However, campgrounds and other outdoor eating areas would still provide cowbirds with a food source.

Limited new facility construction within existing developed areas would have negligible adverse effects because the amount of habitat affected would be small and is already affected by ongoing uses. Relocating facilities outside the parks could result in the removal of habitat and displacement of wildlife, depending on the selected relocation sites. With careful siting and design of facilities and mitigating measures to minimize long-term impacts, impacts are expected to be site-specific and minor, although possibly moderate in intensity. Further studies and environmental analysis would be completed as part of the site-selection process.

**Cumulative Impacts.** As described for the no-action alternative, widespread, more intensive cumulative impacts have occurred on the regional level, with adverse effects on wildlife composition, abundance, and distribution. However, this alternative's contribution to those effects would be incremental and localized.

Some ongoing and future restoration programs within the parks and proposed development projects would have both beneficial and adverse impacts to wildlife habitat. Impacts would generally be minor because development would be reduced or expanded in areas that would continue to accommodate high-use levels.

Programs and actions outside the parks that could have cumulative beneficial effects include plans by the U.S. Forest Service related to the Sierra Nevada Framework for Conservation and Collaboration, wilderness management plans, and a Giant Sequoia National Monument management plan, which would all address ecosystem management issues on adjacent lands.

On a cumulative basis, alternative A would contribute a minor to moderate, beneficial, long-term effect through reduced use and development, and a minor, adverse, long-term effect from the construction of limited new development within and outside the parks. While some actions would have beneficial, long-term effects in the parks and region, overall past, present, and reasonably foreseeable actions throughout the larger Sierra Nevada region, in conjunction with actions under this alternative, would continue to have major, adverse, cumulative impacts on wildlife and wildlife habitat over the long term.

**Conclusion.** Alternative A would result in minor to moderate, beneficial, long-term impacts as a result of reduced use and fewer facilities, and minor, adverse, long-term impacts from limited new concession developments.

On a cumulative basis, this alternative would contribute minor to moderate beneficial impacts and minor adverse impacts. In conjunction with past, present, and reasonably foreseeable actions, there would continue to be major, adverse, long-term impacts on wildlife, principally as a result of impacts outside the parks.

There would be no impairment of resources or values.

### Impacts of Alternative C

**Analysis.** Impacts related to new development would be the same as those described for the preferred alternative. They would be both short term (e.g., construction-related noise, dust, and visual presence) and long term (e.g., loss of habitat, night lighting, fire suppression in the vicinity of structures, human presence), with effects on the presence and distribution of species within the area. Because new developments would affect limited areas, because they would be located primarily within existing developed areas or at previously disturbed sites, and because impacts would be mitigated to the extent possible, impacts would likely be minor.

More visitor use in developed areas and to a lesser extent along frontcountry trails and easily

accessible backcountry areas could increase localized impacts to wildlife habitat because of trampling and loss of vegetation. However, providing designated river access points and improving trail conditions (e.g., hardening sites, providing fencing to protect resources, designating trails and campsites, maintaining stock trails at higher standards, educating visitors, and restoring disturbed areas) would minimize impacts. Habitat restoration, particularly in riparian areas, would be a minor benefit. Increased human presence would also affect the presence and distribution of species, a negligible to minor impact because these areas and trails already receive moderate to high use.

Reducing the extent of high-use backcountry areas, dispersing use in the backcountry, and improving trail conditions would improve habitat to a minor degree. Reducing and dispersing stock use could improve meadow and riparian habitats now being heavily grazed, a moderate beneficial impact for species such as rodents or birds. However, to the extent that use was directed to areas where no use occurs now, even a slight increase in human presence could lower the habitat suitability for species such as goshawks or wolverine, displacing them from a portion of their territory. Low-use levels, smaller party sizes, an emphasis on low-impact practices, educating visitors, restricting visitor activities during sensitive times, or other possible management techniques would all help minimize impacts. Most park areas would no longer be subject to disturbance and would presumably continue to provide relatively undisturbed habitat for wildlife species. Overall, impacts in the backcountry would be minor and long term.

Continued management practices, such as providing wildlife-resistant garbage and food storage containers and educating visitors, would help reduce the frequency of human/wildlife interactions, resulting in negligible to minor impacts.

The number of wildlife that are killed or injured by motor vehicles on park roads could increase slightly with additional motor vehicle use and as a result of redirecting some Hume Lake traffic to

the Quail Flat road. However, shuttle service in other park areas could help reduce the extent of traffic growth. Overall, the number of incidents would still be low, and impacts would be negligible to minor.

Even though opportunities for winter use would be expanded, primarily in and around the major developed areas along Generals Highway, use is still expected to be low, thus limiting disturbance to wildlife. Snow cover would protect underlying soils and vegetation from activity-related impacts, with negligible to minor impacts on wildlife habitat.

**Cumulative Impacts.** As described for the no-action alternative, widespread, more intensive cumulative impacts have occurred on the regional level, including reduced and fragmented habitat, disturbance of wildlife, and competition from exotic species, all of which affect wildlife composition, abundance, and distribution. However, this alternative's contribution to those effects would be incremental and localized.

Some ongoing and future restoration programs within the parks and proposed development projects would have both beneficial and adverse impacts to wildlife habitat. Impacts would generally be minor because development would be reduced or expanded in areas that would continue to accommodate high-use levels.

Programs and actions outside the parks that could have cumulative beneficial effects include USFS plans related to the Sierra Nevada Framework for Conservation and Collaboration, along with management plans for wilderness areas and Giant Sequoia National Monument, which would all address ecosystem management issues on adjacent lands.

On a cumulative basis, alternative C would contribute a minor to moderate, beneficial, long-term effect, and a minor, adverse, long-term effect from the construction of limited new facilities. While some actions would have beneficial, long-term effects in the parks and region, overall past, present, and reasonably foreseeable actions throughout the larger Sierra Nevada region, in

conjunction with actions under this alternative, would continue to have major, adverse, long-term, cumulative impacts on wildlife and wildlife habitat.

**Conclusion.** The construction and use of new facilities, more frontcountry and winter use, and the dispersal of backcountry use would result in an increased potential for conflicts between humans and wildlife. Impacts would range from wildlife learning to associate humans with food (with potentially more interactions) to injury or loss of a small number of wildlife from motor vehicle collisions. These impacts would be negligible to minor, localized, and long term. Reducing the extent of high-use backcountry areas would result in minor to moderate, localized, long-term benefits.

On a cumulative basis, alternative C would contribute negligible to moderate beneficial effects and minor adverse effects. In conjunction with past, present, and reasonably foreseeable actions, there would continue to be major, adverse, long-term impacts on wildlife and wildlife habitat throughout the region, principally as a result of impacts outside the parks.

There would be no impairment of park resources or values.

## Impacts of Alternative D

**Analysis.** Impacts related to new development could be both short term (e.g., construction-related noise, dust, and visual presence) and long term (e.g., loss of habitat, night lighting, fire suppression in the vicinity of structures, human presence), with effects on the presence and distribution of wildlife species. Because these developments would affect limited areas, because they would be located primarily within existing developed areas or at previously disturbed sites, and because impacts would be mitigated to the extent possible, impacts would likely be minor.

Constructing a Grant Grove bypass would result in the loss of wildlife habitat and could increase wildlife mortality from roadkills. The degree of impact would be related to the location of the

roadway alignment and site-specific conditions along the road corridor. The extent of habitat loss would be minimized through careful design (e.g., siting the alignment to follow existing road corridors wherever possible) and by applying mitigating measures as part of construction (e.g., slope stabilization / erosion control measures, revegetation). Increased vehicular and human activity along the road corridor would likely affect individuals and possibly local wildlife populations. The wildlife community probably has already been affected to some degree by human activity, and vehicles and increasing human use would not be expected to substantially alter wildlife populations. Long-term impacts would likely be minor to moderate in intensity along the road corridor; however, further environmental analysis would be completed prior to construction.

Increased use in developed areas and along existing higher use trails, as well as expanding the frontcountry trail system and adding pullouts along Generals Highway, could result in minor, localized impacts to wildlife habitat, such as trampling and loss of vegetation. More human presence would also affect wildlife present in these areas. Effects would be negligible to minor in areas where use is already moderate to high and where the use of new trails would displace wildlife from the vicinity of the trail. The extent of adverse impacts would be minimized by carefully siting trails to avoid sensitive areas (e.g., raptor nests) and by applying mitigating measures as needed (e.g., closing areas or restricting use). Alternative D would designate river access points in order to reduce localized impacts, allowing other impacted areas to be restored, particularly riparian habitat, a minor benefit.

In the backcountry alternative D would increase use and concentrate it in major trail corridors, as well as allowing larger parties in high-use areas. It is likely then that disturbance associated with existing high-use trail corridors and campsites would increase to a negligible to minor degree. Constructing new high-use trail corridors would disturb wildlife. However, expected low levels of use, various party sizes, designated campsites, visitor education programs, restrictions on visitor activities during sensitive times, or other

possible management techniques would help minimize and confine impacts to wildlife to localized areas. Under this alternative most of the parks would remain as relatively undisturbed habitat for wildlife species. The addition of a high Sierra camp on the Hockett Plateau could result in more opportunities for bear/human interactions. Overall impacts in the backcountry would be minor and long term.

Continued management practices, such as providing wildlife-resistant garbage and food storage containers and educating visitors, would continue to be implemented, resulting in negligible to minor impacts on wildlife.

The number of wildlife killed or injured by motor vehicles on park roads could increase slightly with additional motor vehicles and as a result of redirecting some Hume Lake traffic to a bypass road. In other park areas, shuttle service could also help reduce the extent of traffic growth. Overall, the number of incidents would still be low, and impacts would be negligible to minor.

Expanded winter use in and around the major developed areas along Generals Highway, plus increased winter use in the Mineral King Valley, could affect some wildlife species. Winter use would still be low, and management actions such as restricting off-trail travel, closing areas, and limiting party sizes would be taken as necessary to limit impacts. As a result, long-term impacts would be minor. Snow cover would protect underlying soils and vegetation, and impacts to wildlife habitat would be negligible to minor.

**Cumulative Impacts.** As described for the no-action alternative, widespread, more intensive cumulative impacts on wildlife have occurred regionally as a result of reduced and fragmented habitat, disturbances, and competition from exotic species, all of which affect wildlife composition, abundance, and distribution. However, this alternative's contribution to those effects would be incremental and localized.

Some ongoing and future restoration programs within the parks (e.g., restoring the Giant Forest developed area) and proposed development

projects (e.g., expanded visitor facilities at Grant Grove and Wuksachi, and the Giant Forest transit system) would have both beneficial and adverse impacts to wildlife habitat. Impacts would generally be minor because development would be reduced or expanded in areas that would continue to accommodate high-use levels.

Programs and actions outside the parks that could have cumulative beneficial effects include plans by the U.S. Forest Service related to the Sierra Nevada Framework for Conservation and Collaboration and management plans for adjacent wildernesses and Giant Sequoia National Monument, which would all address ecosystem management issues on nearby lands.

On a cumulative basis, alternative D would contribute minor, beneficial and adverse effects over the long term. In conjunction with past, present, and reasonably foreseeable actions throughout the region, there would continue to be major, adverse, long-term, cumulative impacts on wildlife and wildlife habitat.

**Conclusion.** New facilities, increased front-country use, high-use backcountry corridors, and winter use, along with increased potential for interactions between people and wildlife seeking food, and injury or loss of wildlife from motor vehicle collisions, would all result in localized, negligible to minor, adverse, long-term impacts. Constructing a Grant Grove bypass (if allowed) would have minor to moderate, adverse impacts. Designating river access points would reduce localized impacts and increase opportunities for habitat restoration, particularly riparian habitat, a minor benefit.

On a cumulative basis, alternative D would contribute minor beneficial impacts, as well as minor to moderate adverse effects. In conjunction with past, present, and reasonably foreseeable actions, there would continue to be major, adverse, long-term impacts on regional wildlife, principally as a result of impacts outside the parks.

There would be no impairment of park resources or values.

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## THREATENED, ENDANGERED, OR SENSITIVE SPECIES

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### Methodology for Analyzing Impacts

The alternatives are programmatic in nature. For example, the extent of impacts from changing patterns of use in the backcountry would depend on where use levels changed, the species in those areas, and the current status of those species in regard to existing impacts. Thus, only general impacts are discussed for the alternatives. Before any proposals for backcountry use or other specific actions were implemented, further environmental analysis and site-specific data collection would be completed to fully evaluate potential effects on special status species.

If the National Park Service determined that an action might adversely affect a federally listed species, then in accordance with the Endangered Species Act it must consult with the U.S. Fish and Wildlife Service to ensure that the species' continued existence would not be jeopardized or critical habitat destroyed or adversely modified. If any actions in the preferred alternative were likely to adversely affect one or more federally listed species, a biological assessment would be prepared to document the potential effects. The Fish and Wildlife Service would then prepare a biological opinion based on the assessment and other scientific sources to determine whether the proposed actions would be likely to jeopardize the continued existence of the listed species or to result in the destruction or adverse modification of critical habitat. Such an opinion would be the same as a determination of impairment. To ensure that a species was not jeopardized by proposed actions, the Park Service would confer with the Fish and Wildlife Service to identify measures for reducing adverse effects and would integrate those into the preferred alternative.

### Regional Context

Regionally, rare wildlife and vegetation populations have been and will likely continue to be affected by logging, loss of natural fire regimes, mining, grazing, agriculture, development, water

*Impact Thresholds for Threatened, Endangered, or Sensitive Species*

In accordance with language used to determine effects on threatened and endangered species under the federal Endangered Species Act (USFWS 1998), potential effects on special status species are categorized as follows:

**No effect** — The proposed actions would not affect special status species or critical habitat.

**Not likely to adversely affect** — The effects on special status species would be extremely unlikely to occur and could not be meaningfully measured, detected, or evaluated, or they would be completely beneficial.

**Likely to adversely affect** — Any adverse effect to listed species that might occur as a direct or indirect result of proposed actions, and the effect would not be discountable or would be completely beneficial.

**Is likely to jeopardize proposed species / adversely modify proposed critical habitat (impairment)** — The appropriate conclusion when the National Park Service or the U.S. Fish and Wildlife Service identifies situations in which an action could jeopardize the continued existence of a proposed species or adversely modify critical habitat to a species within or outside park boundaries.

Remaining considerations concerning special status species, including conclusions and evaluation of cumulative impacts, are presented in accordance with the general definitions described above.

damming and diversions, recreational use, and introduction of nonnative species. Over 50% of the 30 native Sierra Nevada amphibian species have experienced population declines. The most at-risk species are closely tied to aquatic and riparian habitat and include the true frogs (*Rana* spp.) and toads (*Bufo* spp.). Possible causes

include habitat destruction, nonnative fish, pesticides, and diseases. Declines in golden trout are associated with hybridization, competition, and predation by introduced fish in native trout habitat. Carnivores including wolverines, fishers, and Sierra Nevada red foxes have had significant declines in their range in the Sierra Nevada due in large part to habitat fragmentation and loss.

### Impacts of the No-Action Alternative

**Analysis.** Potential effects on threatened, endangered, or sensitive species under the no-action alternative would be associated with limited increased human use in the parks. The no-action alternative would result in no effect or would not be likely to adversely affect any special status species. However, some inconsequential changes to habitat from increased visitor use might occur. Potential impacts on species that are listed by the federal government or the state as threatened, endangered, or of special concern are included in Table 27. As mentioned in the “Methodology for Analyzing Impacts” section, only general impacts are discussed for the alternatives. Before any proposals for backcountry use or other specific actions were implemented, further environmental analysis would be completed to fully evaluate effects on special status species.

**Cumulative Impacts.** The no-action alternative would have no effect or would not be likely to adversely affect any special status species. Consequently, the alternative would not contribute to cumulative effects.

As discussed in the “Regional Context” section, rare wildlife and vegetation populations have been and will likely continue to be affected by past and present activities throughout the region (logging, loss of natural fire regimes, mining, grazing, agriculture, development, water damming and diversions, recreational use, and introduction of nonnative species). Altogether, these impacts would continue to have a major, adverse, long-term impact.

**TABLE 27: EFFECTS ON POPULATIONS OF THREATENED, ENDANGERED, OR SENSITIVE SPECIES — NO-ACTION ALTERNATIVE**

Common Name	Status	Impact
<b>Vertebrate Animals</b>		
<b>Mammals</b>		
Bat, big-eared	FSC, CSC	Not likely to be adversely affected. This is primarily a forest-dwelling species. While development would continue to displace habitat or cause disturbance, no appreciable changes in development would occur under this alternative. Cave dwelling bats would continue to be protected by the existing <i>Cave Management Plan</i> (NPS 1992a) and other measures.
Bat, greater western mastiff	FSC, CSC	Same as above.
Bat, spotted	FSC, CSC	Same as above.
Bear, grizzly	FT	Extirpated from the Sierra Nevada.
Beaver, mountain	FSC, CSC	No effect. Fairly restricted habitat that currently receives no or very little use or is unlikely to receive increased use.
Fisher, Pacific	FSC, CSC	Not likely to be adversely affected. This species needs large areas of relatively undisturbed habitat. Although development would continue to displace habitat, no appreciable changes in development would occur.
Fox, Sierra Nevada red	CT, FSC	Not likely to be adversely affected. No data to confirm potential impacts and may not exist in the parks. If they do occur, they are highly intolerant of human presence and probably occur in the most remote and little-used areas, based on existing patterns of use or amount of use in backcountry, which would not change.
Hare, white-tailed	CSC	Not likely to be adversely affected. Although development could continue to displace habitat, no appreciable changes in development would occur.
Marten	FSS	Same as above.
Myotis, fringed	FSC	Not likely to be adversely affected. This is primarily a forest-dwelling species. While development would continue to displace habitat or cause disturbance, no appreciable changes in development would occur under this alternative. Cave dwelling bats would continue to be protected by the existing <i>Cave Management Plan</i> (NPS 1992a) and protective measures.
Myotis, long-eared	FSC	Same as above.
Myotis, long-legged	FSC	Same as above.
Myotis, small-footed	FSC	Same as above.
Myotis, Yuma	FSC, CSC	Same as above.
Pallid	CSC	Same as above.
Sheep, bighorn	FE, CE	No effect. Most existing use in portions of sheep range occurs along trails and is predictable and therefore less disturbing to sheep. Patterns of backcountry use or amount of use would not change. Currently one area is closed to protect sheep. Restrictions on areas or times of visitor use of sheep range would continue to be imposed as necessary.
Wolverine, California	CT, FSC	Not likely to be adversely affected. No data to confirm potential impacts; however, wolverines are highly intolerant of human presence and probably occur in the most remote and little-used areas of parks, based on existing patterns of use or amount of use in backcountry, which would not change.
<b>Birds</b>		
Condor, California	FE, CE	Extirpated from the parks.
Eagle, bald	FT, CE	No effect. The parks are outside this species' preferred habitat. No known nesting or communal roosting in the parks.
Eagle, golden	CP, CSC	Not likely to be adversely affected. Although development would continue to displace habitat and varying levels of recreation-related disturbance from human activity would continue, no appreciable changes in development or patterns of use would occur.
Falcon, peregrine	CSC	No effect. No impacts to nesting habitat. Management actions such as restrictions on areas and timing of visitor use, primarily climbing activities, are used as necessary to protect nest sites.
Falcon, prairie	CSC	No effect. Rare in the parks, and no known nesting sites. Potential cliff nesting habitat would not be affected. Management actions would be imposed similar to those for peregrines if necessary.

ENVIRONMENTAL CONSEQUENCES

Common Name	Status	Impact
Flycatcher, willow	CE, FSS	Not likely to be adversely affected. Rare in the parks. Currently little habitat disturbance to two known sites. Increased use could have a negligible effect on the extent of the impact area, but use restrictions would be imposed if necessary. Stock grazing currently has minimal impacts to suitable willow habitat; stock use is curtailed based on impacts to more sensitive meadow grass/sedge species, which would occur before impacts to willows. Studies to date show no significant evidence of cowbird parasitism on riparian nesting birds.
Goshawk, northern	FSC, CSC	Not likely to be adversely affected. Although development would continue to displace habitat and varying levels of recreation-related disturbance from human activity would continue, no appreciable changes in development or patterns of use would occur under this alternative.
Gull, California	CSC	No effect. Uncommon migrants through alpine/subalpine areas.
Harrier, northern	CSC	No effect. Uncommon in the parks. Generally uses open, burnt, chaparral habitat where visitor use is currently low and unlikely to increase due to difficulty of travel through vegetation.
Hawk, Cooper's	CSC	Not likely to be adversely affected. Although development would continue to displace habitat and varying levels of recreation-related disturbance from human activity would continue, no appreciable changes in development or patterns of use would occur.
Hawk, sharp-shinned	CSC	Same as above.
Hawk, Swainson's	CT	No effect. Rare resident or accidental visitor in the parks, which are outside its usual range and preferred habitat.
Kite, white-tailed	CP	Same as above.
Lark, horned	CSC	Same as above.
Martin, purple	CSC	Same as above.
Merlin	CS	No effect. Sporadic use of open terrain in the parks.
Osprey	CSC	No effect. Rare resident or accidental visitor in the parks, which are outside its usual range and preferred habitat.
Owl, great gray	CE, FSS	Not likely to be adversely affected. Parks are apparently south of its normal range in the Sierra Nevada. Rare/limited occurrence in the parks. Increased use may have a negligible adverse effect.
Owl, long-eared	CSC	No effect. Very rare in montane zones.
Owl, short-eared	CSC	No effect. Very rare visitor.
Owl, spotted	FSC, CSC	Not likely to be adversely affected. Although development would continue to displace habitat and varying levels of recreation-related disturbance from human activity would continue, no appreciable changes in development or patterns of use would occur under this alternative.
Shrike, loggerhead	FSC, CSC	No effect. Rare resident or accidental visitor in the parks, which are outside its usual range and preferred habitat.
Swift, Vaux's	CSC	Not likely to be adversely affected. Although development would continue to displace habitat and varying levels of recreation-related disturbance from human activity would continue, no appreciable changes in development or patterns of use would occur.
<b>Reptiles</b>		
Lizard, California legless	FSC, CSC	Not likely to be adversely affected. Little current use or expected increased use through specific habitat along the Middle Fork of the Kaweah River.
Lizard, coast horned	FSC, CP, CSC	No effect. No modern records of sightings for the parks. Either extirpated or never established in the parks.
<b>Amphibians</b>		
Frog, foothill yellow-legged	FSC, CP, CSC	Extirpated from the parks.
Frog, mountain yellow-legged	FSC, CP, CSC	Not likely to be adversely affected. Little current disturbance to breeding areas from visitor/stock use. Currently one area is closed to overnight stock use to protect a frog-breeding area. Restrictions on areas or times of stock use would continue to be imposed as necessary.
Toad, Yosemite	FSC, CP, CSC	Not likely to be adversely affected. Restrictions on areas or times of stock use would be imposed as necessary.

Common Name	Status	Impact
Turtle, Western pond	FSC, CP, CSC	No effect. Very little existing human or stock use / disturbance of habitat (foothill streams/rivers); no likely increase in use.
Salamander, Mount Lyell	FSC, CP, CSC	No effect. Very little existing human or stock use / disturbance to habitat; no likely increase in use.
<b>Fishes</b>		
Roach, California	CSC	No effect. Minimum water flows below Kaweah hydroelectric diversions would continue to adequately protect this species.
Trout, California golden	FSC, CSC	No effect. Does not occur within the parks as a native species. Continued fishing area closures / special regulations would apply. Regulations revised as necessary based on monitoring.
Trout, Kern River rainbow	FSC, CSC	No effect. Continued fishing area closures / special regulations would apply. Regulations revised as necessary based on monitoring.
Trout, Little Kern golden	FT	Same as above.
<b>Invertebrate Animals</b>		
<b>Insects</b>		
Beetle, Ciervo aegialian	FSC	Not likely to be adversely affected. No appreciable change in development/use patterns under this alternative.
Beetle, Hopping's blister	FSC	No effect. Distribution/habitat not found in the parks.
Beetle, moestan blister	FSC	Same as above.
Beetle, molestan blister	FSC	Same as above.
Beetle, Morrison's blister	FSC	Same as above.
Beetle, San Joaquin dune	FSC	Same as above.
Beetle, San Joaquin tiger	FSC	Same as above.
Beetle, valley elderberry longhorn	FT	Not likely to be adversely affected. Believed absent due to the presence of other subspecies.
Beetle, wooly hydroporous diving	FSC	Not likely to be adversely affected. No appreciable change in development/use patterns under this alternative.
Bug, Dry Creek cliff strider	FSC	Same as above.
Butterfly, Bohart's blue	FSC	Same as above.
Butterfly, San Emigdio blue	FSC	Same as above.
Caddisfly, Denning's cryptic	FSC	Same as above.
Caddisfly, Kings Canyon cryptochian	FSC	Same as above.
Grasshopper, Sierra pygmy	FSC	Same as above.
<b>Crustaceans</b>		
Linderiella, California	FSC	Not likely to be adversely affected. No appreciable change in development/use patterns under this alternative.
Shrimp, vernal pool fairy	FT	Same as above.
<b>Plants</b>		
Tompkins' sedge	CR	Not likely to be adversely affected. Areas of any future development would be surveyed and plant populations avoided to the extent possible.

FE = federally endangered  
 FT = federally threatened  
 FSC = federal species of concern

CE = California endangered  
 CT = California threatened  
 CSC = California species of concern

CP = California protected  
 CR = California rare  
 FSS = Forest Service sensitive

**Conclusion.** The no-action alternative would have no effect or would not be likely to adversely affect any special status species. If impacts were expected, mitigating measures would be taken as necessary in consultation with the U.S. Fish and Wildlife Service.

The no-action alternative would not contribute to cumulative effects on special status species. While some actions would have beneficial, long-

term effects in the parks and region, overall past, present, and reasonably foreseeable actions would continue to have major, adverse, long-term impacts.

Because no rare, threatened, or endangered species would be likely to be adversely affected, no impairment is expected.

### Impacts of the Preferred Alternative

**Analysis.** Most potential impacts would be related to modest increases in the footprint of development and to limiting backcountry use. The extent and intensity of potential benefits to some species would depend on where backcountry use was restricted, which would be determined in the subsequent wilderness stewardship / stock use plan. Further evaluation of effects on special status species would be included in that plan. Potential impacts under the preferred alternative that would differ from those under the no-action alternative are shown in Table 28.

As described for the no-action alternative, there would be no effects on the following species:

*Mammals* — grizzly bear, mountain beaver

*Birds* — California condor (extirpated from the parks), bald eagle, peregrine falcon, prairie falcon, California gull, Swainson’s hawk, white-tailed kite, horned lark, purple martin, merlin, northern harrier, osprey, long-eared owl, short-eared owl, loggerhead shrike

*Reptiles* — coast horned lizard

*Amphibians* — foothill yellow-legged frog (extirpated from the parks), Mount Lyell salamander

*Fishes* — California golden trout, California roach, Little Kern golden trout, Kern River rainbow trout

*Insects* — beetles (Hopping’s blister, moestan blister, molestan blister, Morrison’s blister, San Joaquin dune, and San Joaquin tiger)

**TABLE 28: EFFECTS ON POPULATIONS OF THREATENED, ENDANGERED, OR SENSITIVE SPECIES — PREFERRED ALTERNATIVE**

Common Name	Status	Impact
<b>Vertebrate Animals</b>		
<b>Mammals</b>		
Bat, big-eared	FSC, CSC	Not likely to be adversely affected. This species is primarily forest dwelling; there would be an incrementally small decrease in the extent of habitat due to increased development footprint / associated use / lighting. Individuals could be displaced if any buildings they occupied were removed. A survey would be completed before any action was implemented. Cave-dwelling bats would continue to be protected by the existing <i>Cave Management Plan</i> (NPS 1992a) and protective measures.
Bat, greater western mastiff	FSC, CSC	Same as above.
Bat, spotted	FSC, CSC	Same as above.
Fisher, Pacific	FSC, CSC	Not likely to be adversely affected. Large areas of relatively undisturbed habitat would remain. Incrementally small decreases in the extent of habitat.
Fox, Sierra Nevada red	CT, FSC	Not likely to be adversely affected. Species may not exist in the parks. If individuals do occur, they are highly intolerant of human presence and probably occur in the most remote and little-used areas. Patterns of use in little-used or unused portions of parks would not change or could decrease in some areas, which would be a beneficial effect.
Hare, white-tailed	CSC	Not likely to be adversely affected. Incrementally small decreases in the extent of habitat.
Marten	FSS	Same as above.
Myotis, fringed	FSC	Not likely to be adversely affected. This species is primarily forest dwelling; there would be an incrementally small decrease in the extent of habitat due to increased development footprint / associated use / lighting. Individuals could be displaced if any buildings they occupied were removed. Surveys would be completed before any action was implemented. Cave-dwelling bats would continue to be protected by the existing <i>Cave Management Plan</i> (NPS 1992a) and protective measures.
Myotis, long-eared	FSC	Same as above.
Myotis, long-legged	FSC	Same as above.
Myotis, small-footed	FSC	Same as above.
Myotis, Yuma	FSC, CSC	Same as above.
Pallid	CSC	Same as above.

Common Name	Status	Impact
Sheep, bighorn	FE, CE	Not likely to be adversely affected. Increased recreational use could occur in little or unused portions of sheep range, which could disturb sheep principally from the infrequent/unpredictable nature of cross-country use. Restrictions on cross-country use would be imposed in sheep range to avoid impacts.
Wolverine, California	CT, FSC	Not likely to be adversely affected. No data to confirm potential impacts; however, wolverines are highly intolerant of human presence and probably occur in the most remote and little-used areas of the parks. Patterns of use in little-used or unused portions of parks would not change or could decrease in some areas, which would be a beneficial effect.
<b>Birds</b>		
Eagle, golden	CP, CSC	Not likely to be adversely affected. Incrementally small decrease in habitat due to increased development footprint.
Flycatcher, willow	CE, FSS	Not likely to be adversely affected. Only two known sites, with little habitat disturbance. Increased use could have a negligible effect on the extent of the impact area, but use restrictions would be imposed if necessary. Stock grazing currently has minimal impacts to suitable willow habitat; stock use is curtailed based on impacts to more sensitive meadow grass/sedge species, which would be impacted before willows. Studies show no significant evidence of cowbird parasitism on riparian nesting birds, but dispersed stock use would increase the potential for impacts.
Goshawk, northern	FSC, CSC	Not likely to be adversely affected. Incrementally small decrease in habitat due to increased development footprint.
Hawk, Cooper's	CSC	Same as above.
Hawk, sharp-shinned	CSC	Same as above.
Owl, great gray	CE, FSS	Not likely to be adversely affected. Rare/limited occurrence in the parks, which are south of their normal range in the Sierra Nevada. Occurs in high visitor use/grazing locations, and potential decreased use could be a negligible to minor benefit.
Owl, spotted	FSC, CSC	Not likely to be adversely affected. Incrementally small decrease in habitat due to increased development footprint.
Swift, Vaux's	CSC	Same as above.
<b>Reptiles</b>		
Lizard, California legless	FSC, CSC	Not likely to be adversely affected. Some increased use could occur in specific habitat along the Middle Fork of the Kaweah River, although controlling use/designating access points would limit potential impacts.
<b>Amphibians</b>		
Frog, mountain yellow-legged	FSC, CP, CSC	Not likely to be adversely affected. Little current disturbance to breeding areas from visitor/stock use; reducing this use in some areas could have a negligible to minor beneficial effect.
Toad, Yosemite	FSC, CP, CSC	Not likely to be adversely affected. Reducing use in some areas could have a negligible beneficial effect.
Turtle, Western pond	FSC, CP, CSC	Not likely to be adversely affected. Low use levels along the North Fork of the Kaweah could affect turtles.
<b>Invertebrate Animals</b>		
<b>Insects</b>		
Beetle, Ciervo aegialian	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect if the species is present.
Beetle, valley elderberry longhorn	FT	Not likely to be adversely affected. Believed absent due to the presence of other subspecies. Presence would be verified as correct subspecies before any development that could affect potential habitat.
Beetle, wooly hydroporous diving	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect if the species is present.
Bug, Dry Creek cliff strider	FSC	Same as above.
Butterfly, Bohart's blue	FSC	Same as above.
Butterfly, San Emigdio blue	FSC	Same as above.
Caddisfly, Denning's cryptic	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect.
Caddisfly, Kings Canyon cryptochian	FSC	Same as above.
Grasshopper, Sierra pygmy	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect if the species is present.

Common Name	Status	Impact
<b>Crustaceans</b>		
Linderiella, California	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect if the species is present.
Shrimp, vernal pool fairy	FT	Same as above.
<b>Plants</b>		
Tompkins' sedge	CR	Not likely to be adversely affected. There would be an incrementally small decrease in the extent of habitat due to increased development footprint. Affected areas would be surveyed and plant populations avoided to the extent possible.

FE = federally endangered  
 FT = federally threatened  
 FSC = federal species of concern

CE = California endangered  
 CT = California threatened  
 CSC = California species of concern

CP = California protected  
 CR = California rare  
 FSS = Forest Service sensitive

**Cumulative Impacts.** The preferred alternative would have no effect or would not be likely to adversely affect special status species. Consequently, the alternative would generally not contribute to cumulative effects.

As discussed in the “Regional Context” section, rare wildlife and vegetation populations have been and will likely continue to be affected by past and present activities throughout the region (logging, loss of natural fire regimes, mining, grazing, agriculture, development, water dams and diversions, recreational use, and introduction of nonnative species). While some cumulative actions would have beneficial, long-term effects in the parks and region, overall past, present, and reasonably foreseeable actions would have major, adverse, long-term impacts.

**Conclusion.** The preferred alternative would have no effect or would not be likely to adversely affect any special status species. Mitigation in consultation with the U.S. Fish and Wildlife Service would be implemented as necessary.

The preferred alternative would generally not contribute to cumulative effects. While some cumulative actions would have beneficial, long-term effects in the parks and region, in conjunction with past, present, and reasonably foreseeable actions, there would continue to be major, adverse, long-term impacts.

Because no rare, threatened, or endangered species would likely be adversely affected under this alternative, no impairment is expected.

### Impacts of Alternative A

**Analysis.** Alternative A would have no effect on most species or would not be likely to affect species. Some species of concern within the parks could benefit from actions under alternative A. Table 29 lists impacts that would differ from those under the no-action alternative. Of the federally listed species, the bighorn sheep could be beneficially affected. The extent and intensity of potential benefits to some species would depend on the extent and location of decreased back-country use, which would be determined in a wilderness stewardship / stock use plan. Further evaluation of effects on special status species would be included in that plan.

As described for the no-action alternative, there would be no effects on the following species:

*Mammals* — grizzly bear, mountain beaver

*Birds* — California condor (extirpated from the parks), bald eagle, peregrine falcon, prairie falcon, California gull, Swainson’s hawk, white-tailed kite, horned lark, purple martin, merlin, northern harrier, osprey, long-eared owl, short-eared owl, loggerhead shrike

*Reptiles* — coast horned lizard

*Amphibians* — foothill yellow-legged frog (extirpated from the parks), Mount Lyell salamander, western pond turtle

*Fishes* — California golden trout, California roach, Little Kern golden trout, Kern River rainbow trout

*Insects* — beetles (Hopping’s blister, moestan blister, molestan blister, Morrison’s blister, San Joaquin dune, and San Joaquin tiger).

**TABLE 29: EFFECTS ON POPULATIONS OF THREATENED, ENDANGERED, OR SENSITIVE SPECIES — ALTERNATIVE A**

Common Name	Status	Impact
<b>Vertebrate Animals</b>		
<b>Mammals</b>		
Bat, big-eared	FSC, CSC	Not likely to be adversely affected. This is primarily a forest-dwelling species. A decreased development footprint would result in less habitat displacement, a negligible benefit. Cave-dwelling bats would continue to be protected by the existing <i>Cave Management Plan</i> (NPS 1992a) and protective measures.
Bat, greater western mastiff	FSC, CSC	Same as above.
Bat, spotted	FSC, CSC	Same as above.
Fisher, Pacific	FSC, CSC	Not likely to be adversely affected. This species needs large areas of relatively undisturbed habitat. Reducing visitor use and removing trails in foothill hardwood / mixed conifer zones could increase habitat suitability in some areas.
Fox, Sierra Nevada red	CT, FSC	Not likely to be adversely affected. Rare resident that is highly intolerant of human presence and probably occurs in the most remote and little-used areas of the parks. Patterns of use in little-used or unused portions of parks would not change or could decrease in some areas. Trail corridors, particularly in higher use areas, could be acting as barriers that affect home range size and dispersal. Trails, including some high-use trails, would be reduced. This alternative could have beneficial effects.
Hare, white-tailed	CSC	Not likely to be adversely affected. Decreased development footprint and less displacement of habitat would slightly increase extent of habitat, a negligible benefit.
Marten	FSS	Not likely to be adversely affected. Decreased development footprint and less displacement of habitat would slightly increase extent of habitat, a negligible benefit.
Myotis, fringed	FSC	Not likely to be adversely affected. This is primarily a forest-dwelling species. A decreased development footprint would result in less habitat displacement, a negligible benefit. Cave-dwelling bats would continue to be protected by the existing <i>Cave Management Plan</i> (NPS 1992a) and protective measures.
Myotis, long-eared	FSC	Same as above.
Myotis, long-legged	FSC	Same as above.
Myotis, small-footed	FSC	Same as above.
Myotis, Yuma	FSC, CSC	Same as above.
Pallid	CSC	Same as above.
Sheep, bighorn	FE, CE	Not likely to be adversely affected. Decreased recreational use, with less disturbance of sheep. Restrictions on cross-country use would be imposed in sheep range to avoid impacts.
Wolverine, California	CT, FSC	Not likely to be adversely affected. Rare resident that is highly intolerant of human presence and probably occurs in the most remote and little-used areas of the parks. Patterns of use in little-used or unused portions of the parks would not change or could decrease in some areas. Trail corridors, particularly in higher use areas, could be acting as barriers that affect home range size and dispersal. Trails, including some high-use trails, would be reduced. This alternative could have beneficial effects.
<b>Birds</b>		
Eagle, golden	CP, CSC	Not likely to be adversely affected. Impacts due to decreased development footprint and habitat displacement would have a negligible beneficial effect.
Flycatcher, willow	CE, FSS	Not likely to be adversely affected. Rare in the parks. Little habitat disturbance to two known sites; consequently, reduced visitor use would have a negligible beneficial effect. Stock grazing currently has minimal impacts to suitable willow habitat, and stock use is curtailed based on impacts to more sensitive meadow grass/sedge species, which would be impacted before willows. Studies to date show no evidence of cowbird parasitism on riparian nesting birds. Eliminating stock could have a negligible beneficial effect on some suitable riparian habitat and reduced potential for brown-headed cowbird presence.
Goshawk, northern	FSC, CSC	Not likely to be adversely affected. Impacts due to decreased development footprint and habitat displacement would have a negligible beneficial effect.
Hawk, Cooper's	CSC	Same as above.
Hawk, sharp-shinned	CSC	Same as above.

ENVIRONMENTAL CONSEQUENCES

Common Name	Status	Impact
Owl, great gray	CE, FSS	Not likely to be adversely affected. Rare/limited occurrence in the parks, which are apparently south of their normal range in the Sierra Nevada. Occurs in existing high visitor use/grazing locations. Potential decreased use in existing high-use areas may be a negligible to minor benefit.
Owl, spotted	FSC, CSC	Not likely to be adversely affected. Impacts due to decreased development footprint and habitat displacement would have a negligible beneficial effect.
Swift, Vaux's	CSC	Same as above.
<b>Reptiles</b>		
Lizard, California legless	FSC, CSC	Not likely to be adversely affected. Little current use through specific habitat along the Middle Fork of the Kaweah River. Reduced recreational use could have a beneficial effect.
<b>Amphibians</b>		
Frog, mountain yellow-legged	FSC, CP, CSC	Not likely to be adversely affected. Little current disturbance to breeding areas from visitor/stock use. Reduced recreational use and the elimination of stock/grazing in some breeding areas could have a beneficial effect.
Toad, Yosemite	FSC, CP, CSC	Same as above.
<b>Invertebrate Animals</b>		
<b>Insects</b>		
Beetle, Ciervo aegialian	FSC	Not likely to be adversely affected. Decreased use could have a localized, negligible, adverse effect if the species is present.
Beetle, valley elderberry longhorn	FT	Not likely to be adversely affected. Believed absent due to presence of other subspecies. Presence would be verified as correct subspecies before any development that could affect potential habitat.
Beetle, wooly hydroporous diving	FSC	Not likely to be adversely affected. Decreased use could have a localized, negligible, adverse effect if the species is present.
Bug, Dry Creek cliff strider	FSC	Same as above.
Butterfly, Bohart's blue	FSC	Same as above.
Butterfly, San Emigdio blue	FSC	Same as above.
Caddisfly, Denning's cryptic	FSC	Not likely to be adversely affected. Small increase in extent of natural areas would be a negligible benefit.
Caddisfly, Kings Canyon cryptochian	FSC	Same as above.
Grasshopper, Sierra pygmy	FSC	Not likely to be adversely affected. Decreased use could have a localized, negligible, adverse effect if the species is present.
<b>Crustaceans</b>		
Linderiella, California	FSC	Not likely to be adversely affected. Decreased use could have a localized, negligible, adverse effect if the species is present.
Shrimp, vernal pool fairy	FT	Same as above.
<b>Plants</b>		
Tompkins' sedge	CR	Not likely to be adversely affected. Decreased development footprint and less displacement of habitat could result in a small increase in extent of habitat, a negligible benefit.

FE = federally endangered  
 FT = federally threatened  
 FSC = federal species of concern

CE = California endangered  
 CT = California threatened  
 CSC = California species of concern

CP = California protected  
 CR = California rare  
 FSS = Forest Service sensitive

**Cumulative Impacts.** On a cumulative basis, alternative A would have a beneficial impact on some species. As discussed in the “Regional Context” section, rare wildlife and vegetation populations will likely continue to be affected by past and present activities throughout the region (logging, loss of natural fire regimes, mining, grazing, agriculture, development, water damming and diversions, recreational use, and intro-

duction of nonnative species). These actions would have major, adverse, long-term impacts.

**Conclusion.** Alternative A would have no effect on any federal species except the Valley elderberry longhorn beetle, which would not be likely to be adversely affected. Mitigation in consultation with the U.S. Fish and Wildlife Service would occur as necessary. There could be bene-

ficial impacts on some special status species because of reduced development and use.

On a cumulative basis, alternative A would have a beneficial effect to some species. In conjunction with past, present, and reasonably foreseeable actions throughout the region, adverse impacts would continue to be long term and major.

Because no rare, threatened, or endangered species would be likely to be adversely affected, no impairment is expected.

### Impacts of Alternative C

**Analysis.** Most potential impacts would be related to increasing the development footprint and dispersing/increasing backcountry use to little or unused portions of the parks. Impacts that would differ from those under the no-action alternative are presented in Table 30.

The extent and intensity of potential benefits to some species would depend on the extent and location of decreased backcountry use, which would be determined in a wilderness stewardship / stock use plan subsequent to the general

management plan. Further evaluation of effects on special status species would be included in that plan.

As described for the no-action alternative, there would be no effects on the following species:

*Mammals* — grizzly bear, mountain beaver

*Birds* — California condor (extirpated from the parks), bald eagle, peregrine falcon, prairie falcon, California gull, Swainson’s hawk, white-tailed kite, horned lark, purple martin, merlin, northern harrier, osprey, long-eared owl, short-eared owl, loggerhead shrike

*Reptiles* — coast horned lizard

*Amphibians* — foothill yellow-legged frog (extirpated from the parks), Mount Lyell salamander

*Fishes* — California golden trout, California roach, Little Kern golden trout, Kern River rainbow trout

*Insects* — beetles (Hopping’s blister, moestan blister, molestan blister, Morrison’s blister, San Joaquin dune, and San Joaquin tiger)

**TABLE 30: EFFECTS ON POPULATIONS OF THREATENED, ENDANGERED, OR SENSITIVE SPECIES — ALTERNATIVE C**

Common Name	Status	Impact
<b>Vertebrate Animals</b>		
<b>Mammals</b>		
Bat, big-eared	FSC, CSC	Not likely to be adversely affected. This species is primarily forest dwelling; there would be an incrementally small decrease in the extent of habitat due to increased development footprint / associated use / lighting. Individuals could be displaced if any buildings they occupied were removed. Surveys would be completed before any action was implemented. Cave-dwelling bats would continue to be protected by the existing <i>Cave Management Plan</i> (NPS 1992a) and protective measures.
Bat, greater western mastiff	FSC, CSC	Same as above.
Bat, spotted	FSC, CSC	Same as above.
Fisher, Pacific	FSC, CSC	Not likely to be adversely affected. This species needs large areas of relatively undisturbed habitat. There would be an incrementally small decrease in the extent of habitat due to increased development and use.
Fox, Sierra Nevada red	CT, FSC	Not likely to be adversely affected. This rare resident is highly intolerant of human presence and probably occurs in the most remote and little-used areas of parks, based on existing patterns of use or amount of use in the backcountry. Increased cross-country use, although low, could still disturb this species and affect portions of its home range. Trail corridors, particularly higher use trail corridors, could affect home range size and dispersal. Trails, including some high-use trails, would be reduced, which could have a beneficial effect, depending on the location and extent of trail removal.

ENVIRONMENTAL CONSEQUENCES

Common Name	Status	Impact
Hare, white-tailed	CSC	Not likely to be adversely affected. There would be an incrementally small decrease in the extent of habitat due to increased development footprint.
Marten	FSS	Same as above.
Myotis, fringed	FSC	Not likely to be adversely affected. This species is primarily forest dwelling; there would be an incrementally small decrease in the extent of habitat due to increased development footprint / associated use / lighting. Surveys would be completed before any action was implemented. Individuals could be displaced if any buildings they occupied were removed. Cave-dwelling bats would continue to be protected by the existing <i>Cave Management Plan</i> (NPS 1992a) and protective measures.
Myotis, long-eared	FSC	Same as above.
Myotis, long-legged	FSC	Same as above.
Myotis, small-footed	FSC	Same as above.
Myotis, Yuma	FSC, CSC	Same as above.
Pallid	CSC	Same as above.
Sheep, bighorn	FE, CE	Not likely to be adversely affected. Increased recreational use could occur in little/unused portions of sheep range, which could disturb sheep principally from the infrequent/unpredictable nature of cross-country use. Restrictions on cross-country use would be imposed in sheep range to avoid impacts.
Wolverine, California	CT, FSC	Not likely to be adversely affected. This rare resident is highly intolerant of human presence and probably occurs in the most remote and little-used areas of parks, based on existing patterns of use or amount of use in the backcountry. Increased cross-country use, although low, could incrementally disturb this species and affect portions of its home range. Trail corridors, particularly higher use trail corridors, could affect home range size and dispersal. Trails, including some high-use trails, would be reduced, which could have a beneficial effect, depending on the location and extent of trail removal.
<b>Birds</b>		
Eagle, golden	CP, CSC	Not likely to be adversely affected. There would be an incrementally small decrease in the extent of habitat due to increased development footprint.
Flycatcher, willow	CE, FSS	Not likely to be adversely affected. Rare in the parks. Currently little habitat disturbance to two known sites. Increased use near nest sites could have negligible effect on the extent of impacts, but use restrictions would be imposed if necessary. Stock grazing currently has minimal impacts to suitable willow habitat; stock use is curtailed based on impacts to more sensitive meadow grass/sedge species, which would occur before impacts to willows. Studies to date show no evidence of cowbird parasitism on riparian nesting birds, although dispersed stock use would increase the potential for such impacts.
Goshawk, northern	FSC, CSC	Not likely to be adversely affected. There would be an incrementally small decrease in the extent of habitat due to increased development footprint.
Hawk, Cooper's	CSC	Same as above.
Hawk, sharp-shinned	CSC	Same as above.
Owl, great gray	CE, FSS	Not likely to be adversely affected. Rare/limited occurrence in the parks because they are apparently south of normal range in the Sierra Nevada. Occurs in high visitor use/grazing locations. Potential decreased use in existing high-use areas could be a negligible benefit.
Owl, spotted	FSC, CSC	Not likely to be adversely affected. There would be an incrementally small decrease in the extent of habitat due to increased development footprint.
Swift, Vaux's	CSC	Same as above.
<b>Reptiles</b>		
Lizard, California legless	FSC, CSC	Not likely to be adversely affected. Some increased use could occur in specific habitat along the Middle Fork of the Kaweah River, although controlling use and designating access points would limit potential impacts.
<b>Amphibians</b>		
Frog, mountain yellow-legged	FSC, CP, CSC	Not likely to be adversely affected. There is little current disturbance to breeding areas from visitor/stock use, and reducing use areas could have a negligible beneficial effect. There would be an incrementally small decrease in the extent of habitat due to increasing stock use of more or different lakes by dispersing use.

Common Name	Status	Impact
		However, restrictions on areas or times of stock use would continue to be imposed as necessary to avoid or minimize impacts.
Toad, Yosemite	FSC, CP, CSC	Same as above.
Turtle, Western pond	FSC, CP, CSC	Not likely to be adversely affected. Some increased use along the North Fork of the Kaweah River could affect turtles due to human disturbance. Low levels of use would limit effects.
<b>Invertebrate Animals</b>		
<b>Insects</b>		
Beetle, Ciervo aegialian	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect if the species is present.
Beetle, valley elderberry longhorn	FT	Not likely to be adversely affected. Believed absent due to presence of other subspecies. Presence would be verified as correct subspecies before any development that could affect potential habitat.
Beetle, wooly hydroporous diving	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect if the species is present.
Bug, Dry Creek cliff strider	FSC	Same as above.
Butterfly, Bohart's blue	FSC	Same as above.
Butterfly, San Emigdio blue	FSC	Same as above.
Caddisfly, Denning's cryptic	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect.
Caddisfly, Kings Canyon cryptochian	FSC	Same as above.
Grasshopper, Sierra pygmy	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect if the species is present.
<b>Crustaceans</b>		
Linderiella, California	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect if the species is present.
Shrimp, vernal pool fairy	FT	Same as above.
<b>Plants</b>		
Tompkins' sedge	CR	Not likely to be adversely affected. There would be an incrementally small decrease in the extent of habitat due to increased development footprint. Affected areas would be surveyed and plant populations avoided to the extent possible.

FE = federally endangered  
 FT = federally threatened  
 FSC = federal species of concern

CE = California endangered  
 CT = California threatened  
 CSC = California species of concern

CP = California protected  
 CR = California rare  
 FSS = Forest Service sensitive

**Cumulative Impacts.** Alternative C would have no effect or would not be likely to adversely affect any special status species. Consequently, the alternative would generally not contribute to cumulative effects.

As discussed in the “Regional Context” section, rare wildlife and vegetation populations have been and will likely continue to be affected by past and present activities throughout the region (logging, loss of natural fire regimes, mining, grazing, agriculture, development, water dams and diversions, recreational use, and nonnative species). Altogether, these impacts would have a long-term, major, adverse impact.

**Conclusion.** This alternative would have no effect or would not be likely to adversely affect any special status species. Mitigation would be implemented as necessary in consultation with the U.S. Fish and Wildlife Service.

Alternative C would generally not contribute to cumulative effects on special status species. While some cumulative actions would have beneficial impacts in the parks and region, in conjunction with past, present, and reasonably foreseeable actions, there would continue to be major, adverse, long-term impacts.

Because no rare, threatened, or endangered species would be likely to be adversely affected, no impairment is expected.

### Impacts of Alternative D

**Analysis.** Potential impacts on threatened or endangered species would be related to increasing the development footprint and frontcountry trail system and slightly increasing backcountry concentrated use areas. Impacts that would differ from those under the no-action alternative are presented in Table 31. The extent and intensity of potential benefits to some species would depend on where backcountry use decreased, which would be determined in a subsequent wilderness stewardship / stock use plan. Effects on special status species would be further evaluated in that plan.

As described for the no-action alternative, there would be no effects on the following species:

*Mammals* — grizzly bear, mountain beaver

*Birds* — California condor (extirpated from the parks), bald eagle, peregrine falcon, prairie falcon, California gull, Swainson’s hawk, white-tailed kite, horned lark, purple martin, merlin, northern harrier, osprey, long-eared owl, short-eared owl, loggerhead shrike

*Reptiles* — coast horned lizard

*Amphibians* — foothill yellow-legged frog (extirpated from the parks), Mount Lyell salamander

*Fishes* — California golden trout, California roach, Little Kern golden trout, Kern River rainbow trout

*Insects* — beetles (Hopping’s blister, moestan blister, molestan blister, Morrison’s blister, San Joaquin dune, and San Joaquin tiger)

**TABLE 31: EFFECTS ON POPULATIONS OF THREATENED, ENDANGERED, OR SENSITIVE SPECIES — ALTERNATIVE D**

Common Name	Status	Impact
<b>Vertebrate Animals</b>		
<b>Mammals</b>		
Bat, big-eared	FSC, CSC	Not likely to be adversely affected. This species is primarily forest dwelling; there would be an incrementally small decrease in the extent of habitat due to increased development footprint / associated use / lighting. Individuals could be displaced if any buildings they occupied were removed. Surveys would be conducted before any action was implemented. Cave-dwelling bats would continue to be protected by the existing <i>Cave Management Plan</i> (NPS 1992a) and protective measures.
Bat, greater western mastiff	FSC, CSC	Same as above.
Bat, spotted	FSC, CSC	Same as above.
Fisher, Pacific	FSC, CSC	Not likely to be adversely affected. This species needs large areas of relatively undisturbed habitat. There would be an incrementally small decrease in the extent of habitat due to increased development and use.
Fox, Sierra Nevada red	CT, FSC	Not likely to be adversely affected. This rare resident is highly intolerant of human presence and probably occurs in the most remote and little-used areas of parks, based on existing patterns of use or amount of backcountry use. Increased use would occur in existing high-use areas; extended high-use areas would most likely occur along existing secondary trails, areas that foxes probably already avoid.
Hare, white-tailed	CSC	Not likely to be adversely affected. There would be an incrementally small decrease in the extent of habitat due to increased development footprint.
Marten	FSS	Same as above.
Myotis, fringed	FSC	Not likely to be adversely affected. This species is primarily forest dwelling; there would be an incrementally small decrease in the extent of habitat due to increased development footprint / associated use / lighting. Individuals could be displaced if any buildings they occupied were removed. Surveys would be conducted before any action was implemented. Cave-dwelling bats would continue to be protected by the existing <i>Cave Management Plan</i> (NPS 1992a) and protective measures.
Myotis, long-eared	FSC	Same as above.
Myotis, long-legged	FSC	Same as above.
Myotis, small-footed	FSC	Same as above.
Myotis, Yuma	FSC, CSC	Same as above.
Pallid	CSC	Same as above.

Common Name	Status	Impact
Sheep, bighorn	FE, CE	Not likely to be adversely affected. Increased recreational use of trails in portions of sheep range would be unlikely to result in disturbance to sheep, which are accustomed to recreational use along the trails.
Wolverine, California	CT, FSC	Not likely to be adversely affected. This rare resident is highly intolerant of humans and probably occurs in the most remote and little-used areas of parks, based on existing patterns of use or amount of use in the backcountry. Increased use would occur in existing high-use areas; extended high-use areas would most likely occur along existing secondary trails, areas that wolverines probably already avoid.
<b>Birds</b>		
Eagle, golden	CP, CSC	Not likely to be adversely affected. There would be an incrementally small decrease in the extent of habitat due to increased development footprint.
Flycatcher, willow	CE, FSS	Not likely to be adversely affected. Rare in the parks. Little habitat disturbance to two known sites. Increased use would likely have a negligible effect because social trails are difficult to create in willow habitat. Current stock grazing has minimal impacts to suitable willow habitat; stock use is curtailed based on impacts to more sensitive meadow grass/sedge species, which would be impacted before willows. Studies show no evidence of cowbird parasitism on riparian nesting birds to date.
Goshawk, northern	FSC, CSC	Not likely to be adversely affected. There would be an incrementally small decrease in the extent of habitat due to increased development footprint.
Hawk, Cooper's	CSC	Same as above.
Hawk, sharp-shinned	CSC	Same as above.
Owl, great gray	CE, FSS	Not likely to be adversely affected. Rare/limited occurrence because parks are apparently south of the owl's normal range in the Sierra Nevada. Occurs in high visitor use/grazing locations. There would be an incrementally small decrease in habitat extent due to potential increased visitor use in existing high-use areas.
Owl, spotted	FSC, CSC	Not likely to be adversely affected. There would be an incrementally small decrease in the extent of habitat due to increased development footprint.
Swift, Vaux's	CSC	Same as above.
<b>Reptiles</b>		
Lizard, California legless	FSC, CSC	Not likely to be adversely affected. Some increased use could occur in specific habitat along the Middle Fork of the Kaweah River, although controlling use and designating access points would limit potential impacts.
<b>Amphibians</b>		
Frog, mountain yellow-legged	FSC, CP, CSC	Not likely to be adversely affected. There is little current disturbance to breeding areas from visitor/stock use. Currently one area is closed to overnight stock use to protect the frog-breeding area. There would be an incrementally small decrease in the extent of habitat due to increased use in existing high-use areas. However, restrictions on areas or times of stock use would continue to be imposed as necessary, which would avoid or minimize potential new impacts.
Toad, Yosemite	FSC, CP, CSC	Same as above.
Turtle, Western pond	FSC, CP, CSC	Not likely to be adversely affected. Some increased human use along the North Fork of the Kaweah River could affect turtles. Low levels of use would limit effects.
<b>Invertebrate Animals</b>		
<b>Insects</b>		
Beetle, Ciervo aegialian	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect if the species is present.
Beetle, valley elderberry longhorn	FT	Not likely to be adversely affected. Believed absent due to presence of other subspecies. Presence would be verified as correct subspecies before any development that could affect potential habitat.
Beetle, wooly hydroporous diving	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect if the species is present.
Bug, Dry Creek cliff strider	FSC	Same as above.
Butterfly, Bohart's blue	FSC	Same as above.
Butterfly, San Emigdio blue	FSC	Same as above.
Caddisfly, Denning's cryptic	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect.

Common Name	Status	Impact
Caddisfly, Kings Canyon cryptochian	FSC	Same as above.
Grasshopper, Sierra pygmy	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect if the species is present.
<b>Crustaceans</b>		
Linderiella, California	FSC	Not likely to be adversely affected. Increased use could have a localized, negligible, adverse effect if the species is present.
Shrimp, vernal pool fairy	FT	Same as above.
<b>Plants</b>		
Tompkins' sedge	CR	Not likely to be adversely affected. Increased development footprint could affect this species. Plant populations would be surveyed and avoided to the extent possible.

FE = federally endangered  
 FT = federally threatened  
 FSC = federal species of concern

CE = California endangered  
 CT = California threatened  
 CSC = California species of concern

CP = California protected  
 CR = California rare  
 FSS = Forest Service sensitive

**Cumulative Impacts.** Alternative D would have no effect or would not be likely to adversely affect any special status species. Consequently, there would generally be no contribution to cumulative effects.

As discussed in the “Regional Context” section, rare wildlife and vegetation populations have been and will likely continue to be affected by past and present activities throughout the region (logging, loss of natural fire regimes, mining, grazing, agriculture, development, water damming and diversions, recreational use, and introduction of nonnative species). While some cumulative actions would have beneficial, long-term, effects in the parks and region, overall past, present, and reasonably foreseeable actions, in conjunction with this alternative, would have major, adverse, long-term impacts.

**Conclusion.** This alternative would have no effect on would not be likely to affect any special status species. Mitigation would be implemented as necessary in consultation with the U.S. Fish and Wildlife Service.

Alternative D would generally not contribute to cumulative effects on special status species. While some cumulative actions would have beneficial, long-term effects in the parks and region, overall past, present, and reasonably foreseeable actions, in conjunction with this alternative, would have major, adverse, long-term impacts.

Because no rare, threatened, or endangered species would be likely to be adversely affected, no impairment is expected.

## AIR QUALITY

### Methodology

#### *Impacts Related to Stationary Sources, Smoke Emissions, Human Health and Enjoyment*

Impacts of alternatives within the parks would be similar under all alternatives. No actions being considered would increase levels of park stationary source emissions above conformity *de minimis* values of 50–100 tons per year. Smoke emissions from the parks’ managed wildland fires over the next 10 years have been included in the State Implementation Plan for the San Joaquin Valley and would not vary by alternative. The parks would continue to provide periodic air quality warnings and education. This information would not vary by alternative.

#### *Transportation-Related Impacts*

**Park Visitor Use Studies.** A survey of visitors to Sequoia and Kings Canyon National Parks conducted in 1994–95 indicated that 62% of visitors were from California (NPS 1995e). However, this survey did not include information on state vehicle registration. It is expected that approximately 80% or more of the vehicles entering the parks are registered in California, including rental vehicles.

The 1998 “Visitor Use Study” determined that 94% of vehicles were passenger cars, 3% were other passenger vehicles under 22 feet in length (including motorcycles, pickups, and vans), and 3% were buses, trucks, and RVs over 22 feet in length (BRW and Lee Engineering 1999).

Since transportation-related air quality is partly a function of traffic volume, the roadway segments chosen for the carrying capacity analysis were also used for air quality analysis, plus segments on Generals Highway were added for Lost Grove and Moro Rock. Table 32 shows the speed limits for these segments and their length.

Because the majority of vehicles going to Sequoia and Kings Canyon are registered in California, fleetwide average emission factors for light-duty autos that comply with California emission standards were used in the analysis. The California Air Resources Board provided the emission factors used in this study.

**Mobile Emissions.** To compare future emissions under each alternative with the base year, emission factors for 1997 and 2010 were used. Due to continual improvements in motor vehicle emission control technology and the replacement of older vehicles with newer models, gaseous

emissions from automobiles are projected to decrease fleetwide by approximately 70% for volatile organic compounds (VOC), carbon monoxide (CO), and nitrogen oxides (NO<sub>x</sub>). During the same period, fleetwide emission factors for sulfur dioxide (SO<sub>2</sub>) are expected to decrease by approximately 40%. Particulate emissions (PM<sub>10</sub>) from automobiles include exhaust emissions, and emissions due to brake and tire wear. Fleetwide average PM<sub>10</sub> emission factors are expected to remain essentially constant throughout the analysis period.

Motor vehicle emission factors provided by the California Air Resources Board are in grams per mile and are dependent on motor vehicle speed. For the impact analysis, emissions were determined for each roadway segment based on segment length (miles), minimum posted speed (mph), and daily traffic volumes. Daily traffic volumes for each segment were converted to annual vehicle miles traveled (VMT). The following formula was used to calculate emissions for each road segment:

$$\text{annual VMT} \times \text{emission factor (g/mi)} \div 453.6 \text{ g/lb} \div 2,000 \text{ lb/ton} = \text{emissions (ton/year)}$$

To simplify the impact analysis, it was assumed that all vehicles entering the park would be light

**TABLE 32: SUMMARY OF PEAK-SEASON DAILY VEHICLE VOLUME ESTIMATES FOR THE AIR QUALITY ANALYSIS**

Area	Representative Road Segment	Posted Speed (mph)	Road Segment Length (miles)	Existing (1997)	No-Action Alternative	Preferred Alternative	Alternative A	Alternative C	Alternative D
<b>Growth Factor</b>					<b>1.23</b>	<b>1.30</b>	<b>0.90</b>	<b>1.30</b>	<b>1.48</b>
Cedar Grove	Kings Canyon Highway west of Cedar Grove	35	8.8	1,040	1,280	1,350	940	1,350	1,540
Grant Grove / Big Stump	Kings Canyon Highway west of Generals Highway	25	4.7	3,720	4,580	4,840	3,350	4,840	5,510
Upper Generals Highway	Generals Highway north of Lost Grove	45	11.3	1,610	1,980	2,090	1,450	2,090	2,380
Wuksachi/Lodgepole/Wolverton	Generals Highway south of Lodgepole	25	2.2	2,340	2,880	3,040	2,110	3,040	3,460
Giant Forest	Generals Highway south of Moro Rock	35	4.3	2,220	2,730	2,890	2,000	2,890	3,290
Ash Mountain/Foothills	Generals Highway north of Ash Mountain	25	6.5	2,470	3,040	3,210	2,220	3,210	3,660
Mineral King	Mineral King Road	25	15.5	230	280	300	210	300	340

SOURCE: Segment lengths and speed limits — “Sequoia / Kings Canyon Road System Evaluation/Parkwide Road Engineering Study,” January 1988; future estimates — URS Corporation.

NOTE: Future estimates are for the year 2010.

**TABLE 33: EMISSION FACTORS AND CALCULATIONS**

Year	Applicable Emission Factors for Posted Speed (g/mile)				
	VOC	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub>
<b>Cedar Grove (Posted speed is 35 mph; road segment is 8.8 miles.)</b>					
1997	0.466	10.508	0.859	0.005	0.032
2010	0.101	3.302	0.228	0.003	0.031
<b>Grant Grove / Big Stump Area (Posted speed is 25 mph; road segment is 4.7 miles.)</b>					
1997	0.659	12.514	0.919	0.007	0.036
2010	0.145	3.907	0.248	0.004	0.036
<b>Upper Generals Highway (Posted speed is 45 mph; road segment is 11.3 miles.)</b>					
1997	0.399	9.708	0.864	0.005	0.03
2010	0.086	2.965	0.224	0.003	0.029
<b>Wuksachi / Lodgepole / Wolverton Area (Posted speed is 25 mph; road segment is 2.5 miles.)</b>					
1997	0.659	12.514	0.919	0.007	0.036
2010	0.145	3.907	0.248	0.004	0.036
<b>Giant Forest Area (Posted speed is 35 mph; road segment is 4.3 miles.)</b>					
1997	0.466	10.508	0.859	0.005	0.032
2010	0.101	3.302	0.228	0.003	0.031
<b>Mineral King Area (Posted speed is 25 mph; road segment is 15.5 miles.)</b>					
1997	0.659	12.514	0.919	0.007	0.036
2010	0.145	3.907	0.248	0.004	0.036

duty automobiles and that all vehicles on a given road segment would travel the entire length.

Speed-dependent emission factors were selected based on the minimum posted speed for each roadway segment (NPS 1988b). Table 33 shows the posted speed for each segment and the applicable emission factors.

A comprehensive assessment of emission changes associated with transit was beyond the scope of this study. More detailed information on the number and types of buses, projected ridership, size and locations of parking facilities, seasonal use variations, and other factors would be needed for a detailed assessment of emission changes associated with each alternative. Under all alternatives bus emissions could increase, partially offsetting any reductions in automobile emissions due to higher emission standards.

Impact definitions and intensities are shown in the text box on the next page. As previously stated, the San Joaquin Valley is a severe non-attainment area for ozone and a serious nonattainment area for particulate matter. Both VOC and NO<sub>x</sub> are ozone precursors in the presence of sunlight and are evaluated separately in lieu of ozone, which is formed as a secondary pollutant.

### Impacts of the No-Action Alternative

#### Analysis

As stated in the “Methodology” section, actions under this alternative would not increase stationary emissions above conformity *de minimis* values of 50–100 tons per year. Smoke emissions from the parks’ managed wildland fires over the next 10 years have been included in the San Joaquin Valley’s State Implementation Plan. The parks would continue to provide periodic air quality warnings and education. This information would not vary by alternative.

Even though traffic is projected to increase in the parks under the no-action alternative, emissions of CO, VOC, and NO<sub>x</sub> are expected to decrease from base year levels due to higher emission standards and cleaner engines (see Table 34). For all the road segments analyzed, CO emissions are projected to decrease by about two-thirds, from 282 to 108 tons per year. The impact would be reduced from major adverse (emissions exceeding 250 tons per year in a CO attainment area) to moderate adverse (emissions greater than 100 tons/year).

VOC emissions, a precursor to ozone formation in the presence of sunlight, would decrease from

**Thresholds for Air Quality Human Health Impacts**

**Attainment Pollutants:** The following impact thresholds have been defined for attainment pollutants:

	<u>Activity Analyzed</u>		<u>Current Air Quality</u>
<b>Negligible:</b>	Emission levels would be less than 50 tons/year for each pollutant.	<b>and</b>	The first highest three-year maximum for each pollutant is less than NAAQS.
<b>Minor:</b>	Emission levels would be less than 100 tons/year for each pollutant.	<b>and</b>	The first highest three-year maximum for each pollutant is less than NAAQS.
<b>Moderate:</b>	Emission levels would be greater than or equal to 100 tons/year for any pollutant.	<b>or</b>	The first highest three-year maximum for each pollutant is greater than NAAQS.
<b>Major:</b>	Emission levels would be greater than or equal to 250 tons/year for any pollutant.	<b>and</b>	The first highest three-year maximum for each pollutant is greater than NAAQS.

**Nonattainment Pollutants (severe for O<sub>3</sub> and serious for PM):** The following impact thresholds have been defined for the non-attainment pollutants and their precursors:

<b>Negligible:</b>	There would be a net decrease in emissions from current levels.
<b>Minor:</b>	Emissions would be 0–5 tons/year.
<b>Moderate:</b>	Emissions would be greater than 5 tons/year and less than conformity <i>de minimis</i> levels* (25 tons/year for ozone and 70 tons/year for PM).
<b>Major:</b>	Emissions would be equal to or greater than conformity <i>de minimis</i> levels (25 tons/year for ozone and 70 tons/year for PM).

\* Conformity *de minimis* levels are levels of emissions below which a federal action in a nonattainment area is presumed to conform to a state’s implementation plan and would not require further review. Actions in attainment areas are presumed to conform and do not require analysis with respect to *de minimis* levels. Emission values representing the Clean Air Act conformity *de minimis* levels for all pollutants are shown in the glossary.

**Criteria for Determining Impairment**

**Impairment (for both attainment and non-attainment/maintenance areas):** Impacts would have a major adverse effect on park resources and values, and they would

- contribute to deterioration of the park’s air quality to the extent that the park’s purpose could not be fulfilled as established in its enabling legislation; or
- affect resources key to the park’s natural or cultural integrity or opportunities for enjoyment; or
- affect the resource whose conservation is identified as a goal in the general management plan or other park planning documents.

about 13.4 tons per year to 3.6 tons per year (a 74% reduction). The impact level for a severe ozone nonattainment area would decrease from moderate adverse (less than 25 tons/year) to minor (less than 5 tons/year). NO<sub>x</sub> emissions, which are also an ozone precursor, would decrease from about 22.5 tons per year to 7.3 tons per year (a 68% reduction), with a moderate adverse impact (greater than 5 tons/year but less than 25 tons/year).

Emissions of PM<sub>10</sub> would increase slightly under the no-action alternative (from 0.83 ton/year to 1.01 tons/year). Emission factors are expected to remain relatively constant through 2010, and the rise mirrors projected traffic increases under the no-action alternative. Impacts from PM<sub>10</sub> emissions would be minor throughout the assessment period because they would be less than 5 tons per year in a serious nonattainment area for particulate matter.

Emissions of SO<sub>2</sub> are expected to decrease slightly and would be negligible throughout the assessment period (less than 50 tons/year in an attainment area for SO<sub>2</sub>).

**Cumulative Impacts**

Other actions in the immediate area and the greater San Joaquin Valley could have cumulative impacts when viewed in the context of the alternatives being considered for the general management plan. These include the implementation of public transportation recommendations in the 1996 *Giant Forest Interim Management Plan* (NPS 1996a). The net effect of these actions would be to reduce vehicle-related air emissions in the San Joaquin Valley and along the corridors leading to the parks.

Widening California 180 over the next six or more years and improving California 198 are not likely to increase traffic to the parks according to Tulare County Transportation Commission officials, since the improvements are directed at relieving congestion and not increasing traffic volume.

The parks are surrounded by Sequoia National Forest, Sierra National Forest, and Inyo National Forest, all of which experience wildfires and planned burns. NPS and USFS fire management staff coordinate their planned ignitions and work closely with the San Joaquin Valley Unified Air

**TABLE 34: PEAK-SEASON PROJECTED AUTOMOBILE EMISSIONS — NO-ACTION ALTERNATIVE**

Scenario	Daily Traffic Volume	Daily VMT	Annual VMT	Annual Emissions (tons/year)				
				VOC	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub>
<b>Cedar Grove Area</b>								
1997	1,040	9,152	3,340,480	1.72	38.69	3.16	0.02	0.12
2010	1,280	11,264	4,111,360	0.46	14.96	1.03	0.01	0.14
<b>Grant Grove / Big Stump Area</b>								
1997	3,720	17,484	6,381,660	4.64	88.03	6.46	0.05	0.25
2010	4,580	21,526	7,856,990	1.26	33.84	2.15	0.03	0.31
<b>Upper Generals Highway</b>								
1997	1,610	18,193	6,640,445	2.92	71.06	6.32	0.04	0.22
2010	1,980	22,374	8,166,510	0.77	26.69	2.02	0.03	0.26
<b>Wuksachi / Lodgepole / Wolverton Area</b>								
1997	2,340	5,148	1,879,020	1.36	25.92	1.90	0.01	0.07
2010	2,880	6,336	2,312,640	0.37	9.96	0.63	0.01	0.09
<b>Giant Forest Area</b>								
1997	2,220	9,546	3,484,290	1.79	40.36	3.30	0.02	0.12
2010	2,730	11,739	4,284,735	0.48	15.60	1.08	0.01	0.15
<b>Mineral King Area</b>								
1997	230	3,565	1,301,225	0.95	17.95	1.32	0.01	0.05
2010	280	4,340	1,584,100	0.25	6.82	0.43	0.01	0.06
<b>Total</b>								
1997	11,160	63,088	23,027,120	13.38	282.01	22.46	0.15	0.83
2010	13,730	77,579	28,316,335	3.59	107.87	7.34	0.10	1.01

Pollution Control District so that prescribed fires are conducted under favorable air quality conditions; therefore, potential impacts on smoke-sensitive areas at any one time are minimized.

Other factors affecting air quality in Sequoia and Kings Canyon National Parks include pollutants from the San Joaquin Valley and the central California coast, which are transported on prevailing winds. Automobiles in the San Joaquin Valley are a major source of pollutants. Other sources of pollution include power generation, petroleum production, and agricultural practices.

Expected reductions in automobile emissions as a result of California air quality standards and improved engine technologies would result in beneficial, long-term impacts on air quality in the parks and region. In the short term impacts would continue to be adverse.

Expansion projects in the region would affect air emissions in the San Joaquin Valley. Tulare County is undertaking a master plan that is scheduled to be completed in 2005, and a new plan for the gateway community of Three Rivers will be started once the county plan has been approved. The population of Three Rivers is projected to increase by about 2.8% per year, from 2,200 people in 2000 to 2,900 in 2010 and 3,200 in 2015 (pers. comm. with Graber 2003). According to the Tulare County Association of Governments, the population of Tulare County is projected to increase by about 1% per year, from 386,000 in 2003 to 418,000 in 2010 and 491,675 in 2025 (pers. comm. with Graber 2003). The county has 120,795 housing units currently, which is projected to increase to 154,727 units by 2010, an increase of 33,932 units (pers. comm. with Graber 2003). According to the Council of Fresno County Governments, Fresno County's population in 2002 was 846,855, which is projected to increase to 992,351 by 2010 (pers. comm. with Gagliolo 2003), or approximately 2% per year. The number of households is projected to grow from 283,860 to 336,146 units. Collectively, an increasing population, new housing, and future tourist development would result in additional

vehicles and associated air emissions in the region.

Despite increased visitation, air quality in the parks under the no-action alternative would improve with reduced emissions due to higher emission standards and cleaner engines, decreasing the long-term, adverse impact from major to moderate.

The parks would continue to experience some of the worst air quality in the United States, not as a result of management actions in the parks, but as the result of poor air quality in the San Joaquin Valley. The cumulative impact on air quality would continue to be major, adverse, and long term.

### **Conclusion**

Under the no-action alternative proposed actions within the parks would not increase levels of stationary source emissions above conformity *de minimis* values (50–100 tons/year). Smoke emissions from the parks' managed wildland fires over the next 10 years have been included in the San Joaquin Valley's State Implementation Plan. Despite increased park traffic projections under the no-action alternative, automobile-related emissions are expected to decrease by 2010, primarily as a result of decreases in fleetwide average emission factors. Adverse emission impacts within the parks would range from negligible to moderate.

Other actions in the immediate area and greater San Joaquin Valley may have cumulative impacts when viewed in the context of past, present, and reasonably foreseeable actions. Wildfires and planned burns on adjacent federal lands are coordinated with the San Joaquin Valley Unified Air Pollution Control District to minimize potential impacts on smoke sensitive areas at any one time. Other factors affecting air quality include pollutants from the San Joaquin Valley and the central California coast, including those from automobiles, power generation, petroleum production, and agricultural practices. Expected reductions in automobile emissions as a result of California air quality standards and

improved engine technologies would result in reduced automobile emissions over the long term. Development projects in the region would affect air emissions in the San Joaquin Valley to an unknown degree.

The parks would continue to experience some of the worst air quality in the United States, not as a result of management actions in the parks, but as the result of poor air quality in the San Joaquin Valley. The cumulative impact on air quality would continue to be major and adverse over the long term.

No park air quality resources or values would be impaired under this alternative.

**Impacts of the Preferred Alternative**

**Analysis**

Impacts would be similar to the no-action alternative. Proposed actions within the parks would not increase levels of stationary source emissions above conformity *de minimis* values (50–100 tons/year). Smoke emissions from the parks’ managed wildland fires over the next 10 years have been included in the San Joaquin Valley’s

State Implementation Plan. The parks would continue to provide periodic air quality warnings and education.

Visitor traffic projections under the preferred alternative are expected to increase by 30% compared to the no-action alternative. Nevertheless, emissions of CO, VOC, and NO<sub>x</sub> are expected to decrease by 2010 from base year levels due to lower fleetwide emissions (see Table 35). By 2010 CO emissions are projected to be about 114 tons per year, a decrease of about 60% from the base year. Similar to the no-action alternative, the impact would be reduced from major to moderate (greater than 100 tons/ year in a CO attainment area).

VOC emissions would decrease by about 72% from the base year, to about 3.8 tons per year by 2010. The impact would be minor adverse because emissions would be less than 5 tons per year. NO<sub>x</sub> emissions would decrease by about two thirds, to about 7.8 tons per year; the impact level would be moderate adverse because emissions would be greater than 5 tons per year but less than 25 tons per year in a severe nonattainment area for ozone.

**TABLE 35: PROJECTED AUTOMOBILE EMISSIONS — PREFERRED ALTERNATIVE AND ALTERNATIVE C**

Scenario	Daily Traffic Volume	Daily VMT	Annual VMT	Annual Emissions (tons/year)				
				VOC	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub>
<b>Cedar Grove Area</b>								
1997	1,040	9,152	3,340,480	1.72	38.69	3.16	0.02	0.12
2010	1,350	11,880	4,336,200	0.48	15.78	1.09	0.01	0.15
<b>Grant Grove / Big Stump Area</b>								
1997	3,720	17,484	6,381,660	4.64	88.03	6.46	0.05	0.25
2010	4,840	22,748	8,303,020	1.33	35.76	2.27	0.04	0.33
<b>Upper Generals Highway</b>								
1997	1,610	18,193	6,640,445	2.92	71.06	6.32	0.04	0.22
2010	2,090	23,617	8,620,205	0.82	28.17	2.13	0.03	0.28
<b>Wuksachi / Lodgepole / Wolverton Area</b>								
1997	2,340	5,148	1,879,020	1.36	25.92	1.90	0.01	0.07
2010	3,040	6,688	2,441,120	0.39	10.51	0.67	0.01	0.10
<b>Giant Forest Area</b>								
1997	2,220	9,546	3,484,290	1.79	40.36	3.30	0.02	0.12
2010	2,890	12,427	4,535,855	0.50	16.51	1.14	0.01	0.15
<b>Mineral King Area</b>								
1997	230	3,565	1,301,225	0.95	17.95	1.32	0.01	0.05
2010	300	4,650	1,697,250	0.27	7.31	0.46	0.01	0.07
<b>Total</b>								
1997	11,160	63,088	23,027,120	13.38	282.01	22.46	0.15	0.83
2010	14,510	82,010	29,933,650	3.79	114.04	7.76	0.11	1.08

Emissions of PM<sub>10</sub> would increase slightly (from 0.83 to 1.08 tons/year) but would remain minor adverse for a serious nonattainment area (less than 5 tons/year); emission factors are expected to remain relatively constant through 2010.

Emissions of SO<sub>2</sub> are expected to decrease slightly and would be negligible throughout the assessment period (less than 50 tons/year in an SO<sub>2</sub> attainment area).

### **Cumulative Impacts**

As described for the no-action alternative, other actions in the immediate area and the greater San Joaquin Valley could have cumulative impacts in conjunction with past, present, and reasonably foreseeable actions. Implementing public transportation recommendations in the *Giant Forest Interim Management Plan* (NPS 1996a) would help reduce vehicle-related air emissions in the valley and along the corridors leading to the parks.

Planned highway improvements on California 180 and 198 are not likely to increase park traffic because the improvements would relieve congestion, not increase traffic volume.

Wildfire management and planned burns in the parks and adjacent national forests are coordinated with the San Joaquin Valley Unified Air Pollution Control District. Prescribed fires are conducted under favorable air quality conditions to minimize potential impacts on smoke sensitive areas.

Other factors affecting air quality in Sequoia and Kings Canyon National Parks include pollutants from the San Joaquin Valley and the central California coast, which are transported on prevailing winds. These pollutants are generated by traffic in the San Joaquin Valley, power generation, petroleum production, and agricultural practices. Expected reductions in automobile emissions as a result of California air quality standards and improved engine technologies would result in beneficial, long-term impacts on air quality in the parks and region. In the short term impacts would continue to be adverse.

As described for the no-action alternative, regional population growth in Tulare and Fresno Counties would affect air emissions in the San Joaquin Valley. According to the Tulare County Association of Governments, the population of Tulare County is projected to increase from 386,000 in 2003 to 418,00 in 2010 (pers. comm. with Graber 2003). The county has 120,795 housing units currently, which is projected to increase to 154,727 units by 2010 (pers. comm. with Graber 2003). According to the Council of Fresno County Governments, Fresno County's population in 2002 was 846,855, which is projected to increase to 992,351 by 2010 (pers. comm. with Gagliolo 2003). The number of households is projected to grow from 283,860 to 336,146 units.

Despite increased visitation, air quality in the parks under the preferred alternative would improve with reduced emissions due to higher emission standards and cleaner engines, decreasing the long-term, adverse impact from major to moderate.

The parks would continue to experience some of the worst air quality in the United States, not as a result of management actions in the parks, but as the result of poor air quality in the San Joaquin Valley. The cumulative impact on air quality would continue to be major and adverse over the long term.

### **Conclusion**

Under the preferred alternative proposed actions within the parks would not increase levels of stationary source emissions above conformity *de minimis* values, the same as the no-action alternative. Smoke emissions from the parks' managed wildland fires over the next 10 years have been included in the San Joaquin Valley's State Implementation Plan. Despite increased park visitor traffic projections, automobile-related emissions are expected to decrease by 2010, primarily as a result of lower fleetwide average emissions. By 2010 adverse vehicle emission impacts within the parks would range from negligible to moderate, with no change in impact level from the no-action alternative.

Other actions in the immediate area and greater San Joaquin Valley may have cumulative impacts when viewed in the context of the preferred alternative and combined with past, present, and reasonably foreseeable actions. Wildfires and planned burns on adjacent federal lands are coordinated with the San Joaquin Valley Unified Air Pollution Control District to minimize potential impacts on smoke-sensitive areas. Other factors affecting air quality include pollutants from the San Joaquin Valley and the central California coast, including those from automobiles, power generation, petroleum production, and agricultural practices. Expected reductions in automobile emissions as a result of California air quality standards and improved engine technologies would result in reduced automobile emissions over the long term. Development projects in the region would affect air emissions in the San Joaquin Valley to an unknown degree.

The parks would continue to experience some of the worst air quality in the United States, not as a result of management actions in the parks, but as the result of poor air quality in the San Joaquin Valley. The cumulative impact on air quality would continue to be major and adverse over the long term.

No park air quality resources or values would be impaired as a result of actions under this alternative.

## Impacts of Alternative A

### *Analysis*

Impacts from stationary sources would be similar to the no-action alternative. Proposed development within the parks would not increase emissions above conformity *de minimis* levels of 50–100 tons per year. Smoke from the parks' managed wildland fires over the next 10 years have been included in the San Joaquin Valley's State Implementation Plan. The parks would continue to provide periodic air quality warnings and education.

Impacts related to visitor traffic under alternative A would be similar to but less than those described for the no-action alternative because visitor use is projected to decrease by about 10% (see Table 36). Overall reductions in automobile emissions would occur as a result of fleetwide emission improvements. By 2010 CO emissions are projected to be about 79 tons per year, a decrease of 72% from the base year. The impact level would be reduced from major to minor adverse because emissions would be less than 100 tons per year in a CO attainment area.

VOC emissions would decrease by about 80%, to 2.6 tons per year, and the impact would decrease from moderate to minor for a severe ozone non-attainment area. NO<sub>x</sub> emissions would decrease by about 75% (to 5.4 tons/year), resulting in a moderate adverse impact because emissions would be greater than 5 tons per year.

Emissions of PM<sub>10</sub> would increase slightly but would remain minor adverse (less than 5 tons/year for a serious nonattainment area); emission factors are expected to remain relatively constant through 2010.

Emissions of SO<sub>2</sub> are expected to decrease slightly and would be negligible throughout the assessment period.

### *Cumulative Impacts*

As described for the no-action alternative, other actions that could have cumulative impacts in conjunction with past, present, and reasonably foreseeable actions include the following:

- Implementing public transportation recommendations in the *Giant Forest Interim Management Plan* would help reduce vehicle-related air emissions in the San Joaquin Valley and along the corridors leading to the parks.
- Improving California 180 and 198 is aimed at relieving congestion, not increasing traffic volume.

**TABLE 36: PROJECTED AUTOMOBILE EMISSIONS — ALTERNATIVE A**

Scenario	Daily Traffic Volume	Daily VMT	Annual VMT	Annual Emissions (tons/year)				
				VOC	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub>
<b>Cedar Grove Area</b>								
1997	1,040	9,152	3,340,480	1.72	38.69	3.16	0.02	0.12
2010	940	8,272	3,019,280	0.34	10.99	0.76	0.01	0.10
<b>Grant Grove / Big Stump Area</b>								
1997	3,720	17,484	6,381,660	4.64	88.03	6.46	0.05	0.25
2010	3,350	15,745	5,746,925	0.92	24.75	1.57	0.03	0.23
<b>Upper Generals Highway</b>								
1997	1,610	18,193	6,640,445	2.92	71.06	6.32	0.04	0.22
2010	1,450	16,385	5,980,525	0.57	19.55	1.48	0.02	0.19
<b>Wuksachi / Lodgepole / Wolverton Area</b>								
1997	2,340	5,148	1,879,020	1.36	25.92	1.90	0.01	0.07
2010	2,110	4,642	1,694,330	0.27	7.30	0.46	0.01	0.07
<b>Giant Forest Area</b>								
1997	2,220	9,546	3,484,290	1.79	40.36	3.30	0.02	0.12
2010	2,000	8,600	3,139,000	0.35	11.43	0.79	0.01	0.11
<b>Mineral King Area</b>								
1997	230	3,565	1,301,225	0.95	17.95	1.32	0.01	0.05
2010	210	3,255	1,188,075	0.19	5.12	0.32	0.01	0.05
<b>Total</b>								
1997	11,160	63,088	23,027,120	13.38	282.01	22.46	0.15	0.83
2010	10,060	56,899	20,768,135	2.64	79.14	5.38	0.09	0.75

- Coordinating wildfire management and planned burns in the parks and adjacent national forests with the San Joaquin Valley Unified Air Pollution Control District would minimize potential impacts on smoke sensitive areas.
- Regional population growth in Fresno and Tulare counties would affect air emissions. Fresno County’s population is projected to increase from 846,855 in 2002 to 992,351 by 2010, and the number of households from 283,860 to 336,146. Tulare County is projected to increase from 386,000 people in 2003 to 418,00 in 2010 and housing units from 120,795 to 154,727.

Pollutants from the San Joaquin Valley and the central California coast are transported into the parks on prevailing winds. These pollutants are generated by traffic in the San Joaquin Valley, power generation, petroleum production, and agricultural practices. Expected reductions in automobile emissions as a result of California air quality standards and improved engine technologies would result in beneficial, long-term impacts on air quality in the parks and region. In

the short term impacts would continue to be adverse.

With level or reduced visitation, air quality in the parks under alternative A would improve because of reduced emissions associated with higher emission standards and cleaner engines, reducing the long-term impact from major adverse to moderate adverse.

The parks would continue to experience some of the worst air quality in the United States, not as a result of management actions in the parks, but as the result of poor air quality in the San Joaquin Valley. The cumulative impact on air quality would be major and adverse over the long term.

**Conclusion**

Under alternative A proposed development within the parks would not increase levels of stationary source emissions above conformity *de minimis* values, the same as the no-action alternative. Smoke emissions from the parks’ managed wildland fires over the next 10 years have been included in the San Joaquin Valley’s State Imple-

mentation Plan. Park visitor traffic projections are expected to decrease by 10% compared to the no-action alternative. By 2010 vehicle emission impacts within the parks would range from negligible to minor adverse; compared to the no-action alternative this would be beneficial because the impact would be reduced.

As described for the no-action alternative, other actions in the immediate area and the greater San Joaquin Valley may have cumulative impacts. Wildfires and planned burns on adjacent federal lands are coordinated with the San Joaquin Valley Unified Air Pollution Control District to minimize potential impacts on smoke sensitive areas. Pollutants from the San Joaquin Valley and the central California coast that affect air quality in the parks include those from automobiles, power generation, petroleum production, and agricultural practices. Long-term reductions in automobile emissions are expected as a result of California air quality standards and improved engine technologies. Development projects in the region would affect air emissions in the San Joaquin Valley to an unknown degree.

The parks would continue to experience some of the worst air quality in the United States, not as a result of management actions in the parks, but as the result of poor air quality in the San Joaquin Valley. The cumulative impact on air quality would be major and adverse over the long term.

No air quality resources or values would be impaired as a result of actions under this alternative.

## Impacts of Alternative C

### Analysis

Impacts would be similar to the no-action alternative. Proposed development within the parks would not increase levels of stationary source emissions above conformity *de minimis* values of 50–100 tons per year. Smoke emissions from the parks' managed wildland fires over the next 10 years have been included in the San Joaquin Valley's State Implementation Plan. The parks

would continue to provide periodic air quality warnings and education.

Visitor traffic projections in the parks under alternative C are expected to be the same as the preferred alternative, with a 30% projected increase. Even with increased park visitor traffic, overall emissions of CO, VOC, and NO<sub>x</sub> are expected to decrease by 2010 due to lower fleet-wide emissions (see Table 35). CO emissions are projected to decrease by about 60% to 114 tons per year, resulting in a moderate adverse impact.

VOC emissions, as a precursor to ozone formation, would decrease by about 72% to 3.8 tons per year, resulting in a minor adverse impact in a severe ozone nonattainment area. NO<sub>x</sub> emissions would decrease by about 66% to 7.8 tons per year, resulting in a moderate adverse impact.

Emissions of PM<sub>10</sub> would increase slightly but would remain minor adverse for a serious non-attainment area.

Emissions of SO<sub>2</sub> are expected to decrease slightly and would be negligible throughout the assessment period.

### Cumulative Impacts

As described for the no-action alternative, other actions in the immediate area and greater San Joaquin Valley that could have cumulative impacts when viewed in conjunction with past, present, and reasonably foreseeable actions include the following:

- Implementing public transportation recommendations in the *Giant Forest Interim Management Plan* would help reduce vehicle-related air emissions in the San Joaquin Valley and along the corridors leading to the parks.
- Improving California 180 and 198 is aimed at relieving congestion, not increasing traffic volume.
- Coordinating wildfire management and planned burns in the parks and adjacent national forests with the San Joaquin Valley Unified Air Pollution Control District

would minimize potential impacts on smoke sensitive areas.

- Regional population growth in Fresno and Tulare counties would affect air emissions. Fresno County's population is projected to increase from 846,855 in 2002 to 992,351 by 2010, and the number of households from 283,860 to 336,146. Tulare County is projected to increase from 386,000 people in 2003 to 418,00 in 2010 and housing units from 120,795 to 154,727.

Prevailing winds transport pollutants from the San Joaquin Valley and the central California coast into the parks. These pollutants are generated by traffic in the San Joaquin Valley, power generation, petroleum production, and agricultural practices. Expected reductions in automobile emissions as a result of California air quality standards and improved engine technologies would result in beneficial, long-term impacts on air quality in the parks and region. In the short term impacts would continue to be adverse.

Despite increased visitation, air quality in the parks under alternative C would improve with decreased emissions because of higher emission standards and cleaner engines, reducing the long-term, adverse impact from major to moderate.

The parks would continue to experience some of the worst air quality in the United States, not as a result of management actions in the parks, but as the result of poor air quality in the San Joaquin Valley. The cumulative impact on air quality would continue to be major and adverse over the long term.

### **Conclusion**

Under alternative C proposed development within the parks would not increase levels of stationary source emissions above conformity *de minimis* values, the same as the no-action alternative. Smoke emissions from the parks' managed wildland fires over the next 10 years have been included in the San Joaquin Valley's State Implementation Plan. Despite increased park visitor traffic projections, automobile-related emissions are expected to decrease by 2010,

primarily as a result of lower fleetwide average emissions. By 2010 vehicle emission impacts within the parks would range from negligible to moderate adverse, with no change in impact levels from the no-action alternative.

Other actions in the immediate area and greater San Joaquin Valley may have cumulative impacts when viewed in the context of alternative C and combined with past, present, and reasonably foreseeable actions. Wildfire management and planned burns on adjacent federal lands are coordinated with the San Joaquin Valley Unified Air Pollution Control District to minimize potential impacts on smoke-sensitive areas. Other factors affecting park air quality include pollutants from the San Joaquin Valley and the central California coast, including those from automobiles, power generation, petroleum production, and agricultural practices. Long-term reductions in automobile emissions are expected as a result of California air quality standards and improved engine technologies. Development projects in the region would affect air emissions in the San Joaquin Valley to an unknown degree.

The parks would continue to experience some of the worst air quality in the United States, not as a result of management actions in the parks, but as the result of poor air quality in the San Joaquin Valley. The cumulative impact on air quality would continue to be major and adverse over the long term.

No air quality resources or values would be impaired as a result of actions under this alternative.

## **Impacts of Alternative D**

### **Analysis**

Impacts would be similar to the no-action alternative. Proposed development within the parks would not increase levels of stationary source emissions above conformity *de minimis* values of 50–100 tons per year. Smoke emissions from the parks' managed wildland fires over the next 10 years have been included in the San Joaquin Valley's State Implementation Plan. The parks would continue to provide periodic air quality warnings and education.

Park visitor traffic projections under alternative D would be the highest of any alternative, with an expected 48% increase compared to the no-action alternative. Even though traffic would increase, emissions of CO, VOC, and NO<sub>x</sub> are expected to decrease by 2010 due to lower fleet-wide average emissions (see Table 37). CO emissions are projected to decrease by about 54% to 130 tons per year, resulting in a moderate adverse impact (greater than 100 tons/year in a CO attainment area).

As a precursor to ozone formation, VOC emissions would decrease by about 68% to 4.3 tons per year, a minor adverse impact in a severe ozone nonattainment area. NO<sub>x</sub> emissions would fall by about 60%, to 8.8 tons per year, with a moderate adverse impact.

Emissions of PM<sub>10</sub> would increase slightly (from 0.83 to 1.23 tons/year) but would remain minor adverse for a serious nonattainment area.

Emissions of SO<sub>2</sub> are expected to decrease slightly and would be negligible throughout the assessment period.

**Cumulative Impacts**

As described for the no-action alternative, other actions that could have cumulative impacts in conjunction with past, present, and reasonably foreseeable actions include the following:

- Implementing public transportation recommendations in the *Giant Forest Interim Management Plan* would help reduce vehicle-related air emissions in the San Joaquin Valley and along the corridors leading to the parks.
- Improving California 198 and 180 is aimed at relieving congestion, not increasing traffic volume.
- Coordinating wildfire management and planned burns in the parks and adjacent national forests with the San Joaquin Valley Unified Air Pollution Control District would minimize potential impacts on smoke sensitive areas.
- Regional population growth in Fresno and Tulare counties would affect air emissions. Fresno County’s population is projected to increase from 846,855 in 2002 to 992,351 by 2010, and the number of households

**TABLE 37: PROJECTED AUTOMOBILE EMISSIONS — ALTERNATIVE D**

Scenario	Daily Traffic Volume	Daily VMT	Annual VMT	Annual Emissions (tons/year)				
				VOC	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub>
<b>Cedar Grove Area</b>								
1997	1,040	9,152	3,340,480	1.72	38.69	3.16	0.02	0.12
2010	1,540	13,552	4,946,480	0.55	18.00	1.24	0.02	0.17
<b>Grant Grove / Big Stump Area</b>								
1997	3,720	17,484	6,381,660	4.64	88.03	6.46	0.05	0.25
2010	5,510	25,897	9,452,405	1.51	40.71	2.58	0.04	0.38
<b>Upper Generals Highway</b>								
1997	1,610	18,193	6,640,445	2.92	71.06	6.32	0.04	0.22
2010	2,380	26,894	9,816,310	0.93	32.08	2.42	0.03	0.31
<b>Wuksachi / Lodgepole / Wolverton Area</b>								
1997	2,340	5,148	1,879,020	1.36	25.92	1.90	0.01	0.07
2010	3,460	7,612	2,778,380	0.44	11.97	0.76	0.01	0.11
<b>Giant Forest Area</b>								
1997	2,220	9,546	3,484,290	1.79	40.36	3.30	0.02	0.12
2010	3,290	14,147	5,163,655	0.57	18.79	1.30	0.02	0.18
<b>Mineral King Area</b>								
1997	230	3,565	1,301,225	0.95	17.95	1.32	0.01	0.05
2010	340	5,270	1,923,550	0.31	8.28	0.53	0.01	0.08
<b>Total</b>								
1997	11,160	63,088	23,027,120	13.38	282.01	22.46	0.15	0.83
2010	16,520	93,372	34,080,780	4.31	129.83	8.83	0.13	1.23

from 283,860 to 336,146. Tulare County is projected to increase from 386,000 people in 2003 to 418,00 in 2010 and housing units from 120,795 to 154,727.

Pollutants from the San Joaquin Valley and the central California coast are transported into the parks on prevailing winds. These pollutants are generated by traffic in the San Joaquin Valley, power generation, petroleum production, and agricultural practices. Expected reductions in automobile emissions as a result of California air quality standards and improved engine technologies would result in beneficial, long-term impacts on air quality in the parks and region. Short-term impacts would continue to be adverse.

Despite increased visitation, air quality in the parks under alternative D would improve with reduced emissions due to higher emission standards and cleaner engines, decreasing the long-term, adverse impact from major to moderate.

The parks would continue to experience some of the worst air quality in the United States, not as a result of management actions in the parks, but as the result of poor air quality in the San Joaquin Valley. Long-term cumulative impacts would continue to be major and adverse.

### **Conclusion**

Under alternative D proposed development within the parks would not increase levels of stationary source emissions above conformity *de minimis* values, the same as the no-action alternative. Smoke emissions from the parks' managed wildland fires over the next 10 years have been included in the San Joaquin Valley's State Implementation Plan. Despite increased park visitor traffic projections, automobile-related emissions are expected to decrease by 2010 because of lower fleetwide average emissions. By 2010 vehicle emission impacts would range from negligible to moderate adverse, with no change in impact level from the no-action alternative.

Other actions in the immediate area and greater San Joaquin Valley may have cumulative impacts in conjunction with past, present, and reasonably foreseeable actions. Planned burns on

adjacent federal lands are coordinated with the San Joaquin Valley Unified Air Pollution Control District to minimize potential impacts on smoke-sensitive areas. Other factors affecting park air quality include pollutants from the San Joaquin Valley and the central California coast, including those from automobiles, power generation, petroleum production, and agricultural practices. Long-term reductions in automobile emissions are expected as a result of California air quality standards and improved engine technologies. Development projects in the region would affect air emissions in the San Joaquin Valley to an unknown degree.

The parks would continue to experience some of the worst air quality in the United States, not as a result of management actions in the parks, but as the result of poor air quality in the San Joaquin Valley. The cumulative impact on air quality would continue to be major and adverse over the long term.

No park air quality resources or values would be impaired under this alternative.

### **Conformity Determination**

The alternatives being considered would conform to the Clean Air Act for the following reasons:

1. Emissions from existing and proposed stationary sources in the park would be below the conformity *de minimis* values.
2. Emissions from managed wildland fires in the parks over the next 10 years have been included in the San Joaquin Valley's State Implementation Plan.
3. Future traffic projections for the parks have been included in the regional transportation model that will be used to develop the regional transportation plan for the San Joaquin Valley.
4. The National Park Service is committed to employing best management practices to reduce emissions from all air pollution sources within the parks, as stated in the *Air Resources Management Action Plan* (NPS 1999a).

# Wild and Scenic Rivers

## **GUIDING REGULATIONS AND POLICIES**

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The Wild and Scenic Rivers Act of 1968, as amended, states that the comprehensive river management plan for the Middle and South Forks of the Kings River and the North Fork of the Kern River “shall assure that no development or use of park lands shall be undertaken that is inconsistent with the designation of the river” (16 USC 1274(a)(63) and (64). The act also stipulates that rivers included in the system are to be preserved and protected in their free-flowing condition.

Section 10(a) of the Wild and Scenic Rivers Act states that river managing agencies may provide for other uses of the river corridor so long as such uses are not inconsistent with the protection and enhancement of outstandingly remarkable values and with public use and enjoyment of the river area.

Section 7 of the Wild and Scenic Rivers Act prohibits the Federal Energy Regulatory Commission (FERC) from licensing the “construction of any dam, water conduit, reservoir, powerhouse, transmission line, or other project works under the Federal Power Act . . . on or directly affecting any river” designated as a component of the wild and scenic rivers system. Any developments below or above a wild, scenic, or recreational river area shall not “invade the area or unreasonably diminish the scenic, recreational, fish or wildlife values present in the area.” Hydroelectric facilities within Sequoia National Park are not covered by the Federal Energy Regulatory Commission.

Public Law 99-338, as amended by Public Law 108-447, authorizes the secretary of the interior to extend the permit for hydroelectric facilities within the park until September 8, 2026 (16 USC 45a-1). Public Law 95-625, which amended Public Law 93-522, incorporated hydroelectric facilities within the Mineral King addition.

## **METHODOLOGY FOR ANALYZING IMPACTS**

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The impact analysis evaluates how well each alternative would protect and enhance outstandingly remarkable values for designated and eligible wild and scenic rivers. Outstandingly remarkable values include scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values or features. Thresholds for the impacts are defined in the text box.

Impacts are evaluated on a segment-wide basis in terms of whether they would be beneficial or adverse to the outstandingly remarkable values that have been defined for a river segment. Beneficial impacts would result from actions that protect and enhance these values, while adverse impacts would result from actions that reduce those values.

The duration of the impact considers whether the impact would be temporary and/or associated with transitional types of activities or if the impact would occur over a long period and affect the protection and enhancement of outstandingly remarkable river values.

Impacts are generically analyzed for the backcountry and frontcountry segments that are designated or are eligible and suitable for designation as wild and scenic rivers.

## **AREAS OF IMPACT ANALYSIS**

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Areas of impact analysis for wild and scenic rivers are the river corridors inside the parks. Designated and eligible river segments and their associated outstandingly remarkable values are shown in Table 38. For frontcountry river segments, the areas of impact analysis include the following:

- the Kings Canyon for the lower segments of the South Fork of the Kings River

*Impact Thresholds for Wild and Scenic Rivers*

**Negligible** — Impacts would not be detectable to most visitors and would have no discernible effect on a river’s outstandingly remarkable values.

**Minor** — Impacts would be slightly detectable to some visitors but are not expected to have an overall effect on a river’s outstandingly remarkable values.

**Moderate** — Impacts would be clearly detectable by many visitors and could have an appreciable effect on a river’s outstandingly remarkable values.

**Major** — Impacts would have a substantial and noticeable effect on most visitors or the river’s outstandingly remarkable values.

*Criteria for Determining Impairment*

An impact would more likely constitute an impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the general management plan or other relevant planning documents.

- the Lodgepole and Potwisha areas for the lower segments of the Marble Fork of the Kaweah
- the foothills area from the Buckeye Flat campground to Ash Mountain for the Middle Fork of the Kaweah
- the Mineral King Valley area for the East Fork of the Kaweah
- the South Fork campground area for the South Fork of the Kaweah.

**RIVER PROTECTION MEASURES  
COMMON TO ALL ALTERNATIVES**

Under all alternatives measures would be taken to protect and enhance the values and free-flowing condition of designated and study rivers as described in the alternatives. These measures include the evaluation of water resources projects according to criteria in section 7 of the Wild and Scenic Rivers Act, floodplain / wetland assessments, restoring ecological processes, and managing impacts on riverbanks. There are over 134 miles of designated and eligible rivers in the parks. No development is proposed along the less accessible wild segments — more than 80% (110+ miles) of the designated and eligible rivers. Actions proposed for recreational segments would affect less than 18% (24 miles) of designated or eligible rivers. Section 7 of the Wild and Scenic Rivers Act applies to designated rivers. By policy the National Park Service would apply the same standard of review for eligible rivers.

River use levels are expected to remain at or near current levels for each classified or eligible river.

Zoning prescriptions and zone locations support river classification and protection by describing typical river protection measures, desired resource conditions, and appropriate activities and facilities. Management zoning overlays the river segment classifications. Zoning describes the general carrying capacity or degree of social interaction that visitors could expect in each zone. Most rivers in the backcountry or designated wilderness would be classified as wild, the exception being the recreational classification for the East Fork of the Kaweah in the Mineral King Valley area because it is bridged and accessible by road. Rivers in frontcountry zones are classified as recreational since roads parallel the segments, or the corridors contain more development. River corridors would include 0.25 mile on each side of the river segment.

Many of the designated and eligible river areas are remote and untrailed. Due to the inaccessibility of these areas to all but the most skilled

**TABLE 38: WILD AND SCENIC RIVER SEGMENTS AND OUTSTANDINGLY REMARKABLE VALUES**

River Segments	Classification	Outstandingly Remarkable Values						
		Scenery	Recreation	Geology	Wildlife	Prehistory / History	Vegetation	Fish
Designated Rivers								
Middle Fork of the Kings	Wild	•	•	•	•	•	•	
South Fork of the Kings	Wild	•	•	•				
South Fork of the Kings	Recreational	•	•	•				
North Fork of the Kern	Wild	•	•	•				•
Eligible Rivers								
South Fork of the San Joaquin	Wild	•	•	•				
Marble Fork of the Kaweah • Upper Segment	Wild	•	•	•				
• Lower Segment	Recreational	•	•	•				
Middle Fork of the Kaweah • Upper Segment	Wild	•						
• Lower Segment	Recreational	•	•			•		
East Fork of the Kaweah • Upper Segment	Wild	•	•	•				
• Center Segment	Recreational	•	•					
• Lower Segment	Wild	•						
South Fork of the Kaweah	Wild	•		•				

cross-country travelers, a detailed user capacity program is not necessary. Use and impacts in more accessible locations would be managed as described below:

- *Backcountry rivers classified as wild or eligible for this classification* — The vast majority of the parks’ designated river segments are in wilderness areas (82.5 miles, out of 90.1 miles total). The rugged terrain in these areas, coupled with the short backcountry season (generally May through September), functions as a natural limit on the number of backcountry users. Usage has been static for more than 20 years. Although these natural barriers help ensure that the parks’ backcountry areas remain largely unchanged by human use, the parks will address and monitor user capacity of these river areas through the use of several different mechanisms. First, backcountry areas of the parks are subject to the parks’ wilderness quota system, which sets limits for numbers of overnight users in different backcountry areas. All overnight backcountry users (both hikers and stock parties) must receive a wilderness permit. Once permitted trailhead limits are reached,

no further permits are issued for that time period. The permitted number of overnight users per trailhead was based on studies of backcountry user travel patterns, and their associated impacts on resources and solitude (Parsons 1986; Stohlgren 1982, 1986; Parsons et al. 1981; Parsons and Stohlgren 1987; Stohlgren and Parsons 1986).

Stock parties are subject to additional restrictions that regulate party size and that determine when parties may access certain areas. Stock parties are limited to 20 head of stock. The average stock party size is 4.5 people and 7 animals, well below the upper limit, and only a few stock parties each year come close to the cap. Stock access to backcountry meadows is regulated under the parks’ *Stock Use and Meadow Management Plan* (NPS 1986d). This plan includes a monitoring component to assess the condition of meadow and riparian resources. Opening dates are established for when stock parties may use meadows; dates are based on snowpack data to ensure that the meadows and trails are dry enough to sustain stock hoof impacts and vegetation stresses. The superintendent also has the ability to tem-

porarily close areas, such as meadows, to all use (36 CFR Part 1). In the past the superintendent has exercised his authority to close meadows and other areas to allow resources to recover from the impacts of human use. If monitoring data indicate that desired meadow conditions are not being met, the superintendent may close a meadow until desired conditions are achieved, based on monitoring data.

These tools will enable park managers to regulate the number of people and stock animals using backcountry areas of the parks and to monitor conditions in the river corridors to prevent the degradation of outstandingly remarkable values.

- *Frontcountry rivers classified as recreational or eligible for this classification* — The only designated wild and scenic river segment in the parks' frontcountry is the lower segment of the South Fork of the Kings River, which is 7.6 miles long. The river corridor boundary extends 0.25 mile on each side of the river. This recreational river segment flows through the floor of the Kings Canyon in Kings Canyon National Park. The area is open seasonally, typically from May through October; road access is limited by Caltrans to those times when safe access can be provided. Under each action alternative this segment would be zoned as low-use frontcountry, with some areas zoned as development.

User capacities for this segment of the Kings River would be addressed by seasonal closures; zoning; limiting areas of development; managing overnight use by limiting the number of developed campsites, parking spaces, and lodging rooms; establishing development setbacks; removing facilities within floodplains; managing river-based recreation; defining river access points; prohibiting motorized watercraft; and regular inspection of the condition of resources, including the river's outstandingly remarkable values. As a mitigating measure, riverbanks would be restored as needed. Watercraft use on the river would

be prohibited under all alternatives except alternative D, which would allow for limited, nonmotorized watercraft use. Stock use would continue, except under alternative A, which would remove the pack station. The pack station in Cedar Grove provides service for backcountry stock trips. The number of stock entering the backcountry here is subject to the stock party size restrictions and the backcountry overnight permitting system. Hiking and other forms of recreation such as fishing, picnicking, and bicycle use would continue within the river corridor. Day use on the floor of the Kings Canyon is limited by the remoteness of the area, which is two hours of challenging driving from the nearest metropolitan area. Day use is largely comprised of scenic driving, walking trails through Zumwalt Meadow, and viewing Roaring River Falls.

The number of overnight users and the type of overnight use would be regulated through zoning and facility sizing and design. Facilities for overnight use (such as lodging buildings, campgrounds and employee housing) can only be located in developed zones, and overnight facilities cannot be located in floodplains. Overnight lodging at Cedar Grove consists of 21 beds. Lodging facilities under each of the action alternatives (except alternative A) could be modestly expanded provided that site-specific compliance indicates that the expansion would not degrade the river's outstandingly remarkable values. There are four campgrounds within or adjacent to the river corridor, which contain a total of 352 campsites. Under each of the action alternatives (except alternative C) campgrounds would be redesigned and fewer spaces would be provided. Cedar Grove also accommodates 21 employee housing units. Each of the alternatives would maintain the existing number of housing units with the exception of alternative C, which would slightly expand housing opportunities, provided that the expansion did not degrade outstandingly remarkable values.

## IMPACTS COMMON TO ALL ALTERNATIVES

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Small-scale, historic hydroelectric facilities on the Marble and Middle Forks of the Kaweah River, and four dams in Mineral King that feed the East Fork of the Kaweah River, if permitted by the secretary of the interior, will continue to operate in accordance with the conditions imposed by Congress in Public Law 108-447, with minor, adverse impacts on flows. It has been determined that the magnitude of impacts resulting from these relatively small-scale facilities does not preclude the inclusion of these segments in the wild and scenic rivers system, since they remain “generally natural and riverine in appearance” (47 FR (173): 39458). These facilities are somewhat conspicuous. Their continued operation is expected to have moderate, adverse, long-term impacts on scenic values. Recreational activities have occurred along the access routes, resulting in moderate, beneficial impacts.

Park managers will work with the hydroelectric operator through a regulated permitting process to ensure that the facilities are maintained and operated in a manner that does not impair park resources. In accordance with Public Law 108-447, a reauthorization permit requires that an independent safety assessment be conducted and that any identified deficiencies be corrected. The secretary of the interior may also impose any other reasonable terms and conditions necessary for the management and care of Sequoia National Park and the purposes for which it was established. Because new hydroelectric infrastructure would not be permitted in the national parks, the secretary of the interior may consider termination of the special use permit if catastrophic damage requiring reconstruction occurred to existing facilities.

## IMPACTS OF THE NO-ACTION ALTERNATIVE

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### Analysis

**Backcountry Rivers.** There would be negligible to minor, beneficial impacts on scenic and recre-

ational values of designated and eligible river segments as a result of the management prescriptions, the goal of which would be to improve resource conditions. Most of these sections are already in designated wilderness or roadless areas, and recreation is controlled by permit and park regulations. Recreational and scenic values along riverbanks would be affected in localized areas as a result of erosion caused by backcountry stock and hiker use, resulting in minor, adverse, short- and long-term impacts. There would be no impacts on other outstandingly remarkable values along backcountry wild river segments. Geology would not be altered along any river segment; the rare Kern Valley rainbow trout would not be affected along the North Fork of the Kern; and wildlife, vegetation, and prehistory / history along the Middle Fork of the Kings River would not be affected. In conjunction with management prescriptions, impacts would be mitigated by requiring permits for use and regulating seasonal access to some areas (that is, areas would be opened depending on soil moisture conditions, and some areas would be closed to stock use).

**Frontcountry Rivers.** Concentrated human use combined with unlimited river access under the no-action alternative would continue to have minor, adverse, short- and long-term impacts on scenic and recreational values in more heavily used areas. Crowded conditions, riverbank erosion, and littering could occur seasonally as a result of water play, camping, fishing, and non-motorized watercraft use. (Nonmotorized watercraft use is not allowed on the lower segment of the South Fork of the Kings River, which is a designated wild and scenic river, but it is allowed on frontcountry segments of proposed rivers.) Activities, such as camping in campgrounds and fishing, would continue to be regulated on river segments designated or proposed as wild or scenic, helping protect recreational values. While some use conflicts could occur along small stretches of rivers between different types of users, these conflicts would not change the range of recreational opportunities; thus, impacts would be minor and adverse. Slight use increases along some river sections could result in minor, adverse, short-

term impacts on scenic values, but the impact would affect only small areas that are generally more heavily used, and scenic values would continue to predominate. Replacing and relocating some facilities within floodplains would result in safer visitor experiences; the impact on recreational values in localized areas would be minor to moderate, beneficial, and long term. There would be no impacts on geology values in front-country segments since most of the formations are granite and meta-volcanic.

### **Cumulative Impacts**

In the past hiker and stock use levels were higher and were not as proactively managed or regulated as they are today. This contributed to riverbank erosion and damage in backcountry areas, resulting in moderate, adverse, long-term impacts on both recreational and scenic values. Continued permit requirements for backcountry use, resource monitoring, seasonal closures, and reduced backcountry use have all resulted in improved conditions. Along portions of the South Fork of the Kings River crowding sometimes occurs because this is a popular backcountry entry point, resulting in localized, moderate, adverse impacts on both scenic and recreational values. Other outstandingly remarkable values as described in the alternatives matrix in volume 1 are not likely to have been or be impacted by past, present, or reasonably foreseeable future actions; for example, geology would not be altered because most of the formations are granite and meta-volcanic. The remoteness and inaccessibility of the North Fork of the Kern River would protect the outstandingly remarkable value related to fish. Similarly, the remoteness and inaccessibility of the Middle Fork of the Kings River would protect the value of pre-history / history (Native American sites in the Tehipite Valley). In conjunction with the actions of this alternative, there would be negligible additional impacts on outstandingly remarkable values for the backcountry river segments because no new development would occur, and use levels would remain relatively constant.

In the frontcountry past construction and reconstruction of roads (Generals Highway and Kings

Canyon Highway) and park facilities contributed to impacts on scenic values. While roads and park facilities may intrude on the scenery, values have generally not been affected by the small-scale facilities, resulting in negligible, adverse, long-term impacts. At the same time these projects have facilitated public recreational access to river corridors for fishing, camping, and water play, resulting in minor, beneficial, long-term impacts. These beneficial impacts relate to the outstandingly remarkable value of recreation for the South Fork of the Kings River, the Marble Fork of the Kaweah River (areas near the Lodgepole and Potwisha campgrounds), and the Middle Fork of the Kaweah River (the Buckeye Flat campground, Potwisha, Hospital Rock, and the Ash Mountain area). River access in some frontcountry areas is limited by steep or rocky terrain, so that use is often concentrated in a few spots, resulting in crowding, numerous visitor-created trails, and localized erosion. These impacts, however, have not resulted in the degradation of outstandingly remarkable values along designated or eligible segments.

Planned improvements of campgrounds and developed areas would result in more campsites or facilities being relocated outside the floodplain. The bridge at Cedar Grove would be relocated or rebuilt so it would not be subject to damage during floods and would have a reduced impact on free-flowing conditions in the river. These future actions would result in negligible to moderate, beneficial, long-term impacts on recreational values since safer, more sustainable facilities would be provided, and recreational activities such as fishing, hiking, and water play would continue.

Impacts under the no-action alternative on recreational and scenic values of frontcountry river segments would continue to result largely from visitation and uncontrolled river access in several popular areas. Impacts on scenic and recreational values would be minor, adverse, and long term because of riverbank erosion, visitor-created trails, and littering. Conflicts between fishing and water play, or crowding at popular water play areas, could result in minor, adverse, short-term impacts to recreational values.

The no-action alternative, in conjunction with the other cumulative actions, would result in negligible to minor, beneficial, long-term impacts to recreational values as the result of planned facility improvements. At the same time these actions would continue to perpetuate minor, adverse, short- and long-term impacts on recreational and scenic values from uncontrolled river access in some frontcountry areas.

## Conclusion

While unregulated river access in some frontcountry areas would continue, the overall impact on designated and eligible river segments and their outstandingly remarkable values would be minor, beneficial, and long term due to improved facilities, as well as facilities being relocated out of floodplains.

In conjunction with past, present, and reasonably foreseeable actions affecting the outstandingly remarkable values of rivers, cumulative impacts to wild and scenic rivers and eligible segments within the parks and the values they represent would generally be negligible to minor, beneficial, as well as adverse, and long term.

There would be no impairment of wild and scenic river resources or values.

## IMPACTS OF THE PREFERRED ALTERNATIVE

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### Analysis

**Backcountry Rivers.** Most of the river segments are in designated wilderness or roadless areas, and recreation is controlled by permit and park regulations. There would be negligible to minor impacts as a result of restoring impacted areas in the major trails zone. Under the preferred alternative improving resource conditions and providing for sustainable use would result in negligible to minor, beneficial, long-term impacts on the scenic and recreational values of designated or eligible wild and scenic rivers. There would be no impacts on the other outstandingly remarkable values along backcountry wild river segments. Geology would not be

altered along any river segment; the rare Kern Valley rainbow trout would not be affected along the North Fork of the Kern; and wildlife, vegetation, and prehistory / history along the Middle Fork of the Kings River would not be affected. Recreational and scenic values along riverbanks would be affected by riverbank erosion caused by backcountry stock and hiker use, resulting in minor, adverse, short- and long-term impacts in localized areas. These impacts would not degrade outstandingly remarkable values along designated or eligible segments. Requiring permits for backcountry use, regulating seasonal access to some areas (that is, opening areas depending on soil moisture conditions), and closing some areas to stock use would mitigate adverse effects.

**Frontcountry Rivers.** Under the preferred alternative visitor use would be managed to protect river values. Providing well-defined river access routes and restoring riverbanks by removing unwanted trails that were created by visitors would enhance both scenic and recreational values, resulting in minor to moderate, beneficial, long-term impacts along popular frontcountry river corridors. There would be no impacts on geology values along frontcountry segments since most of the formations are granite and meta-volcanic. Riverbank erosion and littering would be reduced, but crowding in some areas could occur in summer as a result of water play, camping, fishing, and nonmotorized watercraft use. (Nonmotorized watercraft use is not allowed on the lower segment of the South Fork of the Kings River, which is a designated wild and scenic river, but it is allowed on frontcountry segments of proposed rivers.) Activities, such as camping in campgrounds and fishing, would continue to be regulated on river segments designated or proposed as wild or scenic. Although some use conflicts could occur along small stretches of rivers, these conflicts would not alter the range of recreational opportunities, and impacts on recreational values would be minor. Crowding along some river sections could result in minor and generally short-term, adverse impacts on scenic values; such impacts would be limited to small areas, and scenic values would continue to predominate. Relocating some facil-

ities out of floodplains would improve scenic resources and make visitor experiences safer; impacts on scenic and recreational values in localized areas would be minor, beneficial, and long term.

## **Cumulative Impacts**

As described for the no-action alternative, hiking and stock use in the past caused riverbank erosion in some backcountry areas. Recreational and scenic qualities were also affected before the river segments were designated. Permit requirements for backcountry use, reduced use levels, resource monitoring to support adjusting regulations, and seasonal closures have improved conditions. Crowding along portions of the wild segment of the South Fork of the Kings River, which is a popular backcountry entry point, results in localized, moderate, adverse impacts on both scenic and recreational values. Other outstandingly remarkable values such as geology are not likely to have been or be impacted by past, present, or reasonably foreseeable actions. The remote location, low levels of use, and regulated fishing would protect the value related to fish on the North Fork of the Kern River. Similarly, remoteness and the absence of any new development along the wild segments of the Middle Fork of the Kings River would protect the value related to prehistory / history (Native American sites in the Tehipite Valley). In conjunction with the actions under this alternative, there would be negligible cumulative impacts on outstandingly remarkable values for backcountry river segments.

In the frontcountry past construction and reconstruction of roads (Generals Highway and Kings Canyon Highway) and park facilities have contributed to moderate, adverse, short- to long-term impacts on scenic river values, while at the same time facilitating recreational access on rivers classified as recreational. Even though roads and park facilities may be apparent, their small scale generally means they do not intrude on the scenery, resulting in a negligible, long-term impact on scenic values. Overall impacts on fishing, camping, and water play have been minor, beneficial, and long term. Rivers with

popular water play areas include the South Fork of the Kings River, the Marble Fork of the Kaweah River (areas near the Lodgepole and Potwisha campgrounds), and the Middle Fork of the Kaweah (Buckeye Flat campground, Potwisha, Hospital Rock, and Ash Mountain). Because access to the rivers is limited by steep or rocky terrain, use is concentrated in several areas, resulting in crowding, numerous visitor-created trails, and localized erosion. These impacts, however, have not resulted in the degradation of outstandingly remarkable values along designated or eligible segments. Reasonably foreseeable plans include ongoing campground and developed area upgrades (relocating more campsites or facilities outside the floodplain) and relocating or rebuilding the bridge at Cedar Grove so it would not be subject to damage during floods and would have a reduced impact on free-flowing conditions in the river. These future actions would result in minor to major, beneficial, long-term impacts on recreational and scenic values because facilities would be safer and more sustainable, and because more development would be removed from the immediate river corridor.

Impacts from visitors on recreational and scenic values along frontcountry rivers would be reduced despite increased visitation because of well-defined river access and the mitigation of visitor impacts in accordance with management prescriptions, such as hardening and defining river access points to reduce riverbank erosion. User conflicts from recreational uses such as fishing and water play, or crowding at popular water play areas, could result in minor, adverse, short-term impacts on recreational values.

The preferred alternative, in conjunction with past, present, and reasonably foreseeable actions, would generally result in negligible to minor, beneficial, long-term impacts to recreational values as a result of improved facilities and controlled river access.

## **Conclusion**

With controlled river access and improved facilities, designated and eligible wild and scenic

river segments would be more protected, ensuring the preservation of outstandingly remarkable values. This would result in minor to moderate, beneficial, long-term impacts. Visitor use in localized areas would continue to result in minor, adverse, long-term impacts on outstandingly remarkable values.

In conjunction with past, present, and reasonably foreseeable actions, cumulative impacts to wild and scenic rivers within the parks and their outstandingly remarkable values would generally be minor to moderate and beneficial over the long term.

There would be no impairment of wild and scenic river resources or values.

## IMPACTS OF ALTERNATIVE A

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### Analysis

**Backcountry Rivers.** Most of the wild river segments are in designated wilderness or roadless areas, and recreation is controlled by permit and park regulations. There would be negligible to minor beneficial impacts on scenic and recreational values along backcountry river segments because resource conditions would be improved, in accordance with management prescriptions. Most of these segments are in designated wilderness or roadless areas, and recreation is controlled by permit and park regulations. Minor, adverse, short- and long-term impacts on scenic values could continue to occur in localized areas along riverbanks because of erosion caused by backcountry stock and hiker use. Continuing to require permits for use, regulating seasonal access to some areas (i.e., opening them depending on soil moisture conditions), and closing some areas to stock use would help mitigate adverse effects. These impacts would not degrade outstandingly remarkable values along designated or eligible segments. There would be no impacts on other outstandingly remarkable values along backcountry wild river segments. Geology would not be altered along any river segment; the rare Kern Valley rainbow trout would not be affected along the North Fork of the Kern; and wildlife, vegetation, and pre-

history / history along the Middle Fork of the Kings River would not be affected.

**Frontcountry Rivers.** Under alternative A park visitation would be limited and managed to protect river values, resulting in improved recreational opportunities and scenery along river segments. Well-defined river access routes and riverbank restoration would enhance both scenic and recreational values, resulting in minor to moderate, beneficial, long-term impacts along popular frontcountry river corridors. Scenic values would be enhanced by reducing riverbank erosion and littering. Current or decreased use levels along river segments could result in negligible to minor, beneficial, short-term impacts on scenic values, which would continue to predominate. Recreational values would be enhanced by less crowded conditions, with improved conditions for water play, camping, fishing, and non-motorized watercraft use. Activities, such as camping in campgrounds and fishing, would continue to be regulated on river segments designated or proposed as wild or scenic, further mitigating any adverse effects. Although some use conflicts could still occur along small stretches of rivers, there would be fewer visitors, and the range of recreational opportunities would not be changed, so impacts would be minor. With fewer facilities and the relocation of some facilities outside floodplains, visitor experiences would be safer, resulting in minor, beneficial, long-term impacts on river-based recreation in localized areas. There would be no impacts on geology values along designated or eligible frontcountry segments since most of the formations are granite and meta-volcanic.

### Cumulative Impacts

As described for the no-action alternative, hiking and stock use caused riverbank erosion in some backcountry areas. Recreational and scenic qualities were also affected before the river segments were designated. Permit requirements for backcountry use, resource monitoring to support adjusting regulations, seasonal closures, and reduced backcountry use have resulted in improved conditions. Crowding along portions of the wild segment of the South Fork of the Kings

River, which is a popular backcountry entry point, results in localized, moderate, adverse impacts on both scenic and recreational values. Other outstandingly remarkable values such as geology, fish, and history / prehistory are not likely to have been or be impacted by past, present, or reasonably foreseeable actions due to remoteness and the absence of any new development. In conjunction with the actions under this alternative, there would be negligible cumulative impacts on outstandingly remarkable values for backcountry river segments.

In the frontcountry past construction and reconstruction of roads (Generals Highway and Kings Canyon Highway) and park facilities have contributed to moderate, adverse, short- to long-term impacts on scenic river values, while at the same time facilitating recreational access. Because of the small scale of roads and park facilities, they do not intrude on the scenery, resulting in a negligible, long-term impact on scenic values. Overall impacts on fishing, camping, and water play have been minor, beneficial, and long term. Access to the rivers is limited by steep or rocky terrain, so use is often concentrated in several areas, resulting in crowding, numerous visitor-created trails, and localized erosion. These impacts, however, have not resulted in the degradation of outstandingly remarkable values along designated or eligible segments. Reasonably foreseeable plans include relocating more campsites and facilities outside the floodplain, and replacing or rebuilding the Cedar Grove bridge so that it would not be subject to damage during floods and would have a reduced impact on free-flowing conditions in the river. These future actions would result in minor to major, beneficial, long-term impacts on recreational values because of safer and more sustainable facilities.

Impacts from visitors on recreational and scenic values related to frontcountry rivers would be reduced because of well-defined river access and the mitigation of visitor impacts in accordance with management prescriptions, such as the restoration of riverbanks. Less crowding at popular water play areas and fewer recreational use conflicts, such as fishing and water play,

would result in negligible to minor, beneficial, short-term impacts to recreational values.

Alternative A in conjunction with other past, present, and reasonably foreseeable actions, would generally result in negligible to minor, beneficial, long-term impacts on recreational values as the result of improved facilities and controlled river access.

## Conclusion

With reduced use, controlled river access, and improved facilities, designated and eligible wild and scenic river segments would be more protected, and associated outstandingly remarkable values would be preserved. This would result in minor to moderate, beneficial, long-term impacts.

In conjunction with past, present, and reasonably foreseeable actions affecting outstandingly remarkable values of rivers, cumulative impacts would generally be minor to moderate, long term, and beneficial. Minor, adverse, long-term impacts on outstandingly remarkable values in localized areas would continue to result from visitor use.

There would be no impairment of wild and scenic river resources or values.

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## IMPACTS OF ALTERNATIVE C

### Analysis

**Backcountry Rivers.** Dispersing use under alternative C and applying management prescriptions would result in negligible to minor, beneficial, long-term impacts on scenic and recreational values along designated and eligible wild and scenic river segments. Most segments are in designated wilderness or roadless areas, and recreation is controlled by permit and park regulations. Riverbank erosion caused by backcountry stock and hiker use has caused minor, adverse, short- and long-term impacts to recreational and scenic values in localized areas. Continuing to require permits for use, regulating seasonal access to some areas (i.e., opening them depend-

ing on soil moisture conditions), and closing some areas to stock use would help mitigate adverse effects. These impacts would not degrade outstandingly remarkable values along designated or eligible segments. There would be no impacts on other outstandingly remarkable values along backcountry wild river segments. Geology would not be altered along any river segment; the rare Kern Valley rainbow trout would not be affected along the North Fork of the Kern; and wildlife, vegetation, and prehistory / history along the Middle Fork of the Kings River would not be affected.

**Frontcountry Rivers.** Under alternative C visitor use would be managed to protect river values. Well-defined river access routes and riverbank restoration of unwanted trails would enhance both scenic and recreational values, resulting in minor to moderate, beneficial, long-term impacts on visitors along popular frontcountry river corridors. Riverbank erosion and littering would be reduced, enhancing scenic values, but recreational values could be affected in crowded areas as a result of water play, camping, fishing, and nonmotorized watercraft use. Activities, such as camping in campgrounds and fishing, would continue to be regulated on river segments designated or proposed as wild or scenic. Although some use conflicts could occur along small stretches of rivers, these conflicts would not alter the range of recreational opportunities, and impacts would be minor. Crowding along some sections could result in minor, short-term, adverse impacts on scenic values, which would continue to predominate. There would be no impacts on geology values along designated or eligible frontcountry segments since most of the formations are granite and meta-volcanic.

### **Cumulative Impacts**

As described for the no-action alternative, hiking and stock use in the past caused riverbank erosion in some backcountry areas. Also recreational and scenic qualities were affected before the river segments were designated. Backcountry permit requirements, reduced use levels, and resource monitoring to support adjusting regulations and seasonal closures have improved

conditions. Crowding along portions of the wild segment of the South Fork of the Kings River, which is a popular backcountry entry point, results in localized, moderate, adverse impacts on both scenic and recreational values. Other outstandingly remarkable values such as geology, fish, and prehistory / history are not likely to have been or be impacted by past, present, or reasonably foreseeable actions. In conjunction with the actions under this alternative, there would be negligible additional discernible impacts on outstandingly remarkable values for backcountry river segments.

In the frontcountry past construction and reconstruction of roads (Generals Highway and Kings Canyon Highway) and park facilities have contributed to moderate, adverse, short- to long-term impacts on scenic river values, but at the same time they have facilitated recreational access. The relatively small scale of roads and park facilities means they generally do not intrude on the scenery, resulting in a negligible, long-term impact on scenic values. Overall impacts on fishing, camping, and water play have been minor, beneficial, and long term. Access to the rivers is limited by steep or rocky terrain, so use is often concentrated in several areas, resulting in crowding, numerous visitor-created trails, and localized erosion. These impacts, however, have not resulted in the degradation of outstandingly remarkable values along designated or eligible river segments. Reasonably foreseeable plans include relocating more campsites or facilities outside the floodplain, and replacing or rebuilding the bridge at Cedar Grove so it is less subject to damage during floods and would have a reduced impact on free-flowing conditions in the river. These future actions would result in minor to major, beneficial, long-term impacts on recreational values because of safer and more sustainable facilities.

Impacts from visitors on recreational and scenic values along frontcountry rivers would be reduced despite increased visitation because of limited and well-defined river access and the mitigation of visitor impacts in accordance with management prescriptions. User conflicts from recreational uses such as fishing and water play,

or crowding at popular water play areas, could result in minor, adverse, short-term impacts on recreational values.

Alternative C, in conjunction with past, present, and reasonably foreseeable actions, would generally result in negligible to minor, beneficial, long-term impacts to recreational values as the result of facility improvement and controlled river access. Minor, localized, long-term adverse impacts on outstandingly remarkable values would continue to result from visitor use.

## Conclusion

With controlled river access and improved facilities, designated and eligible wild and scenic river segments would be protected, and their outstandingly remarkable values preserved, resulting in minor to moderate, beneficial, long-term impacts.

In conjunction with past, present, and reasonably foreseeable actions, cumulative impacts would generally be negligible to minor, beneficial, and long term. Minor, adverse, long-term impacts on outstandingly remarkable values in localized areas would continue to result from visitor use.

There would be no impairment of wild and scenic river resources or values.

## IMPACTS OF ALTERNATIVE D

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### Analysis

**Backcountry Rivers.** Alternative D would have negligible to minor, beneficial impacts on the scenic and recreational values of designated and eligible wild and scenic river segments as a result of management prescriptions. As described for the no-action alternative, most of these sections are in designated wilderness or roadless areas, and recreation is controlled by permit and park regulations. Recreational and scenic values along riverbanks would be affected by riverbank erosion caused by backcountry stock and hiker use, resulting in minor, adverse, short- and long-term impacts in localized areas. These impacts would be mitigated to some extent by requiring

permits for use, regulating seasonal access to some areas (i.e., opening them depending on soil moisture conditions), and closing some areas to stock use. These measures would complement the management prescriptions. Impacts would not degrade outstandingly remarkable values along designated or eligible segments. There would be no impacts on other outstandingly remarkable values along backcountry wild river segments. Geology would not be altered along any river segment; the rare Kern Valley rainbow trout in the North Fork of the Kern would not be affected; and wildlife, vegetation, and prehistory / history along the Middle Fork of the Kings River would not be affected.

**Frontcountry Rivers.** Under alternative D increasing use would be managed to protect the outstandingly remarkable values of rivers. As described for the preferred alternative, well-defined river access routes and riverbank restoration would enhance both scenic and recreational values, resulting in minor, beneficial, long-term impacts. Riverbank erosion and littering would be reduced, but areas of crowding could occur seasonally as a result of water play, camping, fishing, and nonmotorized watercraft use. Activities, such as camping in campgrounds and fishing, would continue to be regulated on river segments designated or proposed as wild or scenic, thus mitigating impacts on recreational values. While some use conflicts could occur along small stretches of rivers, these conflicts would not alter the range of recreational opportunities, and impacts on recreational values would be minor. More people along some river sections could result in minor, localized, adverse, short-term impacts on scenic values, but scenic values would continue to predominate. Relocating some facilities outside floodplains would result in safer visitor experiences, with minor to moderate, beneficial, long-term impacts on recreational values in specific areas. There would be no impacts on geology values along designated or eligible frontcountry segments.

## Cumulative Impacts

As described for the no-action alternative, hiking and stock use in the past caused riverbank erosion in some backcountry areas. Also, recreational and scenic qualities were affected before these river segments were designated. Conditions have improved because of permit requirements, reduced use, resource monitoring to support adjusting regulations, and seasonal closures. Occasional crowding along portions of the wild segment of the South Fork of the Kings River, which is a popular backcountry entry point, results in localized, moderate, adverse impacts on both scenic and recreational values. Other outstandingly remarkable values such as geology, fish, and prehistory / history are not likely to have been or be impacted by past, present, or reasonably foreseeable actions due to remoteness and the absence of any development. In conjunction with the actions under this alternative, there would be negligible additional discernible impacts on outstandingly remarkable values for backcountry river segments.

In the frontcountry past construction and reconstruction of roads (Generals Highway and Kings Canyon Highway) and park facilities have contributed to moderate, adverse, short- to long-term impacts on scenic river values, while at the same time facilitating recreational access. The small scale of roads and park facilities generally means they do not intrude on the scenery, resulting in a negligible, long-term impact on scenic values. Access to the rivers is limited by steep or rocky terrain, so use is concentrated in several areas, resulting in crowding, numerous visitor-created trails, and localized erosion. Reasonably foreseeable plans include relocating more campsites or facilities outside the floodplain, and replacing or rebuilding the bridge at Cedar Grove so it would not be subject to damage during floods and would have a reduced impact

on free-flowing conditions in the river. These future actions would result in minor to major, long-term, beneficial impacts on recreational values because facilities would be safer and more sustainable.

Impacts on recreational and scenic values along frontcountry rivers would be reduced despite increased visitation because of well-defined river access and the mitigation of visitor impacts in accordance with management prescriptions. User conflicts from recreational uses such as fishing and water play, or crowding at popular water play areas, could result in minor, short-term, adverse impacts on recreational values.

Alternative D, in conjunction with past, present, and reasonably foreseeable actions, would generally result in negligible to minor, beneficial, long-term impacts to recreational values as the result of improved facilities and controlled river access. Minor, localized, long-term adverse impacts on outstandingly remarkable values would continue to result from visitor use.

## Conclusion

With controlled river access and improved facilities, designated and eligible wild and scenic river segments would be more protected, ensuring the preservation of outstandingly remarkable values. This would result in minor to moderate, beneficial, long-term impacts.

In conjunction with past, present, and reasonably foreseeable actions, cumulative impacts would be minor to moderate, beneficial, and long term. Minor, adverse, long-term impacts on outstandingly remarkable values in localized areas would continue to result from visitor use.

There would be no impairment of wild and scenic river resources or values.

# Backcountry / Wilderness

Backcountry is a term used by the National Park Service to refer to primitive, undeveloped, and roadless portions of parks. Backcountry includes areas designated or managed to preserve wilderness characteristics. A backcountry or wilderness stewardship plan describes in greater detail how these areas are managed.

At Sequoia and Kings Canyon, most backcountry areas (96.23%) are managed as designated wilderness or to preserve wilderness values. Designated wilderness currently covers 83.56% of the parks, approximately 723,000 acres. Less than 4% of the parks would be considered as frontcountry under any alternative.

## GUIDING REGULATIONS AND POLICIES

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The Wilderness Act defines wilderness as

an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired conditions; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Wilderness areas are to be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical uses. They are to be "administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide

the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness."

Potential wilderness may be designated for areas that do not qualify for immediate designation due to temporary, nonconforming, or incompatible conditions. Once the nonconforming use has been removed or eliminated, these areas may be designated as wilderness.

The NPS *Management Policies 2001* stipulate how proposed, recommended, and designated wilderness areas are to be managed. Essentially, the National Park Service will take no action that would diminish the wilderness suitability of an area possessing wilderness characteristics until Congress has decided about whether to designate wilderness (sec. 6.3.1). Until that time, management decisions pertaining to lands qualifying as wilderness will be made in expectation of eventual wilderness designation. All categories of wilderness may be zoned for visitor experiences and resource conditions consistent with their wilderness values (sec. 6.3.4.1).

## METHODOLOGY FOR ANALYZING IMPACTS

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Since most backcountry is designated wilderness, the impact analysis is generally based on the compatibility and consistency of management with wilderness values and with the vision under each alternative. **This section does not imply that the areas would be designated as wilderness; rather wilderness studies and congressional action would be required before such designation could take place.** This section compares alternatives to show the areas, acreages, and percentages of the parks under each alternative that could be (1) compatible with designation as wilderness, consistent with the vision for each alternative, and (2) areas of potential wilderness that could be designated as wilderness.

**TABLE 39: SUMMARY OF AREAS COMPATIBLE AS DESIGNATED WILDERNESS UNDER EACH ALTERNATIVE**

	No-Action Alternative	Preferred Alternative	Alternative A	Alternative C	Alternative D
Existing Designated Wilderness (in acres)	723,036	723,036	723,036	723,036	723,036
<b>Additional Areas Compatible with Management as Wilderness (in acres)</b>					
• Hockett Plateau (56,315 acres)	56,315*	56,283 (exclude high Sierra camp — 32 acres)	56,315	56,315	0
• Redwood Canyon / North Fork of the Kaweah (35,321 acres)	35,321*	35,321	35,321	35,321	35,250 (exclude Colony Mill Road — 71 ac)
• Chimney Rock / Jennie Lakes addition (1,756 acres)	1,756*	1,756	1,756	1,756	0
• Mineral King Areas (15,600 acres added in 1978; 15,107 acres managed as backcountry)	15,000*	15,107	15,107	15,000	15,000
• Pear Lake (5 acres)	5 (becomes wilderness as facilities removed)	5 (same as no-action alternative)	5 (same as no-action alternative)	5 (same as no-action alternative)	5 (same as no-action alternative)
• Bearpaw Meadow (32 acres)	32 (becomes wilderness as facilities removed)	0 (retain Bearpaw Meadow Camp)	32 (same as no-action alternative)	0 (retain Bearpaw Meadow Camp)	0 (retain Bearpaw Meadow Camp)
• Utility Corridors (34 acres)	34 (becomes wilderness as facilities removed)	34 (same as no-action alternative)	34 (same as no-action alternative)	34 (same as no-action alternative)	34 (same as no-action alternative)
• Oriole Lake (12 acres of private land)	12 (if acquired, designate as wilderness once facilities removed)	12 (same as no-action alternative)	12 (same as no-action alternative)	– (no acquisition)	– (provide public road access)
<b>Subtotal — Additional Areas Compatible with Management as Wilderness</b>	<b>108,475*</b>	<b>108,518</b>	<b>108,582</b>	<b>108,431</b>	<b>50,289</b>
<b>Total</b>	<b>831,511</b>	<b>831,554</b>	<b>831,618</b>	<b>831,467</b>	<b>773,325</b>
<b>Percentages</b>					
Existing Designated Wilderness	83.56%	83.56%	83.56%	83.56%	83.56%
Additional Areas Compatible with Management as Wilderness	12.54%	12.54%	12.55%	12.53%	5.81%
<b>Total</b>	<b>96.10%</b>	<b>96.10%</b>	<b>96.11%</b>	<b>96.09%</b>	<b>89.37%</b>

NOTE: Total park acreage = 865,260.

\* Under the no-action alternative this area would be managed to preserve its wilderness characteristics.

Impacts are evaluated in terms of whether they would be beneficial or adverse to wilderness values and wilderness recreational opportunities. Beneficial impacts would result from actions that would increase wilderness values, recreational opportunities, and compatibility with wilderness designation. Adverse impacts would reduce those same values, opportunities, or the

amount of area compatible with wilderness designation.

### REGIONAL CONTEXT

Designated wilderness areas immediately adjacent to the parks include Golden Trout to the south; John Muir to the east, north, and west;

*Impact Thresholds for Backcountry /  
Wilderness Impacts*

**Negligible** — Impacts would not be detectable to most visitors and would have no discernible effect on wilderness values or recreational opportunities.

**Minor** — Impacts would be slightly detectable to some visitors but would not be expected to have an overall effect on wilderness values or recreational opportunities.

**Moderate** — Impacts would be clearly detectable by many visitors and could have an appreciable effect on wilderness values or recreational opportunities.

**Major** — Impacts would have a substantial and noticeable effect for most visitors on wilderness values or recreational opportunities and could permanently alter various aspects of the visitor experience.

*Criteria for Determining Impairment*

An impact would more likely constitute an impairment to the extent it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the general management plan or other relevant NPS planning documents.

Monarch to the west; and Jennie Lakes between Grant Grove and Sequoia National Park. With the Sequoia-Kings Canyon Wilderness at its core, these contiguous wildernesses form the largest area of designated wilderness in California and the second largest in the lower 48 states. The value of this wilderness lies in its preservation of natural conditions, without permanent improvements or human habitation.

**IMPACTS OF THE NO-ACTION  
ALTERNATIVE**

**Analysis**

Under the no-action alternative 83.56% of the parks would continue to be managed as wilderness and 12.54% (108,475 acres) would continue to be managed to preserve wilderness characteristics. The majority of the parks would be free of the imprint of man, and the wilderness values of solitude and providing for primitive, unconfined recreation would be protected (see Table 39).

If and when facilities were removed at Bearpaw Meadow and two utility corridors, these potential wilderness areas (66 acres) would become designated wilderness, a negligible, beneficial, long-term impact since this would constitute a 0.01% increase in designated wilderness. If remaining private property adjacent to Oriole Lake was acquired by the National Park Service from willing sellers and facilities removed (12 acres), the area would become wilderness. Removing facilities and road access would result in negligible, beneficial, long-term impacts on primitive recreation because this small area is used by few people.

As required by Congress, the Mineral King area would be studied through a public process to make a recommendation to Congress about possible future wilderness designation. However, the no-action alternative does not seek to maximize land compatible with management as wilderness in the Mineral King area.

Bearpaw Meadow currently contains a high Sierra camp, which is a small, very popular, concessioner run tent-camp that provides a different type of backcountry experience for visitors. The facility offers visitors more comfort and the choice to be less self-sufficient by providing beds, food service, restrooms, and showers.

Often, designated NPS wilderness areas are not delineated by signs, so some members of the public might not know where wilderness is or the extent of it. Opportunities to experience primeval areas and solitude by participating in

primitive or unconfined recreation would remain similar to today, a negligible, beneficial, long-term impact.

### **Cumulative Impacts**

Cumulative impacts are based on an analysis of past, present, or reasonably foreseeable actions in the southern Sierra Nevada that would affect wilderness designation or values. As described under the “Regional Context,” adjacent designated wilderness areas contribute to the extensive nature of the Sequoia-Kings Canyon Wilderness. This second largest area of contiguous designated wilderness in the lower 48 states would continue to be managed as wilderness.

Since many park areas are managed to protect wilderness values under the no-action alternative, even though they are not designated wilderness, the intrinsic value of this contiguous wilderness area would not be affected, and wilderness values and experiences would be protected, a major, beneficial, long-term impact. Park managers would continue to work with adjacent agencies and managers to protect the values of contiguous wilderness through compatible regulation and management.

### **Conclusion**

The no-action alternative would continue current management of designated wilderness and non-wilderness backcountry areas, with negligible, beneficial, long-term impacts. Nonwilderness backcountry areas would continue to be managed to preserve wilderness characteristics. Some visitors might be unaware of the wilderness designation.

On a cumulative basis the core of the second largest designated wilderness area in the lower 48 states would be protected, a major, beneficial, long-term impact.

Wilderness characteristics and values would not be impaired.

## **IMPACTS OF THE PREFERRED ALTERNATIVE**

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### **Analysis**

Under the preferred alternative 83.56% of the parks would continue to be managed as designated wilderness (723,036 acres) and 12.54% (108,510 acres) would be compatible with management as wilderness, for a total of 831,554 acres (96.10% of the parks) that would be managed consistent with backcountry / wilderness prescriptions. Compared to the no-action alternative, areas compatible with management as wilderness would increase by about 43 acres.

Most areas suitable for wilderness would be managed to protect wilderness characteristics, including Redwood Canyon, Chimney Rock (Jennie Lakes addition), and the North Fork of the Kaweah. All of these areas include giant sequoia groves. Hockett Plateau would also be compatible for management as wilderness, with an exclusion of 40 acres (0.005% of the parks) to accommodate study for use as an additional high Sierra camp, resulting in negligible, adverse, long-term impacts on wilderness values since the area is so small and would remain roadless. Wilderness designation of Redwood Canyon would increase protection for park caves. Continuing to manage over 96% of the parks as wilderness would be consistent with the alternative vision for park resources.

The preferred alternative would retain the high Sierra camp at Bearpaw Meadow in Sequoia National Park, so 32 acres would continue to be excluded from wilderness.

If remaining private property adjacent to Oriole Lake was acquired by the National Park Service from willing sellers and facilities removed (12 acres), the area would become wilderness. Removing facilities and road access would result in negligible, beneficial, long-term impacts on primitive recreation because this small area is used by few people.

As described for the no-action alternative, the Mineral King area would be studied through a public process to make a recommendation to

Congress about possible future wilderness designation.

Under the preferred alternative visitor education would focus on resource protection, stewardship, and leave-no-trace backcountry skills, potentially making more visitors aware of wilderness designation and wilderness values. These wilderness recreational opportunities and values are highly valued by park visitors. Opportunities for recreation in protected wilderness, along with opportunities to experience primeval areas and solitude by participating in primitive or unconfined recreation, would expand, resulting in minor, beneficial, long-term impacts because many more visitors would be aware of wilderness characteristics, values, and recreational opportunities.

### **Cumulative Impacts**

As described for the no-action alternative, cumulative impacts are based on an analysis of past, present, or reasonably foreseeable actions in the southern Sierra Nevada that could affect wilderness designation or values. Park managers would continue to work with adjacent agencies and managers to protect the values of contiguous wilderness through compatible regulation and management. Increased knowledge and understanding of wilderness characteristics and values would be a moderate, beneficial impact. In conjunction with designated wilderness in the region, the preferred alternative would result in major, beneficial, long-term impacts since it would help ensure that the values of this contiguous wilderness area and opportunities for wilderness recreation would be protected.

### **Conclusion**

A very small additional amount of park land would be compatible and consistent with management as wilderness under the preferred alternative, which would protect ecosystem diversity, preserve park character, and accommodate sustainable growth. Primarily as a result of improving education about wilderness values, the preferred alternative would have negligible to minor, beneficial, long-term impacts on wilder-

ness values and recreational opportunities. At the same time, potentially expanding the popular backcountry high Sierra tent-hotel concept would result in a negligible, adverse, long-term impact.

The core of the second largest designated wilderness area in the lower 48 states would be protected, a major, beneficial, long-term impact.

Wilderness values would not be impaired.

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## **IMPACTS OF ALTERNATIVE A**

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### **Analysis**

Under alternative A 83.56% of the parks would continue to be managed as designated wilderness (723,036 acres) and 12.55% (108,582 acres) would be compatible with management as wilderness, for a total of 831,618 acres (96.11% of the parks) that would be managed consistent with backcountry / wilderness prescriptions. Compared to the no-action alternative, a small amount of additional land (107 acres) would be compatible for management as wilderness. Reduced park visitation under this alternative would be attuned with wilderness goals.

Redwood Canyon, Chimney Rock (the Jennie Lakes addition), the North Fork of the Kaweah, and Hockett Plateau would be compatible with designation as wilderness. All of these areas include giant sequoia groves. Designation of Redwood Canyon would increase protection for park caves. Managing these areas as wilderness would be compatible and consistent with the alternative vision to emphasize natural systems and biodiversity.

If and when facilities were removed at Bearpaw Meadow, this areas would be designated as wilderness. If remaining private property adjacent to Oriole Lake was acquired by the National Park Service from willing sellers and facilities removed (12 acres), the area would become wilderness. Removing facilities and road access would result in negligible, beneficial, long-term impacts on primitive recreation because these areas are used by few people.

As described for the no-action alternative, the Mineral King area would be studied through a public process to make a recommendation to Congress about possible future wilderness designation.

Visitor education focused on resource protection, stewardship, and leave-no-trace practices would likely better inform park visitors about wilderness and wilderness values. Wilderness recreational opportunities and values are highly valued by park visitors. Opportunities to experience primeval areas and solitude by participating in primitive or unconfined recreation could expand slightly, resulting in minor, beneficial, long-term impacts for park visitors.

### **Cumulative Impacts**

As described for the no-action alternative, cumulative impacts are based on an analysis of past, present, or reasonably foreseeable actions in the southern Sierra Nevada that could affect wilderness designation or values. In conjunction with designated wilderness in the region, the actions of alternative A would result in no perceivable change. However, the values of this contiguous wilderness area and opportunities for wilderness recreation would be protected through compatible regulation and management by continuing to work with adjacent agencies and managers, a major, beneficial, long-term impact.

### **Conclusion**

Reducing use and development could create a park environment slightly more attuned to wilderness values. Similar to the no-action alternative, over 96% of the parks would be designated wilderness or would be compatible with management as wilderness. Minor, beneficial, long-term impacts on wilderness values and recreation would result from reduced park visitation, management of slightly over 100 additional acres as compatible with wilderness, and increased education.

The core of the second largest designated wilderness area in the lower 48 states would be protected, a major, beneficial, long-term impact.

Wilderness values would not be impaired.

## **IMPACTS OF ALTERNATIVE C**

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### **Analysis**

Under alternative C 83.56% of the parks would continue to be managed as designated wilderness (723,036 acres) and 12.53% (108,431 acres) would be compatible with management as wilderness, for a total of 831,467 acres (96.09% of the parks) that would be managed consistent with backcountry / wilderness prescriptions. Compared to the no-action alternative, areas compatible with management as wilderness could decrease by around 44 acres since the Bearpaw Meadow high Sierra camp and private property at Oriole Lake would remain, resulting in a negligible, adverse, long-term impact on wilderness values since the areas are small.

Redwood Canyon, Chimney Rock (Jennie Lakes addition), the majority of the North Fork of the Kaweah, and Hockett Plateau would be compatible with designation as wilderness. All of these areas include giant sequoia groves. Designation of Redwood Canyon would increase protection for park caves. Managing these areas as wilderness would be consistent with the alternative vision. Bearpaw Meadow would be retained as a representative of traditional backcountry use patterns, resulting in negligible impacts on wilderness values due to the small size of its facilities. Traditional ranger programs would be the primary means by which to reach park visitors with messages about wilderness values; however, since programs often take place in frontcountry campgrounds, they might not reach or inspire many backcountry users, resulting in negligible, adverse, long-term impacts on wilderness values and recreational opportunities.

Continuing private property at Oriole Lake and providing public access would result in negligible, adverse, long-term impacts on primitive recreation because this small area is used by few people.

As described for the no-action alternative, the Mineral King area would be studied through a

public process to make a recommendation to Congress about possible future wilderness designation.

Opportunities for recreation in protected wilderness and opportunities to experience primeval areas and solitude by participating in primitive or unconfined recreation would remain similar to the no-action alternative, resulting in a negligible, beneficial, long-term impact.

### **Cumulative Impacts**

As described for the no-action alternative, cumulative impacts are based on an analysis of past, present, or reasonably foreseeable actions in the southern Sierra Nevada that could affect wilderness designation or values. In conjunction with designated wilderness in the region, the actions of alternative C would result in major, beneficial, long-term impacts and would help ensure that the values of this contiguous wilderness area and opportunities for wilderness recreation would be protected through compatible regulation and management by continuing to work with adjacent agencies and managers.

### **Conclusion**

Like the other alternatives, over 96% of the parks would be managed as designated wilderness or would be compatible with management as wilderness. Negligible, adverse, long-term impacts on wilderness characteristics would result from reducing the amount of compatible area by 32 acres. Traditional ranger programs are not likely to reach or inspire many backcountry users, resulting in negligible, adverse, long-term impacts on wilderness values and recreational opportunities.

The core of the second largest designated wilderness area in the lower 48 states would be protected, a major, beneficial, long-term impact.

Wilderness values would not be impaired.

## **IMPACTS OF ALTERNATIVE D**

### **Analysis**

Under alternative D 83.56% of the parks would continue to be managed as designated wilderness (723,036 acres) and 5.81% (50,289 acres) would be compatible with management as wilderness, for a total of 773,325 acres (89.37% of the parks) that would be managed consistent with backcountry / wilderness prescriptions. Compared to the no-action alternative, areas compatible with wilderness management would be reduced by 58,186 acres, or 6.7% of the parks, a minor, adverse, long-term impact on wilderness values and recreational opportunities. The more social and backcountry focus of alternative D would allow larger group sizes but would concentrate use along major trails, resulting in minor, adverse, long-term impacts on solitude and unconfined recreation. Additional designated campsites would be likely along major trails, resulting in a minor, adverse, long-term impact on primitive recreation free from evidence of humans.

Wilderness designation would not be sought for Hockett Plateau or the Chimney Rock area of the Jennie Lakes addition so that additional primitive backcountry facilities could be provided. However, these areas would remain roadless, so the impact on wilderness values and recreational opportunities would be minor, adverse, and long term.

Under this alternative Hockett Plateau (56,315 acres) would generally continue to be managed compatibly with wilderness characteristics, but a change in management would be required to allow the establishment of an additional high Sierra camp in this area because this area is managed consistent with wilderness policies. Redwood Canyon and the majority of the North Fork of the Kaweah (except for 71 acres associated with the Colony Mill Road trail corridor, for which a change in management would be required to allow for bicycle use) would be compatible with designation as wilderness. The Chimney Rock area (Jennie Lakes addition) would be managed compatibly with wilderness, but designated primitive backcountry campsites

would be provided. These areas include giant sequoia groves. Designation of Redwood Canyon would increase protection for park caves. Managing these areas as wilderness would be consistent with the alternative vision to instill park conservation values.

If remaining private property adjacent to Oriole Lake was acquired from willing sellers, road access would be provided, along with a primitive picnic area and trail access. If wilderness values were affected, impacts would be negligible, adverse, and long term; however, this small area is used by few people.

As described for the no-action alternative, the Mineral King area would be studied through a public process to determine its wilderness suitability and to make a recommendation to Congress about possible future wilderness designation.

Educational programs for visitors would be emphasized under this alternative, and more people would likely learn about the values of wilderness resources. It is also more likely that designated wilderness areas would be delineated, making it more obvious to visitors when they entered wilderness. Park visitors highly value wilderness recreational opportunities and education. Alternative D would support a diverse educational thrust that would seek to make more visitors comfortable with their backcountry skills, resulting in minor to moderate, beneficial, long-term impacts on visitor understanding of wilderness values.

### **Cumulative Impacts**

As described for the no-action alternative, cumulative impacts are based on an analysis of past,

present, or reasonably foreseeable actions in the southern Sierra Nevada that could affect wilderness designation or values. Additional facilities under alternative D would have a negligible to minor adverse effect on the values of this contiguous wilderness area. At the same time backcountry and wilderness education would increase, a minor, beneficial, impact for some visitors. In conjunction with designated wilderness in the region, alternative D would result in a major, beneficial, long-term impact because the core of the second largest wilderness area in the lower 48 states would be protected through compatible regulation and management by continuing to work with adjacent agencies and managers, similar to the other alternatives.

### **Conclusion**

Under alternative D 89.37% of the parks would be managed as designated wilderness or as compatible with wilderness. A slight decrease in areas compatible with wilderness would be consistent with guided growth and adaptation to changing users under this alternative, while retaining the basic park character. Increased visitor education on resource protection and stewardship, as well as teaching backcountry skills, could make visitors more aware of wilderness designation and values. However, as a result of more concentrated use by larger groups, the impact of this alternative on wilderness values would be negligible to moderate, adverse, and long term.

The core of the second largest designated wilderness area in the lower 48 states would be protected, a major, beneficial, long-term impact.

Wilderness values would not be impaired.

# Cultural Resources

## GUIDING REGULATIONS AND POLICIES

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Numerous acts, regulations, and NPS policies provide direction for the protection, preservation, and management of cultural resources on public lands. Further, these laws and policies establish what must be considered in general management planning and how cultural resources must be managed in future undertakings resulting from the approved plan regardless of the final alternative chosen.

- *The NPS Organic Act* — The National Park Service is mandated to conserve historic objects within national park system areas and to provide for their enjoyment.
- *The National Historic Preservation Act of 1966 and “Regulations of the Advisory Council on Historic Preservation” (36 CFR Part 800)* — Section 106 of the National Historic Preservation Act requires that federal agencies take into account the effect of their undertakings on properties that are listed on, or eligible for listing on, the National Register of Historic Places, and it provides the Advisory Council on Historic Preservation a reasonable opportunity to comment. Section 110 of the act further requires federal land managers to establish programs in consultation with state historic preservation offices for the identification, evaluation, nomination, and protection of properties listed on or eligible for the national register. The National Park Service takes into account the effects of site planning and operations on historic properties under the provisions of the 1995 Programmatic Agreement among the National Park Service, the Advisory Council on Historic Preservation, and the Conference of State Historic Preservation Officers.
- *Archeological Resources Protection Act of 1979* — The Archeological Resources Protection Act requires the protection and preservation of archeological resources on public lands; establishes confidentiality provisions for sensitive site location information where the release of such information may endanger resources.
- *American Indian Religious Freedom Act* — The American Indian Religious Freedom Act protects and preserves for American Indians access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites
- *The Native American Graves Protection and Repatriation Act of 1990* — The Native American Graves Protection and Repatriation Act establishes procedures for determining the final disposition of any human remains, funerary objects, or objects of cultural patrimony that are discovered on public lands or during the course of a federal undertaking.
- *Executive Order 13007* — This executive order establishes responsibility (1) to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and (2) to avoid adversely affecting the physical integrity of such sacred sites.
- *The 1995 Secretary of the Interior’s Standards for the Treatment of Historic Properties, with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings (36 CFR 68)* (“Secretary’s Standards”) — This guideline sets forth standards to be used when planning, undertaking, and supervising projects involving the preservation, rehabilitation, restoration, and/or reconstruction of historic properties listed on or eligible for listing on the National Register of Historic Places.
- *“Curation of Federally Owned and Administered Archeological Collections” (36 CFR 79)* — This regulation stipulates guidelines and procedures for the proper curation and management of archeological

collections owned or administered by federal agencies.

- Applicable agency policies relevant to cultural resources include chapter 5 of the NPS *Management Policies 2001*, *Director's Order #28: Cultural Resource Management*, *NPS-28: Cultural Resource Management Guideline*, and *Director's Order #24: Museum Collections Management*.

## METHODOLOGY FOR ANALYZING IMPACTS

Potential impacts (direct, indirect, and cumulative effects) are described in terms of type (are the effects beneficial or adverse?), duration (are the effects short-term — lasting up to 5 years, long-term — lasting 5–20 years, or permanent?), and intensity (is the degree or severity of effects negligible, minor, moderate, or major?). Because definitions of intensity (negligible, minor, moderate, or major) vary by cultural resource, intensity definitions are provided separately for each cultural resource analyzed.

### Impacts to Cultural Resources and Section 106 of the National Historic Preservation Act

Describing impacts to cultural resources in terms of type, duration, and intensity is consistent with the regulations of the Council on Environmental Quality that implement the National Environmental Policy Act. The following impact analyses are intended, however, to reflect the requirements of both the National Environmental Policy Act and section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's regulations implementing section 106 (36 CFR Part 800, "Protection of Historic Properties"), impacts to cultural resources were also identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are either listed on or eligible to be listed on the National Register of Historic Places; (3) applying the criteria of adverse effect to affected, national register eligible or listed cultural re-

sources; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under the advisory council's regulations, a determination of either *adverse effect* or *no adverse effect* must also be made for affected resources listed on or eligible for the national register.

- An *adverse effect* occurs whenever an action would alter, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion on the national register, e.g., diminishing the integrity of its location (or the extent to which a resource retains its historic appearance), design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the alternatives that would occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5, "Assessment of Adverse Effects").
- A determination of *no adverse effect* means there is an effect, but the effect would not alter the characteristics of the cultural resource that qualify it for inclusion on the national register.

### Mitigation Measures and Section 106

CEQ regulations and the NPS *Director's Order #12* also call for a discussion of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g., reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation only under the National Environmental Policy Act. It does not suggest that the level of effect as defined by section 106 is similarly reduced. Cultural resources are non-renewable resources, and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Therefore, although actions determined to have an adverse effect under section 106 may be mitigated, the effect remains adverse.

A section 106 summary is included in the impact analysis sections. This is **an assessment of the effect of the undertaking (implementation of the alternative) only on cultural resources listed on or eligible for the National Register of Historic Places**, based on the criteria of effect and adverse effect found in the advisory council's regulations.

## IMPACTS COMMON TO ALL ALTERNATIVES

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As previously discussed, Public Law 108-447 (passed in 2004) authorized the secretary of the interior to permit the continuation of the Kaweah no. 3 hydroelectric facilities and special use permit cabins in the Mineral King area. The following discussion therefore applies to all alternatives.

**Kaweah No. 3 Hydroelectric Facilities.** Preserving facilities associated with the Kaweah no. 3 hydroelectric generation system will continue the historical use of this property, which is eligible for listing on the National Register of Historic Places. Two of three contributing structures are within the park — the Marble Fork conduit and the Marble Fork siphon. The facilities may also be interpreted, thus increasing the public's awareness of their historical significance. Impacts would be minor, beneficial, and long term.

**Mineral King Permit Cabins — Cabin Cove, West Mineral King, East Mineral King.** The National Park Service will manage special use permits in accordance with the provisions of Public Law 108-447, *NPS Management Policies 2001*, and *Director's Order #53* (see appendix G). Two-thirds of the approximately 60 permit cabins are contributing elements of the Mineral King Road Cultural Landscape District. A cultural resource preservation plan would be prepared for the cultural landscape district in consultation with the state historic preservation officer and the Mineral King Preservation Society. The plan would identify a viable management / maintenance strategy, including an appropriate treatment method according to the "Secretary's Standards"; measures for resource protection (e.g., addressing cabins in wetland locations or

within floodplains, or actions to make non-contributing cabins more compatible with the historical appearance of the landscape district); and a decision process for determining whether to repair, replace, or remove cabins in the event they are damaged by natural disaster (such as a tree fall, flood, or avalanche). Resulting impacts would be minor to moderate, long term, and beneficial because the cultural landscape district, as well as contributing historic resources, would be preserved.

## HISTORIC STRUCTURES, DISTRICTS, AND CULTURAL LANDSCAPES

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### Impacts of the No-Action Alternative

#### *Analysis*

Under this alternative all potentially historic structures, districts, and landscapes would be inventoried and evaluated under National Register of Historic Places criteria to determine their eligibility for listing on the register, and the listing process would be completed for those resources that were determined eligible. Historic structures, districts, and landscapes would be preserved, rehabilitated, and adaptively used in accordance with the "Secretary's Standards." Where adverse effects such as removal or neglect were unavoidable, mitigation measures would be determined through consultation with the California state historic preservation officer.

Historic structures could suffer wear and tear from increased visitation, but the carrying capacity of historic structures would be monitored and visitation levels or constraints could be imposed that would contribute to the stability or integrity of the resources without unduly hindering interpretation for visitors. Unstaffed or minimally staffed structures could be more susceptible to vandalism. Any adverse impacts would range in intensity from negligible to minor and be long term or permanent. Careful design would ensure that the rehabilitation of parking areas and the expansion or development of trails would minimally affect the scale and visual relationships among landscape features. In addition, the topography, vegetation, circulation features, and land use patterns of any historic district or cul-

*Impact Thresholds for Historic Structures, Districts, and Cultural Landscapes*

**Negligible** — The impact would be at the lowest levels of detection, with neither adverse nor beneficial consequences. The determination of effect under section 106 of the National Historic Preservation Act would be *no adverse effect*.

**Minor** — Adverse impact: The alteration of a feature or features would not diminish the integrity of the resource. The determination of effect under section 106 would be no adverse effect.

Beneficial impact: Features would be stabilized or preserved in accordance with the *Secretary's Standards*. The determination of effect under section 106 would be *no adverse effect*.

**Moderate** — Adverse impact: The alteration of a feature or features would diminish the integrity of the resource. The determination of effect under section 106 would be *adverse effect*. A memorandum of agreement would be executed among the National Park Service 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 the National Environmental Policy Act from major to moderate.

Beneficial impact: A structure or landscape would be rehabilitated in accordance with the "Secretary's Standards." The determination of effect under section 106 would be *no adverse effect*.

**Major** — Adverse impact: The alteration of a feature or features would diminish the integrity of the resource. The determination of effect under section 106 would be *adverse effect*. Measures to minimize or mitigate adverse impacts could not be agreed upon, and the National Park Service and applicable state or tribal historic preservation officer and/or the Advisory Council on Historic Preservation would be unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).

Beneficial impact: A structure or landscape would be restored in accordance with the "Secretary's Standards." The determination of effect under section 106 would be *no adverse effect*.

*Criteria for Determining Impairment*

An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the park's general management plan or other relevant NPS planning documents.

tural landscape would remain largely unaltered. Any adverse impacts would range in intensity from negligible to minor and would be long term or permanent.

**Generals Highway.** Continuing to rebuild the Generals Highway pursuant to an existing memorandum of agreement among the National Park Service, the state historic preservation officer, and the Advisory Council on Historic Preservation would sustain existing traffic volume and preserve the historical character of

the road and its corridor. Historic resources that contribute to the significance of the Generals Highway would be preserved, including the Ash Mountain entrance sign, the Hospital Rock automobile watering station and stone water fountain, Tunnel Rock, the Clover Creek and Marble Fork bridges, as well as CCC rock work along the roadway. Operations associated with rebuilding the road would have negligible to minor, adverse visual impacts during construction. Even though rebuilding the road would have some minor, permanent, adverse impacts

because some historic fabric would be lost, rebuilding the road would result in overall minor to moderate, beneficial, and long-term impacts for the preservation and safe use of this historically significant highway.

**Backcountry.** Historic structures, districts, and landscapes in the backcountry, such as historic ranger cabins, the Smithsonian Institution shelter (the Mount Whitney shelter), the Pear Lake ski hut, and the Shorty Lovelace Historic District cabins, would be preserved. The result would be minor, beneficial, long-term impacts on these resources.

The surveys and research necessary to determine the eligibility of a structure, district, or landscape for listing on the National Register of Historic Places are a prerequisite for understanding the resource's significance, as well as the basis of informed decision-making in the future regarding how the resource should be managed. Such surveys and research would result in negligible to minor, beneficial, long-term impacts.

**Kings Canyon National Park.** *Cedar Grove and the Floor of the Kings Canyon* — Preserving Knapp's cabin would result in minor, beneficial, long-term impacts. The surveys and research necessary to determine the eligibility of a structure, district, or landscape for listing on the National Register of Historic Places are a prerequisite for understanding the resource's significance, as well as the basis of informed decision-making in the future regarding how the resource should be managed. Such surveys and research would result in negligible to minor, beneficial, long-term impacts.

*Grant Grove* — Completing the national register process for General Grant National Park Historic District would help ensure that historic structures that contribute to the significance of the historic district would be preserved and adaptively used for essential services, such as lodging, housing, and park operations. Impacts on historic resources that were preserved would be minor to moderate, beneficial, and long term. Preserving the Redwood Mountain residence and historic structures in the vicinity of the

General Grant Tree, such as the Gamlin cabin, would result in minor, beneficial, long-term impacts to these historic resources. Retaining NPS-owned historic structures in the Wilsonia Historic District could result in minor, beneficial, long-term impacts on the district's resources if they were stabilized or preserved. Privately owned structures in the Wilsonia Historic District would remain, resulting in minor, beneficial, long-term impacts since the district would retain its historical integrity.

*Big Stump Basin* — Big Stump Basin would be assessed to determine its eligibility for listing on the National Register of Historic Places as a cultural landscape. Managing the basin to illustrate a recovering giant sequoia grove would result in the area gradually becoming overgrown with vegetation, reducing the visual impact of logging. The impact on the cultural landscape would be moderate to major, adverse, and permanent because cultural landscape features would inevitably be overgrown.

**Sequoia National Park.** *Lodgepole-Wuksachi (including Dorst campground, Wuksachi village, Lodgepole village, and Wolverton vicinities)* — Evaluating historic structures at Lodgepole and Wolverton to determine their eligibility for listing on the National Register of Historic Places, and preserving and adaptively reusing them if they were eligible, would have moderate, beneficial, long-term impacts. Preserving historic structures at Wolverton, the Cabin Creek ranger residence and dormitory, and the Lost Grove comfort station would have minor, beneficial, long-term impacts.

*Giant Forest* — Continuing to adaptively use the market as a museum; rehabilitating and interpreting the ranger's residence and comfort station; and preserving and interpreting the Cattle cabin, Squatter's cabin, and Tharp's Log would continue to result in minor to moderate, beneficial, long-term impacts on historic structures in Giant Forest.

*Ash Mountain / Foothills* — Preserving historic residences in the upper Ash Mountain housing area and the landscape of the potential Ash

Mountain historic district would have minor, beneficial, long-term impacts. Preservation and continued use of the CCC recreation hall at Ash Mountain for that purpose would have minor, beneficial, long-term impacts. Inventorying and evaluating Mission '66 structures and preserving any that were determined eligible for listing on the National Register of Historic Places would have minor, beneficial, long-term impacts.

Retaining trailer sites at the potential Sycamore CCC camp historic district would have a minor, adverse impact on the integrity of the historic district. If determined eligible for listing on the national register, structures in the potential historic district (including the recreation hall) would be preserved, thus having minor, beneficial, long-term impacts on these resources.

Preserving the historic Colony Mill Road as a historic right-of-way would have minor, beneficial, long-term impacts.

*Mineral King* — Preserving contributing resources of the Mineral King Road Cultural Landscape District, including the historical character of the road corridor, NPS historic facilities, the Atwell Mill ranger station and garage, the Atwell Mill site, and the Lookout Point residence and garage, would generally have minor, beneficial, long-term impacts.

The historic character (alignment and width) of the Mineral King Road corridor would be preserved. This would result in minor, beneficial, long-term impacts to the roadway and the appurtenances associated with its immediate right-of-way.

The recreational community of Silver City (an inholding within the park) is historically similar to the Cabin Cove, West Mineral King, and East Mineral King permit cabin areas. The community consists of privately owned properties and has not been evaluated for national register eligibility. Evaluating these properties would have minor, beneficial, long-term impacts. While privately owned property can be evaluated for the national register, properties cannot be listed without the owner's permission.

Because the National Park Service would allow mining remnants at Mineral King to continue to molder, these resources would be ultimately lost, resulting in moderate to major, adverse, permanent impacts.

*Dillonwood* — Facilities at Dillonwood would be assessed to determine if they are eligible for listing on the National Register of Historic Places. The preservation of any historic properties would result in minor, beneficial, long-term impacts.

### *Cumulative Impacts*

Over the years historic structures, districts, and cultural landscapes have been adversely impacted by the wear and tear associated with visitor access, natural processes such as weathering and erosion, development, and the restoration of natural conditions in sequoia groves. Past construction projects such as the Generals Highway improvements, hydroelectric production, and the development associated with Grant Grove, Cedar Grove, Lodgepole, and Mineral King resulted in the loss of historic structures and the loss or alteration of landscape elements (structures, vegetation, circulation features, spatial organization, or land use patterns). In addition, to protect and preserve the internationally significant sequoia groves (the primary reason that the parks were established), locally significant structures, districts, and landscapes in Sequoia and Kings Canyon National Parks were removed and/or altered. During 1998–99 most structures in the Giant Forest area (some of which dated back to the 1920s) were removed pursuant to a memorandum of agreement among the National Park Service, the California state historic preservation officer, and the Advisory Council on Historic Preservation. Only the ranger's residence, the comfort station, the market, and the Beetle Rock assembly hall were preserved. Adverse impacts associated with visitor access and natural processes were generally long term and negligible to minor in intensity, but the adverse impacts associated with the removal of historic structures and loss or alteration of landscape elements were long term or permanent and of moderate to major intensity.

Concurrent or reasonably foreseeable future actions occurring throughout the region, such as the potential expansion of visitor facilities in Giant Sequoia National Monument, the growth of communities and subdivision development in Tulare County, and proposed improvements to California Highways 180 and 65 by Caltrans, have the potential to disturb historic structures, districts, and cultural landscapes outside the parks' boundaries. Unavoidable adverse impacts to resources eligible for the national register could range in intensity from minor to major, depending on the resource affected.

Implementation of the no-action alternative would contribute minor to moderate, beneficial, long-term impacts, as well as moderate to major, adverse, long-term or permanent impacts, to the cumulative impacts of other past, present, and reasonably foreseeable future actions. The overall cumulative impact associated with the no-action alternative, however, would be adverse.

### **Conclusion**

The no-action alternative would result in minor to moderate, beneficial, long-term impacts on historic structures, districts, and landscapes that would be preserved and adaptively used by the National Park Service for interpretive purposes or park operations.

There would be no impairment of park resources or values.

### **Summary: National Historic Preservation Act, Section 106**

In accordance with the regulations of the Advisory Council on Historic Preservation (36 CFR 800.5) that address the criteria of effect and adverse effect, the following actions under this alternative would have no adverse effects within the national parks:

- inventorying and evaluating all potentially eligible cultural resources in Sequoia and Kings Canyon National Parks to determine their eligibility for listing on the National Register of Historic Places, and submitting

nomination forms to the keeper of the national register for listing

- rebuilding the Generals Highway and its appurtenant structures, preserving historic structures in the vicinity of Giant Forest, or preserving historic properties in the backcountry (including historic ranger cabins, the Mount Whitney shelter, and the Pear Lake ski hut)
- preserving and adaptively using Knapp's cabin, structures in the General Grant National Park Historic District, the Redwood Mountain residence, and NPS historic structures in the Wilsonia Historic District
- preserving the Lost Creek comfort station; preserving and adaptively using the Cabin Creek ranger residence and dormitory; stabilizing or preserving identified historic structures and landscapes in the potential Lodgepole, Wolverton, Ash Mountain, and Sycamore CCC camp historic districts; and preserving the Colony Mill Road as a historic right-of-way
- preserving the Atwell Mill ranger station and garage, the Atwell Mill site, the Lookout Point residence, and resources contributing to the Mineral King Road Cultural Landscape District; and maintaining / preserving the historic character of the Mineral King Road corridor (alignment and width)

This alternative would result in adverse effects to historic structures, districts, and landscapes in the national parks from the following actions:

- managing the Big Stump Basin (if determined eligible as a historic landscape) as a recovering giant sequoia grove, resulting in the area gradually returning to natural conditions
- allowing mining remnants at Mineral King to continue to molder

## **Impacts of the Preferred Alternative**

### **Analysis**

Under this alternative, as described for the no-action alternative, all potentially historic struc-

tures, districts, and landscapes would be inventoried and evaluated under National Register of Historic Places criteria to determine their eligibility for listing on the register, and the listing process would be completed for those resources determined to be eligible. Historic structures, districts, and landscapes would be preserved, restored, rehabilitated, and adaptively used in accordance with the “Secretary’s Standards.” Where adverse effects such as removal or neglect were unavoidable, mitigation measures would be determined through consultation with the California state historic preservation officer.

Numerous diverse historic facilities would be preserved and adaptively reused, resulting in minor to moderate, beneficial impacts to cultural resources over the long term.

The undergrounding of utilities would have minimal, if any, effects on topography, spatial organization, or land use patterns of historic districts or cultural landscapes. If the aboveground utilities were contributing elements to a historic district or cultural landscape, placing them underground would be a minor, adverse, long-term impact. Once the underground utility line was installed and the trench backfilled, the disturbed ground would be restored to its pre-construction contour and condition. Any adverse impacts associated with construction during the installation of underground utilities would be negligible and short term.

Historic structures could suffer wear and tear from increased visitation, but the carrying capacity of historic structures would be monitored, and visitation levels or constraints could be imposed that would contribute to the stability or integrity of the resources without unduly hindering interpretation for visitors. Unstaffed or minimally staffed structures could be more susceptible to vandalism. Any adverse impacts would be negligible to minor in intensity and long term or permanent in duration.

**Generals Highway.** Like the no-action alternative, the Generals Highway would continue to be rebuilt. Operations associated with rebuilding the road would have negligible to minor, adverse

visual impacts during construction. Even though rebuilding the road would have some minor, permanent, adverse impacts because some historic fabric would be lost, rebuilding the road would result in overall minor to moderate, beneficial, and long-term impacts for the preservation and safe use of this historically significant highway. Although actions under this alternative could result in changing use and visitor experience of Generals Highway, historic structures and landscapes associated with the highway would not change.

**Backcountry.** The following impacts would be similar to the no-action alternative:

- preserving historic structures, districts and landscapes in the backcountry (such as historic ranger cabins, the Mount Whitney shelter, the Pear Lake ski hut, and the Shorty Lovelace Historic District cabins) — minor, beneficial, long-term impacts
- conducting surveys and research necessary to determine the eligibility of a structure, district, or landscape for listing on the National Register of Historic Places (a prerequisite for understanding the resource’s significance, as well as the basis of informed decision-making in the future regarding how the resource should be managed) — negligible to minor, beneficial, long-term impacts.

**Kings Canyon National Park.** *Cedar Grove and the Floor of the Kings Canyon* — The impacts of this alternative would be the same as for the no-action alternative:

- preserving Knapp’s cabin — minor, beneficial, long-term impact
- conducting surveys and research necessary to determine the eligibility of a structure, district, or landscape for listing on the National Register of Historic Places — negligible to minor, beneficial, long-term impacts

*Grant Grove* — Under the preferred alternative NPS-owned historic structures in the Wilsonia Historic District would be evaluated for preservation and adaptive reuse. This would result in

minor to moderate, beneficial, long-term impacts. Privately owned historic structures would remain, resulting in minor, beneficial impacts to the integrity of the Wilsonia Historic District. The *Land Protection Plan* would be updated to acknowledge the national register status of the Wilsonia Historic District.

The following impacts would be similar to those for the no-action alternative:

- preserving and adaptively using structures contributing to the significance of the General Grant National Park Historic District — minor to moderate, beneficial, long-term impacts
- preserving and adaptively using the Redwood Mountain residence and historic structures in the vicinity of the General Grant Tree (such as the Gamlin cabin) — minor to moderate, beneficial, long-term impacts

*Big Stump Basin* — As described under the no-action alternative, the National Park Service would evaluate the Big Stump Basin under National Register of Historic Places criteria to determine its eligibility for listing on the national register as a historic landscape. If eligible, managing a portion of the basin to preserve its visible logging history would result in minor, beneficial, long-term impacts on potential cultural landscape features. However, the inevitable loss of cultural landscape values in part of the basin managed as a recovering sequoia grove would have moderate to major, adverse, long-term impacts on potential cultural landscape features.

**Sequoia National Park. Lodgepole-Wuksachi** — The impacts of preserving and adaptively using the Cabin Creek ranger residence and dormitory and preserving the Lost Grove comfort station would be minor to moderate, long term, and beneficial, as described for the no-action alternative.

Surveys and research necessary to determine the eligibility of a structure, district, or landscape for listing on the National Register of Historic

Places (a prerequisite for understanding the resource's significance, as well as the basis of informed decision-making in the future regarding how the resource should be managed) would result in negligible to minor, beneficial, long-term impacts. Preserving historic structures at Lodgepole and Wolverton that could be adaptively reused would have minor to moderate, beneficial, long-term impacts. In order to meet critical housing needs for the parks, new infill housing at Lodgepole and relocated housing from Wolverton would be provided, resulting in minor, adverse, long-term impacts on the setting of the potential historic district, but this action would be mitigated through consultation with the state historic preservation officer.

*Giant Forest* — As described for the no-action alternative, impacts as a result of preserving, rehabilitating, adaptively using, and interpreting the market, the ranger's residence and comfort station, and the Cattle cabin, Squatter's cabin, and Tharp's Log would continue to result in minor to moderate, beneficial, long-term impacts.

*Ash Mountain / Foothills* — Under the preferred alternative retaining trailers in the Sycamore housing area would result in a minor, adverse impact on the integrity of the potential Sycamore CCC camp historic district.

Other impacts on historic structures in the Ash Mountain / Foothills vicinity would be the same as those described for the no-action alternative:

- evaluating and preserving historic residences in the upper Ash Mountain housing area, the landscape of the potential Ash Mountain historic district, and structures in the potential Sycamore CCC camp historic district, including the recreation hall (if determined eligible for listing on the national register) — minor, beneficial, long-term impacts
- evaluating and preserving the historic Colony Mill Road as a trail — minor, beneficial, long-term impacts
- inventorying and evaluating Mission '66 structures and preserving any that were

determined eligible for listing on the National Register of Historic Places — minor to moderate, beneficial, long-term impacts

*Mineral King* — Impacts would be the same as for the no-action alternative:

- preserving contributing resources of the Mineral King Road Cultural Landscape District (the Atwell Mill ranger station, garage, and mill site, and the Lookout Point residence) — minor, beneficial, long-term impacts
- preserving the historic character (alignment and width) of the Mineral King Road corridor — minor, beneficial impacts over the long term
- allowing some mining remnants at Mineral King to molder — moderate to major, adverse, long-term impacts
- evaluating privately owned properties in Silver City for their national register eligibility — minor, beneficial, long-term impacts (properties cannot be listed without the owner's permission)

*Dillonwood* — As described for the no-action alternative, preserving any historic properties determined eligible for listing on the national register would result in direct, minor, long-term, beneficial impacts.

### ***Cumulative Impacts***

As described for the no-action alternative, over the years historic structures, districts, and cultural landscapes have been adversely impacted by wear and tear associated with visitor access, natural processes such as weathering and erosion, development, and the restoration of natural conditions in sequoia groves. Past construction projects, such as the Generals Highway improvements, hydroelectric production, and the development associated with Grant Grove, Cedar Grove, Lodgepole, and Mineral King, resulted in the loss of historic structures and the loss or alteration of landscape elements (structures, vegetation, circulation features, spatial organization, or land use patterns). In addition,

to protect and preserve the internationally significant sequoia groves (the primary reason that the parks were established), locally significant structures, districts, and landscapes in Sequoia and Kings Canyon National Parks were removed or altered. During 1998–99 most structures in the Giant Forest area (some of which dated back to the 1920s) were removed pursuant to a memorandum of agreement among the National Park Service, the California state historic preservation officer, and the Advisory Council on Historic Preservation. Only the ranger's residence, the comfort station, the market, and the Beetle Rock assembly hall were preserved. Adverse impacts associated with visitor access and natural processes were generally long term and negligible to minor in intensity, but the adverse impacts associated with the removal of historic structures and the loss or alteration of landscape elements were long term or permanent and of moderate to major intensity.

Concurrent or reasonably foreseeable future actions occurring throughout the region, such as the potential expansion of visitor facilities in Giant Sequoia National Monument, the growth of communities and subdivision development in Tulare County, and proposed improvements to California Highways 180 and 65 by Caltrans, have the potential to disturb historic structures, districts, and cultural landscapes outside the parks' boundaries. Unavoidable impacts to resources eligible for the national register could be adverse and range in intensity from minor to major, depending on the resources affected.

As described above, the preferred alternative would contribute minor to moderate, beneficial, long-term impacts, as well as moderate to major, adverse, long-term or permanent impacts, to the cumulative impacts of other past, present, and reasonably foreseeable future actions. The overall cumulative impact associated with the preferred alternative, however, would be adverse.

### ***Conclusion***

The preferred alternative would preserve cultural resources that portray the parks' diverse cultural

themes, with minor to moderate, beneficial, long-term effects for these properties. Removing some historic structures would generally have moderate to major, adverse, short- and long-term or permanent effects.

Despite some moderate to major, adverse, permanent impacts on individual locally significant cultural resource sites or districts, there would be no major adverse impacts on resources or values necessary to fulfill specific purposes identified in the enabling legislation or proclamations for the parks, or key to the natural or cultural integrity of the parks or to opportunities for the enjoyment of the parks. There would be no impairment of park resources or values.

**Summary: National Historic Preservation Act, Section 106**

In accordance with the regulations of the Advisory Council on Historic Preservation (36 CFR 800.5), the following actions within the parks would have no adverse effects:

- inventorying and evaluating all potentially eligible cultural resources in Sequoia and Kings Canyon National Parks to determine their eligibility for listing on the National Register of Historic Places, and submitting nomination forms to the keeper of the national register
- rebuilding the Generals Highway and its appurtenant structures, preserving historic structures in the vicinity of Giant Forest, or preserving historic properties in the backcountry (ranger cabins, the Mount Whitney shelter, the Pear Lake ski hut, cabins associated with the Shorty Lovelace Historic District)
- retaining, stabilizing, preserving, and adaptively using Knapp’s cabin, structures in the potential General Grant National Park Historic District, the Redwood Mountain residence, and NPS historic structures in the Wilsonia Historic District; managing the Big Stump Basin to maintain its visible logging history, as well as to illustrate a recovering giant sequoia grove

- preserving the Lost Creek comfort station and preserving and adaptively using the Cabin Creek ranger residence and dormitory; stabilizing / preserving historic structures in the potential Lodgepole, Wolverton, Ash Mountain, and Sycamore CCC camp historic districts; preserving the Colony Mill Road as a trail
- preserving the Atwell Mill ranger station and garage, the Atwell Mill site, the Lookout Point residence, and resources contributing to the Mineral King Road Cultural Landscape District; and maintaining / preserving the historic character of the Mineral King Road corridor (alignment and width)

This alternative would result in adverse effects to historic structures, districts, and landscapes within the parks from the following actions:

- removing structures at Lodgepole and Wolverton that could not be adaptively used (effects on the historic structures that were removed as well as the historic landscapes of those potential historic districts)
- allowing mining remnants at Mineral King to continue to molder

**Impacts of Alternative A**

**Analysis**

Under this alternative, as described for the no-action alternative, all potentially historic structures, districts, and landscapes would be inventoried and evaluated under National Register of Historic Places criteria to determine their eligibility for listing on the register, and the listing process would be completed for those resources that were determined eligible. Historic structures, districts, and landscapes would be preserved, rehabilitated, and adaptively used in accordance with the “Secretary’s Standards” and section 106 of the National Historic Preservation Act. Where adverse effects such as removal or neglect were unavoidable, mitigation measures would be determined through consultation with the California state historic preservation officer.

Key historic resources would be preserved and adaptively reused under alternative A, resulting in minor to moderate, beneficial, long-term impacts on those structures, districts, and landscapes afforded preservation treatment. However, implementation of this alternative could result in the removal of a number of historic structures that are associated with patterns of local history (private or permit recreation cabin communities at Wilsonia, Silver City, and Mineral King). Such removal would result in moderate to major, adverse, and long-term to permanent impacts on affected historic structures, districts, and landscapes.

As previously described, the undergrounding of utilities would have minimal, if any, effect on topography, spatial organization, or land use patterns of historic districts or cultural landscapes. If aboveground utilities were contributing elements to a historic district or cultural landscape, placing them underground would be a minor, adverse, long-term effect. Once the action was completed and the trench backfilled, the disturbed ground would be restored to its pre-construction contour and condition. Any adverse impacts associated with construction would be short term and negligible.

Historic structures could suffer wear and tear from increased visitation. Monitoring the carrying capacity of historic structures could result in the imposition of visitation levels or constraints that would contribute to the stability or integrity of the resources without unduly hindering interpretation for visitors. Unstaffed or minimally staffed structures could be more susceptible to vandalism. Any adverse impacts would be long term or permanent and range in intensity from negligible to minor.

**Generals Highway.** Continued rebuilding of the Generals Highway, as described under the no-action alternative, would have negligible to minor, adverse visual impacts during construction. Even though rebuilding the road would have some minor, permanent, adverse impacts because some historic fabric would be lost, rebuilding the road would result in overall minor to moderate, beneficial, and long-term impacts

for the preservation and safe use of this historically significant highway. Although actions under this alternative could result in changing use and visitor experience of Generals Highway, historic structures and landscapes associated with the highway would not change.

**Backcountry.** Preserving historic structures in the backcountry (such as historic ranger cabins, the Mount Whitney shelter, and the Pear Lake ski hut) if they were needed for park operations, would result in minor, beneficial, long-term impacts on those structures that were preserved. If structures could not be used, they would be recorded and allowed to deteriorate, subject to consultation with the state historic preservation officer, resulting in moderate to major, adverse, long-term impacts.

The surveys and research necessary to determine the eligibility of a structure, district, or landscape for listing on the National Register of Historic Places, as well as establish a basis for future resource management. Such surveys and research would result in negligible to minor, beneficial, long-term impacts.

**Kings Canyon National Park.** *Cedar Grove and the Floor of the Kings Canyon* — Conducting surveys and research necessary to determine the eligibility of a structure, district, or landscape for listing on the National Register of Historic Places, as well as establishing a basis for future resource management, would result in negligible to minor, beneficial, long-term impacts, the same as under the no-action alternative. Under alternative A, however, allowing Knapp's cabin to molder would have a moderate to major, adverse, long-term impact.

*Grant Grove* — Preserving some historic structures in the potential General Grant National Park Historic District, particularly structures in the Grant Grove village area that could be adaptively used for park operations and administration or for visitor services, would have minor to moderate, beneficial, long-term impacts on some historic structures. All other contributing resources in the historic district would eventually be recorded and removed, subject to consultation

with the state historic preservation officer, resulting in moderate to major, adverse, permanent impacts on the structures that were removed. Depending on how many structures were removed, the integrity of the historic district could be affected, with moderate to major, adverse, permanent impacts.

Preserving historic properties in the vicinity of the General Grant Tree, such as the Gamlin cabin, would result in minor, beneficial, long-term impacts.

Recording the Redwood Mountain residence and then removing it, subject to consultation with the state historic preservation officer, would result in a moderate to major, adverse, permanent impact because a historic resource would be lost.

Recording and removing NPS structures in the Wilsonia Historic District, subject to consultation with the state historic preservation officer, would result in moderate to major, adverse, permanent impacts to the historic district. Since all privately owned land would be acquired, all cabins in the Wilsonia Historic District would eventually be removed and the area returned to natural conditions. The removal of all cabins in the district would result in a moderate to major, adverse, permanent impact since the integrity of the district would be lost.

*Big Stump Basin* — If Big Stump Basin was determined eligible for listing on the National Register of Historic Places as a cultural landscape, managing the basin to illustrate a recovering giant sequoia grove would result in the area gradually becoming overgrown with vegetation and reducing the visual impact of logging. As described for the no-action alternative, the impact would be indirect, moderate to major, adverse, and permanent.

**Sequoia National Park. Lodgepole-Wuksachi** — Similar to the no-action alternative, the Lost Grove comfort station would be preserved, resulting in minor, beneficial, long-term impacts. However, under alternative A the Cabin Creek ranger residence and dormitory would be recorded and removed, subject to consultation

with the state historic preservation officer, resulting in moderate to major, adverse, permanent impacts to historic properties.

Historic structures, districts, and landscapes at Lodgepole and Wolverton would be surveyed and evaluated to determine their eligibility for listing on the National Register of Historic Places. At Lodgepole only historic structures that could be adaptively used would be preserved, resulting in minor to moderate, beneficial, long-term impacts for selected structures. However, the removal of other historic structures in consultation with the state historic preservation officer would result in moderate to major, adverse, permanent impacts. Recording and removing historic structures at Wolverton, subject to consultation with the state historic preservation officer, would result in moderate to major, adverse, permanent impacts to the potential historic district.

*Giant Forest* — As described for the no-action alternative, preserving, rehabilitating, and adaptively using historic Giant Forest structures (the market, the ranger's residence and comfort station, the Cattle cabin, Squatter's cabin, and Tharp's Log) would continue to result in minor to moderate, beneficial, long-term impacts since national register properties would be preserved.

*Ash Mountain / Foothills* — As described for the no-action alternative, historic structures and landscapes at Ash Mountain and the Sycamore CCC camp, as well as the Colony Mill Road, would be inventoried and evaluated to determine their eligibility for listing on the national register as historic districts and/or landscapes. A minimum number of housing units would be preserved in the upper Ash Mountain housing area, having minor, beneficial, long-term impacts on the potential historic district. Recording and removing other historic residential structures at Ash Mountain, along with historic residential structures at the Sycamore CCC camp and the CCC recreation hall at Ash Mountain, would result in moderate to major, adverse, permanent impacts. Maintaining and preserving the Colony Mill Road as a trail would result in minor, beneficial, long-term impacts to that resource.

*Mineral King* — Stabilizing and preserving historic structures that could be used for essential NPS functions and that contribute to the significance of the cultural landscape district (the Atwell Mill ranger station and garage, the mill site, and the Lookout Point residence) would result in minor, beneficial, long-term impacts to those resources, similar to the preferred alternative.

Evaluating privately owned properties in Silver City for their national register eligibility would result in minor, beneficial, long-term impacts, as described for the no-action alternative. (Properties cannot be listed without the owner's permission.)

Mining remnants at Mineral King would continue to be allowed to deteriorate, resulting in moderate to major, adverse, permanent impacts.

*Dillonwood* — The preservation of any historic properties that were determined to be eligible for listing on the National Register of Historic Places would result in minor, beneficial, long-term impacts, as described for the no-action alternative.

### ***Cumulative Impacts***

As described for the no-action alternative, over the years historic structures, districts, and cultural landscapes have been adversely impacted by wear and tear associated with visitor access, natural processes such as weathering and erosion, development, and the restoration of natural conditions in sequoia groves. Past construction projects, such as the Generals Highway improvements, hydroelectric production, and the development associated with Grant Grove, Cedar Grove, Lodgepole, and Mineral King, resulted in the loss of historic structures and the loss or alteration of landscape elements (structures, vegetation, circulation features, spatial organization, or land use patterns). In addition, to protect and preserve the internationally significant sequoia groves (the primary reason that the parks were established), locally significant structures, districts, and landscapes in Sequoia and Kings Canyon National Parks were removed

or altered. During 1998–99 most structures in the Giant Forest area (some of which dated back to the 1920s) were removed pursuant to a memorandum of agreement among the National Park Service, the California state historic preservation officer, and the Advisory Council on Historic Preservation. Only the ranger's residence, the comfort station, the market, and the Beetle Rock assembly hall were preserved. Adverse impacts associated with visitor access and natural processes were generally long term and negligible to minor in intensity, but the adverse impacts associated with the removal of historic structures and the loss or alteration of landscape elements were long term or permanent and of moderate to major intensity.

Concurrent or reasonably foreseeable future actions occurring throughout the region, such as the potential expansion of visitor facilities in Giant Sequoia National Monument, the growth of communities and subdivision development in Tulare County, and proposed improvements to California Highways 180 and 65 by Caltrans, have the potential to disturb historic structures, districts, and cultural landscapes outside the parks' boundaries. Unavoidable impacts to resources eligible for the national register could be adverse and range in intensity from minor to major, depending on the resources affected.

Alternative A would contribute minor to moderate, beneficial, long term impacts, as well as moderate to major, adverse, long-term or permanent impacts, to the cumulative impacts of other past, present, and reasonably foreseeable future actions. The overall cumulative impact associated with alternative A, however, would be adverse.

### ***Conclusion***

Alternative A would result in minor to moderate, beneficial, long-term impacts on historic structures, districts, and landscapes that would be preserved and adaptively used by the National Park Service for interpretive purposes or park operations. However, preserving only key cultural resources and removing others, or allowing them

to deteriorate, would generally have moderate to major, adverse, long-term to permanent impacts.

There would be no impairment of park resources or values.

**Summary: National Historic Preservation Act, Section 106**

In accordance with the regulations of the Advisory Council on Historic Preservation (36 CFR 800.5), the following actions within the parks would have no adverse effects:

- inventorying and evaluating all potentially eligible cultural resources in Sequoia and Kings Canyon National Parks to determine their eligibility for listing on the National Register of Historic Places, and submitting nomination forms to the keeper of the national register
- rebuilding the Generals Highway and its appurtenant structures, preserving historic structures in the vicinity of Giant Forest, or preserving historic properties in the backcountry that could be utilized (e.g., ranger cabins, the Mount Whitney shelter, the Pear Lake ski hut)
- preserving and adaptively using selected structures in the potential General Grant National Park Historic District
- preserving the Lost Creek comfort station, structures at Lodgepole that could be adaptively used, and a minimum number of housing units in the upper Ash Mountain housing area; preserving the Colony Mill Road as a trail
- preserving the Atwell Mill ranger station and garage, the Atwell Mill site, the Look-out Point residence and garage, and resources contributing to the Mineral King Road Cultural Landscape District; and maintaining / preserving the historic character of the Mineral King Road corridor (alignment and width)

This alternative would result in adverse effects to historic structures, districts, and landscapes within the parks from the following actions:

- removing the Redwood Mountain residence, structures in the potential General Grant National Park Historic District that could not be used, and NPS and privately owned structures in the Wilsonia Historic District; managing the Big Stump Basin (if determined eligible as a historic landscape) as a recovering giant sequoia grove, resulting in the area gradually returning to natural conditions
- removing the Cabin Creek ranger residence and dormitory, historic structures at Lodgepole and the upper Ash Mountain housing area that could not be used, and all historic structures at Wolverton, the Sycamore CCC camp, and the CCC recreation hall at Ash Mountain
- removing backcountry structures if they could not be adaptively reused
- allowing mining remnants at Mineral King to continue to molder

## Impacts of Alternative C

### Analysis

Under this alternative, as described for the no-action alternative, all potentially historic structures, districts, and landscapes would be inventoried and evaluated under National Register of Historic Places criteria to determine their eligibility for listing on the register, and the listing process would be completed for those resources that were determined eligible. Historic structures, districts, and landscapes would be preserved, rehabilitated, and adaptively used in accordance with the “Secretary’s Standards” and section 106 of the National Historic Preservation Act. Where adverse effects such as removal or neglect were unavoidable, mitigation measures would be determined through consultation with the California state historic preservation officer.

As previously described, the undergrounding of utilities would have minimal, if any, effect on the existing topography, spatial organization, or land use patterns of historic districts or cultural landscapes. If aboveground utilities were contributing elements to a historic district or cultural

landscape, placing them underground would be a minor, adverse, long-term effect. Once the action was completed and the trench backfilled, the disturbed ground would be restored to its pre-construction contour and condition. Any adverse impacts associated with construction would be short term and negligible.

Careful design would ensure that the rehabilitation of parking areas and the expansion or development of trails would minimally affect the scale and visual relationships among landscape features. In addition, the topography, vegetation, circulation features, and land use patterns of any historic district or cultural landscape would remain largely unaltered. Any adverse impacts would be long term or permanent and range in intensity from negligible to minor.

Historic structures could suffer wear and tear from increased visitation. Monitoring the carrying capacity of historic structures could result in the imposition of visitation levels or constraints that would contribute to the stability or integrity of the resources without unduly hindering interpretation for visitors. Unstaffed or minimally staffed structures could be more susceptible to vandalism. Any adverse impacts would be long term or permanent and range in intensity from negligible to minor.

**Generals Highway.** Continued rebuilding of the Generals Highway, as described under the no-action alternative, would have negligible to minor, adverse visual impacts during construction. Even though rebuilding the road would have some minor, permanent, adverse impacts because some historic fabric would be lost, rebuilding the road would result in overall minor to moderate, beneficial, and long-term impacts for the preservation and safe use of this historically significant highway. Although actions under this alternative could result in changing use and visitor experience of Generals Highway, historic structures and landscapes associated with the highway would not change.

**Backcountry.** The impacts of preserving historic structures in the backcountry would be minor, beneficial, and long term, the same as for

the no-action alternative. However, information would be provided to park visitors regarding selected historic backcountry areas, which could cause increased use in these areas and result in indirect, negligible to minor, long-term, adverse impacts on these resources.

**Kings Canyon National Park.** *Cedar Grove and the Floor of the Kings Canyon* — Impacts would be the same as for the no-action alternative:

- preserving Knapp's cabin — minor, beneficial, long-term impact
- conducting surveys and research necessary to determine the eligibility of a structure, district, or landscape for listing on the National Register of Historic Places, as well as establishing a basis for future resource management — negligible to minor, beneficial, long-term impacts

*Grant Grove* — Under this alternative NPS-owned historic structures in the Wilsonia Historic District would be preserved and adaptively reused. Privately owned structures would not be affected. This would result in minor to moderate, beneficial, long-term impacts (the same as the preferred alternative).

The following impacts would be the same as the no-action alternative:

- preserving and adaptively using structures contributing to the significance of the General Grant National Park Historic District — minor to moderate, beneficial, long-term impacts
- preserving the Redwood Mountain residence and historic structures in the vicinity of the General Grant Tree (such as the Gamlin cabin) — minor, beneficial, long-term impacts

*Big Stump Basin* — If Big Stump Basin was determined eligible for listing on the National Register of Historic Places, managing the basin to maintain its visible logging history would result in minor, beneficial, long-term impacts on the historic landscape.

**Sequoia National Park. Lodgepole-Wuksachi**

— As described for the no-action alternative, the impacts of preserving the Cabin Creek ranger residence and dormitory and the Lost Grove comfort station would be minor to moderate, long term, and beneficial.

Surveys and research necessary to determine the eligibility of a structure, district, or landscape for listing on the National Register of Historic Places, as well as establishing a basis for future resource management, would result in negligible to minor, beneficial, long-term impacts. However, as a result of a housing shortage, new infill housing at Lodgepole and relocated housing (from Wolverton) would result in minor to moderate, adverse, long-term impacts on the potential historic district (the same as the preferred alternative). Other structures at Wolverton would be removed if they could not be rehabilitated and adaptively used, resulting in moderate to major, adverse, permanent impacts. These actions would be taken in consultation with the state historic preservation officer.

*Giant Forest* — As described for the no-action alternative, preserving, rehabilitating, and adaptively using historic Giant Forest structures (the market, the ranger’s residence and comfort station, the Cattle cabin, Squatter’s cabin, and Tharp’s Log) would continue to result in minor to moderate, beneficial, long-term impacts.

*Ash Mountain / Foothills* — The following impacts on historic structures in the Ash Mountain / foothills vicinity would be the same as for the no-action alternative:

- evaluating and preserving historic residences in the upper Ash Mountain housing area, the landscape of the potential Ash Mountain historic district, and structures in the potential Sycamore CCC camp historic district, including the recreation hall (if determined eligible for listing on the national register) — minor, beneficial, long-term impacts
- rehabilitating the historic Colony Mill Road as a historic right-of-way — moderate, beneficial, long-term impacts

- inventorying and evaluating Mission ‘66 structures and preserving any that were determined eligible for listing on the National Register of Historic Places — minor, beneficial, long-term impacts

*Mineral King* — The following impacts would be the same as the no-action alternative:

- preserving contributing resources of the Mineral King Road Cultural Landscape District (the Atwell Mill ranger station and mill site, and the Lookout Point residence) — minor, beneficial, long-term impacts
- allowing mining remnants at Mineral King to continue to molder — moderate to major, adverse, long-term impacts
- preserving the historic character (alignment and width) of the Mineral King Road corridor — minor, beneficial impacts over the long term
- evaluating privately owned properties in Silver City for their national register eligibility — minor, beneficial, long-term impacts (properties cannot be listed without the owner’s permission)

*Dillonwood* — As described for the no-action alternative, preserving any historic properties determined eligible for the national register would result in minor, beneficial, long-term impacts.

***Cumulative Impacts***

As described for the no-action alternative, over the years historic structures, districts, and cultural landscapes have been adversely impacted by wear and tear associated with visitor access, natural processes such as weathering and erosion, development, and the restoration of natural conditions in sequoia groves. Past construction projects, such as the Generals Highway improvements, hydroelectric production, and the development associated with Grant Grove, Cedar Grove, Lodgepole, and Mineral King, resulted in the loss of historic structures and the loss or alteration of landscape elements (structures, vegetation, circulation features, spatial organization, or land use patterns). In addition,

to protect and preserve the internationally significant sequoia groves (the primary reason that the parks were established), locally significant structures, districts, and landscapes in Sequoia and Kings Canyon National Parks were removed or altered. During 1998–99 most structures in the Giant Forest area (some of which dated back to the 1920s) were removed pursuant to a memorandum of agreement among the National Park Service, the California state historic preservation officer, and the Advisory Council on Historic Preservation. Only the ranger’s residence, the comfort station, the market, and the Beetle Rock assembly hall were preserved. Adverse impacts associated with visitor access and natural processes were generally long term and negligible to minor in intensity, but the adverse impacts associated with the removal of historic structures and the loss or alteration of landscape elements were long term or permanent and of moderate to major intensity.

Concurrent or reasonably foreseeable future actions occurring throughout the region, such as the potential expansion of visitor facilities in Giant Sequoia National Monument, the growth of communities and subdivision development in Tulare County, and proposed improvements to California Highways 180 and 65 by Caltrans, have the potential to disturb historic structures, districts, and cultural landscapes outside the parks’ boundaries. Unavoidable impacts to resources eligible for the national register could be adverse and range in intensity from minor to major, depending on the resources affected.

Alternative C would contribute minor to moderate, beneficial, long-term impacts, as well as moderate to major, adverse impacts that were long term or permanent, to the cumulative impacts of other past, present, and reasonably foreseeable future actions. Because of the greater emphasis on the preservation of historic resources under alternative C, the beneficial impacts associated with this alternative would be a larger component of any overall cumulative impact than with any of the other alternatives.

### ***Conclusion***

This alternative would provide for the preservation of more historic structures, districts, and landscapes than under any of the other alternatives, and impacts would be generally minor to moderate, beneficial, and long term.

Despite some moderate to major, adverse, permanent impacts on individual locally significant cultural resource sites or districts, there would be no major adverse impacts on resources or values necessary to fulfill specific park purposes, or key to the natural or cultural integrity of the parks or to opportunities for the enjoyment of the parks. There would be no impairment of park resources or values.

### ***Summary: National Historic Preservation Act, Section 106***

In accordance with the regulations of the Advisory Council on Historic Preservation (36 CFR 800.5), the following actions would have no adverse effects within the parks:

- inventorying and evaluating all potentially eligible cultural resources in Sequoia and Kings Canyon National Parks to determine their eligibility for listing on the National Register of Historic Places, and submitting nomination forms to the keeper of the national register
- rebuilding the Generals Highway and its appurtenant structures, preserving historic structures in the vicinity of Giant Forest, or preserving historic properties in the backcountry (ranger cabins, the Mount Whitney shelter, the Pear Lake ski hut, cabins associated with the Shorty Lovelace Historic District)
- stabilizing, preserving, and adaptively using Knapp’s cabin, structures in the potential General Grant National Park Historic District, the Redwood Mountain residence, and NPS historic structures in the Wilsonia Historic District; managing the Big Stump Basin to maintain its visible logging history
- preserving the Lost Creek comfort station and preserving and adaptively using the

Cabin Creek ranger residence and dormitory; preserving / adaptively using eligible structures in the potential Lodgepole, Wolverton, Ash Mountain, and Sycamore CCC camp historic districts; rehabilitating the Colony Mill Road as a historic right-of-way

- preserving the Atwell Mill ranger station and garage, the Atwell Mill site, the Look-out Point residence, and resources contributing to the Mineral King Road Cultural Landscape District; and maintaining / preserving the historical character of the Mineral King Road corridor (alignment and width)

This alternative would result in adverse effects to historic structures, districts, and landscapes within the parks from the following actions:

- relocating a residence from Wolverton to Lodgepole, and removing structures at Lodgepole and Wolverton that could not be adaptively reused
- allowing mining remnants in the Mineral King area to continue to molder

## Impacts of Alternative D

### *Analysis*

Under this alternative, as described for the no-action alternative, all potentially historic structures, districts, and landscapes would be inventoried and evaluated under National Register of Historic Places criteria to determine their eligibility for listing on the register, and the listing process would be completed for those resources that were determined eligible. Historic structures, districts, and landscapes would be preserved, rehabilitated, and adaptively used in accordance with the “Secretary’s Standards” and section 106 of the National Historic Preservation Act. Where adverse effects such as removal or neglect were unavoidable, mitigation measures would be determined through consultation with the California state historic preservation officer.

Actions related to cultural resources under alternative D would generally be minor to moderate, beneficial, and long term since most historic resources would be retained and preserved (with

the exception of the potential historic district at Lodgepole).

As previously described, the undergrounding of utilities would have minimal, if any, effect on the existing topography, spatial organization, or land use patterns of historic districts or cultural landscapes. If aboveground utilities were contributing elements to a historic district or cultural landscape, placing them underground would be a minor, adverse, long-term effect. Once the action was completed and the trench backfilled, the disturbed ground would be restored to its pre-construction contour and condition. Any adverse impacts associated with construction would be short term and negligible.

Careful design would ensure that the rehabilitation of parking areas and the expansion or development of trails would minimally affect the scale and visual relationships among landscape features. In addition, the topography, vegetation, circulation features, and land use patterns of any historic district or cultural landscape would remain largely unaltered. Any adverse impacts would be long term or permanent and range in intensity from negligible to minor.

Historic structures could suffer wear and tear from increased visitation. Monitoring the structures’ carrying capacity could result in the imposition of visitation levels or constraints that would contribute to the stability or integrity of the resources without unduly hindering interpretation for visitors. Unstaffed or minimally staffed structures could be more susceptible to vandalism. Any adverse impacts would be long term or permanent and range in intensity from negligible to minor.

**Generals Highway.** Continued rebuilding of the Generals Highway, as described under the no-action alternative, would have negligible to minor, adverse visual impacts during construction. Even though rebuilding the road would have some minor, permanent, adverse impacts because some historic fabric would be lost, rebuilding the road would result in overall minor to moderate, beneficial, and long-term impacts for the preservation and safe use of this historically significant

highway. Although actions under this alternative could result in changing use and visitor experience of Generals Highway, historic structures and landscapes associated with the highway would not change.

Under alternative D steps would be undertaken to identify and facilitate the use of additional features (some of which were previously closed sites, e.g., sequoia groves) along the highway corridor to disperse visitation and facilitate its use as a bus transportation corridor. Efforts would also be undertaken to have the highway designated as an “All-American Road.” Although these actions could result in changing use and visitor experience of the roadway, the impacts of this alternative on historic structures and landscapes associated with the Generals Highway would be the same as those described for the no-action alternative.

**Backcountry.** The impacts of preserving historic structures in the backcountry would be minor, beneficial, and long term, the same as for the no-action alternative. However, similar to alternative C, information would be provided to park visitors regarding selected historic backcountry areas, which could cause increased use in these areas and result in negligible to minor, adverse, long-term impacts on these resources.

**Kings Canyon National Park.** *Cedar Grove and the Floor of the Kings Canyon* — Impacts would be the same as for the no-action alternative:

- preserving Knapp’s cabin — minor, beneficial, long-term impact
- conducting surveys and research necessary to determine the eligibility of a structure, district, or landscape for listing on the National Register of Historic Places, as well as establishing a basis for future resource management — negligible to minor, beneficial, long-term impacts

*Grant Grove* — The following impacts would be the same as the no-action alternative:

- preserving and adaptively using structures contributing to the significance of the Gen-

eral Grant National Park Historic District — minor to moderate, beneficial, long-term impacts

- preserving the Redwood Mountain residence and historic structures in the vicinity of the General Grant Tree (such as the Gamlin cabin) — minor, beneficial, long-term impacts

Under this alternative NPS-owned historic structures in the Wilsonia Historic District would be preserved and adaptively reused. This would result in minor to moderate, beneficial, long-term impacts (the same as the preferred alternative and alternative C). Privately owned structures in the Wilsonia Historic District could either (1) be removed for public use of the land, resulting in major, adverse, permanent impacts since the historic district would not retain its integrity, or (2) be preserved with no change in management, resulting in minor, beneficial, long-term impacts on the historic district.

*Big Stump Basin* — As described under the no-action alternative, the National Park Service would evaluate the Big Stump Basin under the criteria of the National Register of Historic Places to determine its eligibility for listing on the national register as a historic landscape. Like the preferred alternative, if this area was eligible for listing, management of the basin to maintain its visible logging history, as well as to illustrate a recovering giant sequoia grove, would result in minor, beneficial, long-term impacts on the historic landscape. However, the inevitable loss of cultural landscape values in part of the basin managed as a recovering sequoia grove would have moderate to major, adverse, long-term impacts on potential cultural landscape features.

**Sequoia National Park.** *Lodgepole-Wuksachi* — The impacts of adaptively using the Cabin Creek ranger residence and dormitory and preserving the Lost Grove comfort station would be minor to moderate, beneficial, and long term, as described for the no-action alternative.

Residential areas at Lodgepole would be removed to provide additional public use space, adversely affecting a potential historic district.

Recording and removing all structures and landscapes at Lodgepole under this alternative would have moderate to major, adverse, permanent impacts since the resources that contribute to the significance of the potential district would be lost. At Wolverton recording and removing historic structures and landscapes that cannot be rehabilitated and adaptively used would also result in moderate to major, adverse, permanent impacts.

*Giant Forest* — As described for the no-action alternative, preserving, rehabilitating, and adaptively using historic Giant Forest structures (the market, the ranger's residence and comfort station, the Cattle cabin, Squatter's cabin, and Tharp's Log) would continue to result in minor to moderate, beneficial, long-term impacts.

*Ash Mountain / Foothills* — Under alternative D preserving some historic residences in the upper Ash Mountain housing area to provide seasonal and required housing would have minor, beneficial, long-term impacts. However, recording and removing other historic residential structures at Ash Mountain, along with historic residential structures at the Sycamore CCC camp, would result in moderate to major, adverse, permanent impacts on any potential historic landscape districts at Ash Mountain and the CCC camp. Preserving the CCC recreation hall at Ash Mountain would have a minor, beneficial, long-term impact (the same as the no-action alternative). Preserving Colony Mill Road and designating it as a bicycle trail would have a minor, beneficial, long-term impact.

*Mineral King* — The following impacts would be the same as the no-action alternative:

- preserving contributing resources of the Mineral King Road Cultural Landscape District (the Atwell Mill ranger station and mill site, the Lookout Point residence) — minor, beneficial, long-term impacts
- allowing mining remnants at Mineral King to continue to molder — moderate to major, adverse, long-term impacts
- evaluating privately owned properties in Silver City for their national register eligi-

bility — minor, beneficial, long-term impacts (properties cannot be listed without the owner's permission)

*Dillonwood* — As described for the no-action alternative, preserving any historic properties determined eligible for the national register would result in minor, beneficial, long-term impacts.

### ***Cumulative Impacts***

As described for the no-action alternative, over the years historic structures, districts, and cultural landscapes have been adversely impacted by wear and tear associated with visitor access, natural processes such as weathering and erosion, development, and the restoration of natural conditions in sequoia groves. Past construction projects, such as the Generals Highway improvements, hydroelectric production, and the development associated with Grant Grove, Cedar Grove, Lodgepole, and Mineral King, resulted in the loss of historic structures and the loss or alteration of landscape elements (structures, vegetation, circulation features, spatial organization, or land use patterns). In addition, to protect and preserve the internationally significant sequoia groves (the primary reason that the parks were established), locally significant structures, districts, and landscapes in Sequoia and Kings Canyon National Parks were removed or altered. During 1998–99 most structures in the Giant Forest area (some of which dated back to the 1920s) were removed pursuant to a memorandum of agreement among the National Park Service, the California state historic preservation officer, and the Advisory Council on Historic Preservation. Only the ranger's residence, the comfort station, the market, and the Beetle Rock assembly hall were preserved. Adverse impacts associated with visitor access and natural processes were generally long term and negligible to minor in intensity, but the adverse impacts associated with the removal of historic structures and the loss or alteration of landscape elements were long term or permanent and of moderate to major intensity.

Concurrent or reasonably foreseeable future actions occurring throughout the region, such as the potential expansion of visitor facilities in

Giant Sequoia National Monument, the growth of communities and subdivision development in Tulare County, and proposed improvements to California Highways 180 and 65 by Caltrans, have the potential to disturb historic structures, districts, and cultural landscapes outside the parks' boundaries. Unavoidable impacts to resources eligible for the national register could be adverse and range in intensity from minor to major, depending on the resources affected.

Alternative D would contribute minor to moderate, beneficial, long-term impacts, as well as moderate to major, adverse, long-term or permanent impacts, to the cumulative impacts of other past, present, and reasonably foreseeable future actions. The overall cumulative impact associated with alternative D, however, would be adverse.

### ***Conclusion***

Under alternative D preserving a full spectrum of cultural resources that portray diverse park themes would result in generally minor to moderate, beneficial, long-term impacts. Loss of resources contributing to the significance of the potential Lodgepole historic district would result in moderate to major, adverse, permanent impacts.

Despite some moderate to major, adverse, permanent impacts on individual locally significant cultural resource sites or districts, there would be no major adverse impacts on resources or values necessary to fulfill specific park purposes, or key to the natural or cultural integrity of the parks or to opportunities for the enjoyment of the parks. There would be no impairment of park resources or values.

### ***Summary: National Historic Preservation Act, Section 106***

In accordance with the regulations of the Advisory Council on Historic Preservation (36 CFR 800.5), the following actions would have no adverse effects within the national parks:

- inventorying and evaluating all potentially eligible cultural resources in Sequoia and

Kings Canyon National Parks to determine their eligibility for listing on the National Register of Historic Places, and submitting nomination forms to the keeper of the national register

- rebuilding Generals Highway and appurtenant structures, preserving historic structures in the vicinity of Giant Forest, or preserving historic properties in the backcountry (ranger cabins, the Mount Whitney shelter, the Pear Lake ski hut)
- preserving, and adaptively using Knapp's cabin, structures in the potential General Grant National Park Historic District, the Redwood Mountain residence, and NPS historic structures in the Wilsonia Historic District; managing the Big Stump Basin to maintain its visible logging history as well as a recovering sequoia grove
- preserving the Lost Creek comfort station; preserving and adaptively using the Cabin Creek ranger residence and dormitory; preserving the CCC-era recreation hall at Ash Mountain; preserving the Colony Mill Road as a bike trail
- preserving the Atwell Mill ranger station and garage, the Atwell Mill site, the Lookout Point residence, and resources contributing to the Mineral King Road Cultural Landscape District; and maintaining / preserving the historical character of the Mineral King Road corridor (alignment and width)

This alternative would result in adverse effects to historic structures, districts, and landscapes from the following actions:

- removing historic structures at Wolverton if they could not be adaptively used; recording and removing historic residential structures at Lodgepole
- removing structures at the Ash Mountain residential area and the Sycamore CCC camp

## ARCHEOLOGICAL RESOURCES

### Impacts of the No-Action Alternative

#### *Analysis*

Prior to the demolition of any structure listed on or eligible for the National Register of Historic Places, a survey for archeological resources in the general vicinity of the affected structure would be conducted. The excavation, recordation, and mapping of any significant cultural remains, if present, would be completed prior to demolition to ensure that important archeological data that otherwise would be lost was recovered and documented. Any impacts to archeological resources would be adverse, minor to moderate in intensity, and permanent.

As appropriate, archeological surveys and/or monitoring would precede any construction. Known archeological resources would be avoided to the greatest extent possible. If national register eligible or listed archeological resources could not be avoided, an appropriate mitigation strategy would be developed in consultation with the state historic preservation officer and, if necessary, associated American Indian tribes. Any adverse impacts to archeological resources would be minor to moderate in intensity and long term or permanent in duration.

If during construction previously undiscovered archeological resources were uncovered, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented and an appropriate mitigation strategy developed in consultation with the state historic preservation officer and, if necessary, associated American Indian tribes. Any adverse impacts to archeological resources associated with inadvertent discoveries would be minor to moderate in intensity and long term or permanent in duration.

The Groenfeldt archeological site, which is listed on the National Register of Historic Places, is in a remote, backcountry area on sloping terrain and away from any trails. Incidences of inadvertent disturbance and vandalism

are unlikely. Any adverse impacts to this site would be negligible to minor and long term.

Continued visitation to the Hospital Rock archeological site, which is also listed on the National Register of Historic Places, could result in negligible to minor, adverse, and long-term impacts from incidences of inadvertent disturbance and vandalism.

Potential impacts to archeological resources resulting from stock use and erosion would be negligible to minor in intensity, adverse, and long term or permanent.

#### *Cumulative Impacts*

Archeological resources at Sequoia and Kings Canyon National Parks are subject to potential damage from development, stock grazing and horse use, visitor access, and natural processes such as erosion. Past development in the parks, and associated excavation and construction activities — for example the recent construction of visitor facilities in the Giant Forest and at Grant Grove and Wuksachi, as well as the past construction of the Generals Highway, the Potwisha campground, CCC camps, and hydroelectric facilities — resulted in ground disturbance near archeological resources. Incidences of inadvertent disturbance or vandalism associated with visitor access, as well as the erosional impacts related to stock grazing, horse use, and weather, have also disturbed archeological resources. Impacts to archeological resources resulting from past development, stock grazing, visitor access, and erosion were minor to major, adverse, and long term or permanent.

Reasonably foreseeable future actions occurring throughout the region, such as the potential expansion of visitor facilities in Giant Sequoia National Monument, the growth of communities and subdivision development in Tulare County, and proposed improvements to California Highways 180 and 65, have the potential to disturb archeological resources outside the parks' boundaries. Unavoidable adverse impacts to archeological resources that are eligible for listing on the National Register of Historic

*Impact Thresholds for Archeological Resources*

**Negligible** — The impact would be at the lowest levels of detection, with neither adverse nor beneficial consequences. The determination of effect under section 106 of the National Historic Preservation Act would be *no adverse effect*.

**Minor** — Adverse impact: Disturbance of a site or sites would result in little, if any, loss of integrity. The determination of effect under section 106 would be *no adverse effect*.

Beneficial impact: A site or sites would be maintained and preserved. The determination of effect under section 106 would be *no adverse effect*.

**Moderate** — Adverse impact: Disturbance of a site or sites would result in the loss of integrity. The determination of effect under section 106 would be *adverse effect*. A memorandum of agreement would be executed among the National Park Service 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 the National Environmental Policy Act from major to moderate.

Beneficial impact: A site or sites would be stabilized. The determination of effect under section 106 would be *no adverse effect*.

**Major** — Adverse impact: Disturbance of a site or sites would result in the loss of integrity. The determination of effect under section 106 would be *adverse effect*. Measures to minimize or mitigate adverse impacts could not be agreed upon, and the National Park Service and applicable state or tribal historic preservation officer and/or Advisory Council on Historic Preservation would be unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).

Beneficial impact: There would be active intervention to preserve a site or sites. The determination of effect under section 106 would be *no adverse effect*.

**Criteria for Determining Impairment**

An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the park’s general management plan or other relevant NPS planning documents.

Places could range in intensity from minor to major, and long term or permanent in duration.

The no-action alternative would potentially contribute negligible to moderate, adverse, long-term or permanent impacts to the cumulative impacts of other past, present, and reasonably foreseeable future actions. The adverse impacts to archeological resources associated with the no-action alternative, however, would be a relatively small component of any overall cumulative impact.

**Conclusion**

Potential impacts to archeological resources associated with the removal of historic structures would be adverse, minor to moderate in intensity, and permanent. Known archeological resources would be avoided to the greatest extent possible during the construction of picnic areas and the rehabilitation of parking areas and trails. If national register eligible or listed archeological resources could not be avoided, any adverse impacts would be minor to moderate in intensity and long term or permanent. Long-term, potential impacts to archeological sites from visitor

use would be adverse but negligible to minor in intensity. Potential impacts to archeological resources resulting from stock use and erosion would be negligible to minor in intensity, adverse, and long term or permanent.

Because there would be no major, adverse impacts to a resource or value necessary to fulfill specific purposes identified in the enabling legislation for the parks, or that is key to the natural or cultural integrity of the parks or for opportunities for the enjoyment of the parks, there would be no impairment of park resources or values.

***Summary: National Historic Preservation Act, Section 106***

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5), the National Park Service concludes that this alternative would have no adverse effect on the Groenfeldt and Hospital Rock archeological sites, both of which are listed on the national register.

**Impacts of the Preferred Alternative**

***Analysis***

Prior to demolition of any structure listed on or eligible for listing on the National Register of Historic Places, a survey for archeological resources in the general vicinity of the affected structure would be conducted. The excavation, recordation, and mapping of any significant cultural remains, if present, would be completed prior to demolition to ensure that important archeological data that otherwise would be lost would be recovered and documented. Any impacts to archeological resources would be adverse, minor to moderate in intensity, and permanent.

As appropriate, archeological surveys and/or monitoring would precede any construction. Known archeological resources would be avoided to the greatest extent possible during the undergrounding of utilities, the construction of picnic areas, the rehabilitation of parking areas and trails, and the upgrading of visitor facilities.

If archeological resources eligible for or listed on the national register could not be avoided, an appropriate mitigation strategy would be developed in consultation with the state historic preservation officer and, if necessary, associated American Indian tribes. Any adverse impacts to archeological resources would be minor to moderate in intensity and long term or permanent in duration.

If previously undiscovered archeological resources were uncovered during construction, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented and an appropriate mitigation strategy developed in consultation with the state historic preservation officer and, if necessary, associated American Indian tribes. Any adverse impacts to archeological resources associated with inadvertent discoveries would be minor to moderate in intensity and long term or permanent in duration.

The Groenfeldt archeological site, which is listed on the National Register of Historic Places, is in a remote, backcountry area on sloping terrain and away from any trails. Incidences of inadvertent disturbance and vandalism are unlikely. Any adverse impacts to this site would be negligible to minor and long term.

Continued visitation to the Hospital Rock archeological site, which is also listed on the National Register of Historic Places, could result in negligible to minor, adverse, and long term impacts from incidences of inadvertent disturbance and vandalism.

Potential impacts to archeological resources resulting from stock use and erosion would be adverse, long term or permanent, and negligible to minor in intensity.

***Cumulative Impacts***

As described for the no-action alternative, past development in the parks, and associated excavation and construction activities — for example the recent construction of visitor facilities in the

Giant Forest and at Grant Grove and Wuksachi, as well as the past construction of the Generals Highway, the Potwisha campground, CCC camps, and hydroelectric facilities — resulted in ground disturbance near archeological resources. Incidences of inadvertent disturbance or vandalism associated with visitor access, as well as the erosional impacts related to stock grazing, horse use, and weather, have also disturbed archeological resources. Resulting impacts were minor to major, adverse, and long term or permanent.

Reasonably foreseeable future actions occurring throughout the region, such as the potential expansion of visitor facilities in Giant Sequoia National Monument, the growth of communities and subdivision development in Tulare County, and proposed improvements to California Highways 180 and 65, have the potential to disturb archeological resources outside the parks' boundaries. Unavoidable adverse impacts to archeological resources that are eligible for listing on the National Register of Historic Places could range in intensity from minor to major, and could be long term or permanent in duration.

The preferred alternative would potentially contribute negligible to moderate, adverse, long-term or permanent impacts to the cumulative impacts of other past, present, and reasonably foreseeable future actions. The adverse impacts to archeological resources associated with the preferred alternative, however, would be a small component of any overall adverse cumulative impacts.

### ***Conclusion***

Potential impacts to archeological resources associated with the removal of historic structures would be adverse, minor to moderate in intensity, and permanent. Known archeological resources would be avoided to the greatest extent possible during the undergrounding of utilities, the construction of picnic areas, the rehabilitation of parking areas and trails, and the upgrading of visitor facilities. If archeological resources eligible for or listed on the national register could not be avoided, any adverse im-

acts would be minor to moderate in intensity and long term or permanent in duration. Long-term, potential impacts to archeological sites from visitor use would be adverse but negligible to minor in intensity. Potential impacts to archeological resources from stock use and erosion could be adverse, negligible to minor in intensity, and long term or permanent.

Because there would be no major, adverse impacts to a resource or value necessary to fulfill specific purposes identified in the parks' enabling legislation, or that is key to the natural or cultural integrity of the parks or for opportunities for the enjoyment of the parks, there would be no impairment of park resources or values.

### ***Summary: National Historic Preservation Act, Section 106***

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5), the National Park Service concludes that implementation of this alternative would have no adverse effect on the Groenfeldt and Hospital Rock archeological sites, both of which are listed on the national register.

## **Impacts of Alternative A**

### ***Analysis***

Similar to the no-action alternative, archeological surveys and/or monitoring would precede any construction, as appropriate. During the rehabilitation of parking areas and the removal of trails or campgrounds under alternative A known archeological resources would be avoided to the greatest extent possible. If archeological resources eligible for or listed on the national register could not be avoided, an appropriate mitigation strategy would be developed in consultation with the state historic preservation officer and, if necessary, associated American Indian tribes. Similar to the no-action alternative, any adverse impacts to archeological resources would be minor to moderate in intensity and long term or permanent in duration.

The following actions and resulting impacts on archeological resources would be similar to those described for the no-action alternative:

- conducting a survey for archeological resources in the general vicinity of any structure to be demolished and that is listed on or eligible for the National Register of Historic Places, and recording and mapping any significant cultural remains, if present, to recover and document important archeological data — adverse, minor to moderate, permanent impacts if archeological resources were present
- halting construction work if previously undiscovered archeological resources were uncovered until the resources could be identified and documented and an appropriate mitigation strategy developed in consultation with the state historic preservation officer and, if necessary, associated American Indian tribes — minor to moderate, adverse, long-term or permanent impacts if resources were present
- continued access to the Groenfeldt archeological site — negligible to minor, adverse, long-term impacts because of its remote location and unlikely incidences of inadvertent disturbance or vandalism
- continued use at the Hospital Rock archeological site — negligible to minor, adverse, long-term impacts from incidences of inadvertent disturbance and vandalism as a result of continued visitation
- stock use and erosion — negligible to minor, adverse, long-term or permanent impacts

### ***Cumulative Impacts***

As described for the no-action alternative, past development in the parks, and associated excavation and construction activities resulted in ground disturbance near archeological resources. Incidences of inadvertent disturbance or vandalism associated with visitor access, as well as the erosional impacts related to stock grazing, horse use, and weather, have also disturbed archeo-

logical resources. Resulting impacts were minor to major, adverse, and long term or permanent.

Reasonably foreseeable future actions, such as the potential expansion of visitor facilities in Giant Sequoia National Monument, the growth of communities and subdivision development in Tulare County, and proposed improvements to California Highways 180 and 65, could disturb archeological resources outside the parks' boundaries. Unavoidable adverse impacts to archeological resources that are eligible for listing on the National Register of Historic Places could range from minor to major in intensity and be long term or permanent in duration.

Alternative A would potentially contribute negligible to moderate, adverse, long-term or permanent impacts to the cumulative impacts of other past, present, and reasonably foreseeable future actions. The adverse impacts to archeological resources associated with alternative A, however, would be a relatively small component of any overall adverse cumulative impact.

### ***Conclusion***

Potential impacts to archeological resources associated with the removal of historic structures would be adverse, minor to moderate in intensity, and permanent. Known archeological resources would be avoided to the greatest extent possible during the rehabilitation of parking areas and the removal of trails or campgrounds. If archeological resources eligible for or listed on the national register could not be avoided, any adverse impacts would be minor to moderate in intensity, and long term or permanent in duration. Long-term, potential impacts to archeological sites from visitor use would be adverse but negligible to minor in intensity. Potential impacts to archeological resources resulting from stock use and erosion would be negligible to minor, adverse, and long term or permanent.

As described for the no-action alternative, there would be no impairment of park resources or values.

**Summary: National Historic Preservation Act, Section 106**

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5), the National Park Service concludes that implementation of this alternative would have no adverse effect on the Groenfeldt and Hospital Rock archeological sites, both of which are listed on the national register.

**Impacts of Alternative C**

**Analysis**

Impacts would be the same as those described for the preferred alternative, as summarized below:

- conducting a survey for archeological resources in the general vicinity of any structure to be demolished and that is listed on or eligible for the National Register of Historic Places, and recording and mapping any significant cultural remains, if present, to recover and document important archeological data — adverse, minor to moderate, permanent impacts if archeological resources were present
- conducting archeological surveys and/or monitoring, as appropriate, before the undergrounding of utilities, the construction of picnic areas, the rehabilitation of parking areas and trails, and the upgrading of visitor facilities; avoiding known archeological resources to the greatest extent possible during construction; and if national register eligible or listed resources could not be avoided, developing an appropriate mitigation strategy in consultation with the state historic preservation officer and, if necessary, associated American Indian tribes — minor to moderate, adverse, long-term or permanent impacts if resources were present
- halting construction work if previously undiscovered archeological resources were uncovered until the resources could be identified and documented and an appropriate mitigation strategy developed in consultation with the state historic preservation officer and, if necessary, associated Amer-

ican Indian tribes — minor to moderate, adverse, long-term or permanent impacts if resources were present

- continued access to the Groenfeldt archeological site —negligible to minor, adverse, long-term impacts because of its remote location and unlikely incidences of inadvertent disturbance or vandalism
- continued use at the Hospital Rock archeological site — negligible to minor, adverse, long-term impacts from incidences of inadvertent disturbance and vandalism as a result of continued visitation
- stock use and erosion — negligible to minor, adverse, long-term or permanent impacts

**Cumulative Impacts**

As described for the no-action alternative, archeological resources have been disturbed in the past by construction activities, incidences of inadvertent disturbance and vandalism, and erosional impacts related to stock grazing, horse use, and weather. Resulting impacts to archeological resources were minor to major, adverse, and long term or permanent.

Reasonably foreseeable future actions, such as expanded visitor facilities in Giant Sequoia National Monument, the growth of communities and subdivision development in Tulare County, and proposed improvements to California Highways 180 and 65, could disturb resources outside park boundaries. Impacts could be minor to major and long term or permanent.

Alternative C would potentially contribute negligible to moderate, adverse, long-term or permanent impacts to the cumulative impacts of other past, present, and reasonably foreseeable future actions. The adverse impacts to archeological resources associated with alternative C, however, would be a small component of any overall adverse cumulative impact.

**Conclusion**

Potential impacts to archeological resources associated with the removal of historic structures

would be adverse, minor to moderate, and permanent. Known archeological resources would be avoided to the greatest extent possible during the undergrounding of utilities, the construction of picnic areas, the rehabilitation of parking areas and trails, and the upgrading of visitor facilities. If archeological resources eligible for or listed on the national register could not be avoided, any adverse impacts would be minor to moderate and long term or permanent. Long-term, potential impacts to archeological sites from visitor use would be adverse but negligible to minor in intensity. Potential impacts to archeological resources resulting from stock use and erosion would be adverse, long term or permanent, and negligible to minor.

As described for the no-action alternative, there would be no impairment of park resources or values.

***Summary: National Historic Preservation Act, Section 106***

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5), the National Park Service concludes that implementation of this alternative would have no adverse effect on the Groenfeldt and Hospital Rock archeological sites, both of which are listed on the national register.

**Impacts of Alternative D**

***Analysis***

Actions and related impacts would be similar to those described for the preferred alternative, as summarized below:

- conducting a survey for archeological resources in the general vicinity of any structure to be demolished and that is listed on or eligible for the National Register of Historic Places, and recording and mapping any significant cultural remains, if present, to recover and document important archeological data — adverse, minor to moderate, permanent impacts if archeological resources were present

- conducting archeological surveys and/or monitoring, as appropriate, before the construction under this alternative of three proposed visitor centers (Wye, Potwisha, and Cedar Grove), the bypass road around Grant Grove, and the gasoline station, in addition to the undergrounding of utilities, the construction of picnic areas, the rehabilitation of parking areas and trails, and the upgrading of visitor facilities; avoiding known archeological resources to the greatest extent possible during construction; and if national register eligible or listed resources could not be avoided, developing an appropriate mitigation strategy in consultation with the state historic preservation officer and, if necessary, associated American Indian tribes — minor to moderate, adverse, long-term or permanent impacts if resources were present
- halting construction work if previously undiscovered archeological resources were uncovered until the resources could be identified and documented and an appropriate mitigation strategy developed in consultation with the state historic preservation officer and, if necessary, associated American Indian tribes — minor to moderate, adverse, long-term or permanent impacts if resources were present
- continued access to the Groenfeldt archeological site — negligible to minor, adverse, long-term impacts because of its remote location and unlikely incidences of inadvertent disturbance or vandalism
- continued use at the Hospital Rock archeological site — negligible to minor, adverse, long-term impacts from incidences of inadvertent disturbance and vandalism as a result of continued visitation
- stock use and erosion — negligible to minor, adverse, long-term or permanent impacts

***Cumulative Impacts***

As described for the no-action alternative, archeological resources have been disturbed by con-

struction activities, incidences of inadvertent disturbance and vandalism, and erosional impacts related to stock grazing, horse use, and weather. Resulting impacts to archeological resources were minor to major, adverse, and long term or permanent.

Reasonably foreseeable future actions, such as expanded visitor facilities in Giant Sequoia National Monument, the growth of communities and subdivision development in Tulare County, and proposed improvements to California Highways 180 and 65, could disturb resources outside park boundaries. Impacts could range from minor to major and would be long term or permanent.

Alternative D would potentially contribute negligible to moderate, adverse, long-term or permanent impacts to the cumulative impacts of other past, present, and reasonably foreseeable future actions. The adverse impacts to archeological resources associated with alternative D, however, would be a potentially larger component of any overall adverse cumulative impact than any of the other alternatives.

### ***Conclusion***

Potential impacts to archeological resources associated with the removal of historic structures would be adverse, minor to moderate, and permanent. Known archeological resources would be avoided during the construction of the three proposed visitor centers (Wye, Potwisha, and Cedar Grove), the bypass road around Grant Grove, and the gasoline station, as well as during the undergrounding of utilities, the construction of picnic areas, the rehabilitation of parking areas and trails, and the upgrading of visitor facilities. If archeological resources eligible for or listed on the national register could not be avoided, any adverse impacts would be minor to moderate in intensity and long term or permanent in duration. Potential impacts to archeological resources resulting from stock use and erosion would be adverse, negligible to minor, and long term or permanent.

As described for the no-action alternative, no park resources or values would be impaired.

### ***Summary: National Historic Preservation Act, Section 106***

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5), the National Park Service concludes that implementation of this alternative would have no adverse effect on the Groenfeldt and Hospital Rock archeological sites, both of which are listed on the national register.

## **ETHNOGRAPHIC RESOURCES AND LANDSCAPES**

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Native American consultations have revealed that tribes such as the Wuksachi use particular locations in both parks to gather plants for traditional cultural uses, such as making baskets. However, the Wuksachi Tribe and others have not shared specific information about particular places where plant gathering occurs, about what species are picked during what seasons for what purposes, or about what parts of a plant might be taken and how. The latter is important to practice conservation for the future propagation of relevant plants.

### **Impacts of the No-Action Alternative**

#### ***Analysis***

Visitors to Hospital Rock would continue to be able to walk among the various features of the rock formation and adjacent interpretive waysides to learn of Hospital Rock's importance prehistorically, historically, and culturally. American Indian visitors in particular would continue to be able to access the Hospital Rock and Potwisha areas freely for traditional purposes. Because there would be no change, there would be no impact on how visitors have access to or use Hospital Rock or the Potwisha campground.

Some visitors would continue to be unknowingly intrusive to American Indians paying homage, meditating, or otherwise engaging in traditional

*Impact Thresholds for Ethnographic Resources*

**Negligible** — The impact would be barely perceptible and would neither alter resource conditions, such as traditional access or site preservation, nor the relationship between the resource and the affiliated group’s body of practices and beliefs. The determination of effect on traditional cultural properties (ethnographic resources eligible for the National Register of Historic Places) under section 106 of the National Historic Preservation Act would be *no adverse effect*.

**Minor** — Adverse impact: The impact would be slight but noticeable, but it would neither appreciably alter resource conditions, such as traditional access or site preservation, nor the relationship between the resource and the affiliated group’s body of practices and beliefs. The determination of effect on traditional cultural properties (eligible to be listed on the national register) under section 106 would be *no adverse effect*.

Beneficial impact: The action would allow access to and/or accommodate a group’s traditional practices or beliefs. The determination of effect on traditional cultural properties under section 106 would be *no adverse effect*.

**Moderate** — Adverse impact: The impact would be apparent and would alter resource conditions. Something would interfere with traditional access, site preservation, or the relationship between the resource and the affiliated group’s practices and beliefs, even though the group’s practices and beliefs would survive. The determination of effect on traditional cultural properties (eligible to be listed on the national register) under section 106 would be *adverse effect*.

Beneficial impact: The action would facilitate traditional access and/or accommodate a group’s practices or beliefs. The determination of effect on traditional cultural properties under section 106 would be *no adverse effect*.

**Major** — Adverse impact: The impact would alter resource conditions. Something would block or greatly affect traditional access, site preservation, or the relationship between the resource and the affiliated group’s body of practices and beliefs, to the extent that the survival of a group’s practices and/or beliefs would be jeopardized. The determination of effect on traditional cultural properties (eligible to be listed on the national register) under section 106 would be *adverse effect*.

Beneficial impact: The action would encourage traditional access and/or accommodate a group’s practices or beliefs. The determination of effect on traditional cultural properties under section 106 would be *no adverse effect*.

**Criteria for Determining Impairment**

An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the park’s general management plan or other relevant NPS planning documents.

activities at Hospital Rock or Potwisha. Impacts from inadvertent visitor encounters with American Indian practitioners would be minor, adverse (in that inadvertent encounters would be distracting to practitioners), and short term. Similar adverse impacts resulting from inadvertent visitor encounters with American Indian prac-

tioners gathering plants throughout the parks could also occur.

Continued Native American consultations between the park staff and neighboring American Indian tribes could result in the sharing of some knowledge about indigenous plants that would lead to better resource management of certain

plants and plant areas as ethnographic resources in the parks. Impacts from increased NPS awareness of such knowledge would be minor, beneficial, and long term.

### ***Cumulative Impacts***

Today, as in the past, minor, adverse, long-term impacts to ethnographic resources result from the inadvertent interruption of traditional practices by visitors in the parks. Ongoing Native American consultations could result in the beneficial sharing of knowledge of indigenous plants with park staff. Consultations with associated tribes by the parks, with other neighboring units of the national park system (e.g., Yosemite National Park and Manzanar National Historic Site), and with neighboring units of the national forest system (Sierra, Sequoia, and Inyo national forests, and Sequoia National Monument), all contribute to the enhancement of mutual respect and the sharing of ethnographic knowledge. The beneficial impacts resulting from such consultations would be minor and long term.

Reasonably foreseeable actions, such as expanded visitor facilities in Giant Sequoia National Monument, regional population growth, and continued development in Tulare County, could impact natural resources and intrude on gathering areas or places of traditional cultural importance. Increased tourism and outdoor recreation could also intrude on American Indians engaging in traditional activities. Over the long term impacts to ethnographic resources could be adverse and minor to moderate.

Because existing conditions would remain under the no-action alternative, there would be no contribution to the cumulative impacts of other actions. Consequently, there would be no cumulative impacts to ethnographic resources under this alternative.

### ***Conclusion***

The continuing impacts of visitors interrupting or distracting traditional American Indian practitioners would be minor, adverse, and long term. The extent to which knowledge was shared

by American Indians with park staff about indigenous plants would lead to better resource management of certain plants and plant areas as ethnographic resources, resulting in minor, beneficial, long-term impacts.

There would be no impairment of park resources or values.

### ***Summary: National Historic Preservation Act, Section 106***

The eligibility of Hospital Rock to be listed on the National Register of Historic Places as a traditional cultural property is undetermined. However, after applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5), the National Park Service concludes that there would be no adverse effect on the resource.

### **Impacts of the Preferred Alternative**

Impacts on ethnographic resources under the preferred alternative would be the same as those described for the no-action alternative.

- Visitors would continue to be able to walk among the various features at Hospital Rock, and American Indian visitors in particular would continue to be able to access the Hospital Rock and Potwisha areas freely for traditional purposes. Continuing present uses would have no impact.
- Impacts from inadvertent visitor encounters with American Indian practitioners at Hospital Rock or Potwisha, or those gathering plants throughout the parks, would be minor, adverse, and short term.
- Continued consultations with neighboring American Indian tribes could result in better resource management of certain plants and plant areas as ethnographic resources in the parks, with minor, beneficial, long-term impacts.

### ***Cumulative Impacts***

Ongoing consultations with associated tribes, with other neighboring units of the national park

system (e.g., Yosemite National Park and Manzanar National Historic Site), and with neighboring units of the national forest system (Sierra, Sequoia, and Inyo national forests, and Sequoia National Monument) could all enhance mutual respect and the sharing of ethnographic knowledge. The resulting impacts would be minor, beneficial, and long term.

Reasonably foreseeable actions (e.g., expanded visitor facilities in Giant Sequoia National Monument, regional population growth, and continued development in Tulare County) could impact natural resources and intrude on gathering areas or places of traditional cultural importance. Increased tourism and outdoor recreation could also intrude on traditional American Indian activities. Long-term impacts could be adverse and minor to moderate in intensity.

This alternative would not contribute to the cumulative impacts of other past, present, or reasonably foreseeable actions.

### ***Conclusion***

The continuing impacts of visitors interrupting or distracting traditional American Indian practitioners would be minor, adverse, and long term, the same as the no-action alternative. If American Indians shared knowledge about indigenous plants with park staff, certain plants and plant areas could be managed as ethnographic resources, resulting in minor, beneficial, long-term impacts.

There would be no impairment of park resources or values.

### ***Summary: National Historic Preservation Act, Section 106***

As described for the no-action alternative, the eligibility of Hospital Rock to be listed on the National Register of Historic Places as a traditional cultural property is undetermined. However, after applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5), the National Park Service concludes that there would be no adverse effect on the resource.

## **Impacts of Alternative A**

Under alternative A there would be negligible long-term impacts on access to ethnographic resources as a result of removing the Potwisha campground. Providing a demolition staging area could result in some minor, adverse, short-term impacts by temporarily obstructing access to ethnographic resources.

Other impacts on ethnographic resources would be the same as those described for the no-action alternative.

- Visitors would continue to have access to Hospital Rock, and American Indian visitors in particular would continue to be able to go to the Hospital Rock and Potwisha areas for traditional purposes. Continuing current uses would have no impact.
- Impacts from inadvertent visitor encounters with American Indian practitioners at Hospital Rock or Potwisha, or those gathering plants throughout the parks, would be minor, adverse, and short term.
- Continued consultations with neighboring American Indian tribes could result in better resource management of certain plants and plant areas as ethnographic resources in the parks, with minor, beneficial, long-term impacts.

### ***Cumulative Impacts***

Ongoing consultations with associated tribes and with neighboring national park and national forest system units could enhance mutual respect and the sharing of ethnographic knowledge, resulting in minor, beneficial, long-term impacts.

Expanded visitor facilities in Giant Sequoia National Monument, regional population growth, and continued development in Tulare County could impact natural resources and intrude on gathering areas or places of traditional cultural importance for American Indians, as could increased tourism and outdoor recreation. Impacts could be minor to moderate and adverse over the long term.

Alternative A would contribute negligible to minor, adverse, long-term impacts to the cumulative impacts of other past, present, and reasonably foreseeable actions. However, the adverse impact contributed by alternative A would be a small component of any overall cumulative impact.

### **Conclusion**

Removing the Potwisha campground would result in negligible, long-term impacts on access to ethnographic resources. Providing a demolition staging area could result in some minor, adverse, short-term impacts by temporarily obstructing access to ethnographic resources. The continuing impacts of visitors interrupting or distracting traditional American Indian practitioners would be minor, adverse, and long term, the same as the no-action alternative. If American Indians shared knowledge about indigenous plants with park staff, certain plants and plant areas could be managed as ethnographic resources, resulting in minor, beneficial, long-term impacts.

There would be no impairment of park resources or values.

### **Summary: National Historic Preservation Act, Section 106**

As described for the no-action alternative, the eligibility of Hospital Rock to be listed on the National Register of Historic Places as a traditional cultural property is undetermined. However, after applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5), the National Park Service concludes that there would be no adverse effect on the resource.

### **Impacts of Alternative C**

Impacts on ethnographic resources under the alternative C would be the same as those described for the no-action alternative.

- Visitors would continue to have access to Hospital Rock. American Indian visitors in particular would continue to be able to access the Hospital Rock and Potwisha

areas freely for traditional purposes. Continuing present uses would have no impact.

- Impacts from inadvertent visitor encounters with American Indian practitioners at Hospital Rock or Potwisha, or those gathering plants throughout the parks, would be minor, adverse, and short term.
- Continued consultations with neighboring American Indian tribes could result in better resource management of certain plants and plant areas as ethnographic resources in the parks, with minor, beneficial, long-term impacts.

### **Cumulative Impacts**

Ongoing consultations with associated tribes and with neighboring national park and national forest system units could enhance mutual respect and the sharing of ethnographic knowledge, resulting in minor, beneficial, and long-term impacts.

Expanded visitor facilities in Giant Sequoia National Monument, regional population growth, and continued development in Tulare County could impact natural resources and intrude on gathering areas or places of traditional cultural importance for American Indians, as could increased tourism and outdoor recreation. Impacts could be minor to moderate and adverse over the long term.

This alternative would not contribute to the cumulative impacts of other past, present, or reasonably foreseeable actions.

### **Conclusion**

The continuing impacts of visitors interrupting or distracting traditional American Indian practitioners would be minor, adverse, and long term, the same as the no-action alternative. If American Indians shared knowledge about indigenous plants with park staff, certain plants and plant areas could be managed as ethnographic resources, resulting in minor, beneficial, long-term impacts.

There would be no impairment of park resources or values.

**Summary: National Historic Preservation Act, Section 106**

As described for the no-action alternative, the eligibility of Hospital Rock to be listed on the National Register of Historic Places as a traditional cultural property is undetermined. However, after applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5), the National Park Service concludes that there would be no adverse effect on the resource.

**Impacts of Alternative D**

Under alternative D there would be minor, adverse, long-term impacts on access to ethnographic resources as a result of locating a visitor center in a previously disturbed area across the road from the Potwisha campground. There could also be minor, adverse, short-term impacts on access to ethnographic resources during construction of a new visitor center.

Other impacts on ethnographic resources would be the same as those described for the no-action alternative.

- Visitors would continue to have access to Hospital Rock, and American Indian visitors in particular would continue to be able to go to the Hospital Rock and Potwisha areas for traditional purposes. Continuing current uses would have no impact.
- Impacts from inadvertent visitor encounters with American Indian practitioners at Hospital Rock or Potwisha, or those gathering plants throughout the parks, would be minor, adverse, and short term.
- Continued consultations with neighboring American Indian tribes could result in better resource management of certain plants and plant areas as ethnographic resources in the parks, with minor, beneficial, long-term impacts.

**Cumulative Impacts**

Ongoing consultations with associated tribes, and with neighboring national park and national forest system units could all enhance mutual respect and the sharing of ethnographic knowledge, with minor, beneficial, long-term impacts.

Expanded facilities in Giant Sequoia National Monument, regional population growth, and continued development in Tulare County could impact natural resources and intrude on places of traditional cultural importance for American Indians, as could increased tourism and outdoor recreation. Impacts could be minor to moderate, adverse, and long term.

Alternative D would contribute minor, adverse, long-term impacts to the cumulative impacts of other past, present, and reasonably foreseeable actions. However the adverse impacts contributed by alternative D would be a small component of any overall cumulative impact.

**Conclusion**

Under alternative D there would be negligible, adverse, long-term impacts on access to ethnographic resources as a result of locating a visitor center in a previously disturbed area across the road from the Potwisha campground. The visitor center could cause minor, adverse, short-term impacts on access to ethnographic resources. The continuing impacts of visitors interrupting or distracting traditional American Indian practitioners would be minor, adverse, and long term, the same as the no-action alternative. If American Indians shared knowledge about indigenous plants with park staff, certain plants and plant areas could be managed as ethnographic resources, resulting in minor, beneficial, long-term impacts.

There would be no impairment of park resources or values.

**Summary: National Historic Preservation Act, Section 106**

As described for the no-action alternative, the eligibility of Hospital Rock to be listed on the

National Register of Historic Places as a traditional cultural property is undetermined. However, after applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5), the National Park Service concludes that there would be no adverse effect on the resource.

## **MUSEUM COLLECTIONS AND ARCHIVES**

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### **Impacts of the No-Action Alternative**

#### *Analysis*

The parks' museum collections and archives would continue to be housed at the Ash Mountain facility under adequate museum standards for fire detection and suppression, security, temperature and humidity control, curation, storage, and research. However, there is no further space for additional curation and storage or for expanded research. At some point all or part of the museum collections and archives would have to be moved to an expanded facility. Most likely the space needed to accommodate future curation and storage of museum collections would be found at the headquarters building, with some functions related to park administration moved out of the building so that space dedicated to collections and archives could be expanded. If this should happen, the act of moving the artifacts, specimens, and archives could result in negligible to minor, adverse, short-term impacts to the parks' collection. The long-term beneficial impacts of additional curatorial and storage space that met museum standards would be moderate.

#### *Cumulative Impacts*

The Eastern California Museum, in Independence, California, on the eastern side of the Sierra Nevada, recently completed a new addition for more exhibit, curation, and storage space, and improved security and safety. This has resulted in moderate, beneficial, and long-term impacts to regional museum collections and archives.

If present conditions for storing, curating, and displaying park museum collections and archives continued, this alternative would not contribute to the cumulative impacts of other actions. If, however, the collection was moved to expanded facilities inside the park, the result would be a moderate, beneficial, long-term impact contributed to any overall cumulative impact.

#### *Conclusion*

Museum collections and archives would continue to be safe and secure under this alternative. Within the life of this general management plan, however, part of the museum collections and archives would likely have to be moved to expanded facilities in the parks. Moving artifacts, specimens, and documents would have minor, adverse, short-term impacts. The impact of having additional curatorial and storage space that met museum standards would be moderate, beneficial, and long term.

There would be no impairment of the parks' resources or values.

### **Impacts of the Preferred Alternative**

#### *Analysis*

The parks' museum collections and archives would be housed in expanded and improved facilities in one location that would meet state-of-the-art museum standards for fire detection and suppression, security, temperature and humidity control, curation, storage, and research. Most likely the space needed to accommodate future curation and storage of museum collections would be found at the headquarters building, with some functions related to park administration moved out of the building so that space dedicated to collections and archives could be expanded. Impacts to museum collections and archives would be moderate, beneficial, and long term.

The act of moving the artifacts, specimens, and archives could result in negligible to minor, adverse, short-term impacts.

*Impact Thresholds for Museum Collections and Archives*

Museum collections (prehistoric and historic objects, artifacts, works of art, archival documents, and natural history specimens) are generally ineligible for listing on the National Register of Historic Places. As such, no section 106 determinations of effect are provided.

**Negligible** — The impact would be at the lowest levels of detection or barely measurable, with no perceptible consequences, either adverse or beneficial, to museum collections.

**Minor** — Adverse impact: The integrity of a few items in the museum collection would be affected, but the usefulness of the collection for future research and interpretation would not be degraded.

Beneficial impact: The current condition of the collection or its constituent components would be stabilized to minimize degradation.

**Moderate** — Adverse impact: The integrity of many items in the museum collection would be affected, and the usefulness of the collection for future research and interpretation would be diminished.

Beneficial impact: The condition of the collection would be improved or its constituent parts would be protected from the threat of degradation.

**Major** — Adverse impact: The integrity of most items in the museum collection would be affected, and the usefulness of the collection for future research and interpretation would be destroyed.

Beneficial impact: The condition of the collection as a whole or its constituent components would be secured from the threat of further degradation.

*Criteria for Determining Impairment*

An impact would be more likely to constitute an impairment to the extent that it

- affects a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- is key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- is identified as a goal in the park’s general management plan or other relevant NPS planning documents.

**Cumulative Impacts**

Regional museum collections and archives have benefited by a recent addition to the Eastern California Museum, in Independence, California. The addition provides more exhibit, curation, and storage space, as well as more security and safety. This is a moderate, long-term impact.

Storing the parks’ collections and archives in expanded and improved facilities under state-of-the-art museum standards, as described above, would add a long-term, moderate, beneficial impact to any overall cumulative impacts.

**Conclusion**

Housing the parks’ museum collections and archives in expanded and improved quarters

meeting state-of-the-art museum standards would be a moderate, beneficial, long-term impact.

There would be no impairment of the parks’ resources or values.

**Impacts of Alternative A**

The parks’ museum collections and archives would continue to be housed at Ash Mountain under adequate museum standards for fire detection and suppression, security, temperature and humidity control, curation, storage, and research, as described for the no-action alternative. However, because present space is limited, at some point all or part of the material would have to be moved to expanded facilities in the parks. Most likely the space needed to accommodate future

curation and storage of museum collections would be found at the headquarters building, with some functions related to park administration moved out of the building so that space dedicated to collections and archives could be expanded. If this should happen, moving the collection could result in negligible to minor, adverse, short-term impacts. The long-term beneficial impacts of having additional curatorial and storage space that met museum standards would be moderate.

### ***Cumulative Impacts***

As described for the preferred alternative, regional museum collections and archives have benefited by a recent addition to the Eastern California Museum, in Independence, California. The addition provides more exhibit, curation, and storage space, as well as more security and safety. This is a moderate, long-term impact.

Storing the parks' collections and archives in expanded and improved facilities under state-of-the-art museum standards, as described above, would add a long-term, moderate, beneficial impact to any overall cumulative impacts.

### ***Conclusion***

Museum collections and archives would continue to be safe and secure. Within the life of this general management plan, however, part of the museum collections and archives would likely have to be moved to expanded facilities in the parks. Moving artifacts, specimens, and documents would have minor, adverse, short-term impacts. The impact of having additional curatorial and storage space that met museum standards would be moderate, beneficial, and long term.

There would be no impairment of the parks' resources or values.

## **Impacts of Alternative C**

### ***Analysis***

Impacts under alternative C would be similar to those described for the preferred alternative.

- The parks' museum collections and archives would be housed in expanded and improved facilities in the parks that would meet state-of-the-art museum standards, most likely by transferring some functions in the headquarters building related to park administration and expanding space dedicated to collections and archives, with a moderate, beneficial, long-term impact.
- Moving artifacts, specimens, and archives to a new facility could result in negligible to minor, adverse, short-term impacts.

### ***Cumulative Impacts***

As described for the no-action alternative, regional museum collections and archives have benefited by a recent addition to the Eastern California Museum, which provides more exhibit, curation, and storage space, as well as more security and safety. This is a moderate, long-term impact.

Storing the parks' collections and archives in expanded and improved facilities under state-of-the-art museum standards, as described above, would add a long-term, moderate, beneficial, cumulative impact to any overall cumulative impact.

### ***Conclusion***

Moving the parks' museum collections and archives to facilities meeting state-of-the-art museum standards would be a moderate, beneficial, long-term impact.

There would be no impairment of the parks' resources or values.

## Impacts of Alternative D

### *Analysis*

Impacts under alternative D would be similar to those described for the preferred alternative.

- The parks' museum collections and archives would be housed in expanded and improved facilities in the parks that would meet state-of-the-art museum standards, most likely by transferring some functions in the headquarters building related to park administration and expanding space dedicated to collections and archives, with a moderate, beneficial, long-term impact.
- Moving the artifacts, specimens, and archives to a new or expanded facility could result in negligible to minor, adverse, short-term impacts.

### *Cumulative Impacts*

As described for the no-action alternative, regional museum collections and archives have

benefited by a recent addition to the Eastern California Museum, in Independence, California, which provides more exhibit, curation, and storage space, as well as more security and safety. This is a moderate, long-term impact.

Storing the parks' collections and archives in expanded and improved facilities under state-of-the-art museum standards, as described above, would add a long-term, moderate, beneficial impact to any overall cumulative impacts.

### *Conclusion*

Moving the parks' museum collections and archives to expanded and improved quarters meeting state-of-the-art museum standards would be a moderate, beneficial, long-term impact.

There would be no impairment of the parks' resources or values.

# Transportation

## METHODOLOGY FOR ANALYZING IMPACTS

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Transportation patterns and impacts of the alternatives are discussed for the following major activity areas:

- Cedar Grove and the floor of the Kings Canyon
- Grant Grove / Big Stump
- Lodgepole / Wuksachi / Wolverton
- Ash Mountain
- Mineral King
- Other areas

Giant Forest (including Crystal Cave, Crescent Meadow, and Moro Rock) is omitted because management actions have already been prescribed for the area and do not vary among the alternatives currently being considered (see the *Giant Forest Interim Management Plan*, NPS 1996a). The Sequoia/Kings Canyon backcountry is not addressed because there are no roads, and no trailhead parking capacity issues have been documented.

The 1998 “Visitor Use Study” contains the results of transportation, parking, and visitor survey studies done in 1998 (BRW, Inc., and Lee Engineering 1999). The study also contains a brief examination of projected conditions for 2010, based on a series of declining (but still positive) annual growth rates. These forecasts have been used for this analysis where appropriate.

For each activity area, the transportation vision, issues, and actions are discussed with respect to their effect on carrying capacity related to roadways, parking, and transit. To quantify the carrying capacity, several key assumptions were made about the temporal distribution of visitors, parking behavior, and other minor parameters (such as average automobile occupancy). The assumptions are based on traffic and parking

data in the “Visitor Use Study” (BRW, Inc., and Lee Engineering 1999).

## Temporal Distribution of Visitation

For transportation, carrying capacity is expressed in the number of visitors per day that can be accommodated at each entrance station, because the number of visitors in the park at one time is what defines congestion. Expressing carrying capacity in terms of the number of visitors monthly or annually is not meaningful in terms of transportation measures, because most roads and parking areas in the parks are substantially under capacity (and will probably continue to be) except during the summer.

Hourly traffic count data were recorded at the Ash Mountain entrance station in the summer of 1997. These counts generally indicate the relationship between the peak-hour traffic volume and the peak daily volume for the month at the entrance station. They were compared with monthly visitation estimates for the park as a whole.

## Roadway Capacity

It is assumed that the perception of congestion and a sense of “crowdedness” on park roadways would likely contribute to a negative experience for many visitors. The impact of transportation service quality on visitor experience has not been studied formally, but roadway operations, delays, and frequent undesired stops would likely lead to a negative perception of how visitors experience the parks. To the extent that poor roadway operation could result from (or contribute to) inefficient use at many roadside pullouts, congestion could also lead to safety problems at pullouts where lanes (or parts of lanes) were blocked, sight lines were obscured, and pedestrian activity was high.

Roadway capacity (expressed in vehicles per hour) is defined as a limit to reflect the impact of roadway congestion on visitor experience. Since one park goal is to maximize the quality of visi-

tor experiences, this limit should reflect a traffic level above which that goal is not reasonably attainable. For this exercise, that limit is defined as the LOS D/E boundary, such that LOS D is acceptable, but LOS E is not (see page **Error! Bookmark not defined.** for LOS definitions). Because the value of that capacity varies significantly from one roadway segment to another, it is not quantified here.

The hourly vehicle limit can be translated to a daily capacity by assuming that the daily distribution of demand (percentage of daily traffic during the peak hour) remains constant across alternatives and for future visitation scenarios. This assumption is reasonable because the distribution of traffic throughout the day is governed by factors other than roadway capacity, such as the time visitors start their activities and how far they must travel to reach a desired destination. The daily distribution of traffic can vary significantly from one road segment to the next, and it was documented for many key segments in the “Visitor Use Study.” The following seven roadway segments were selected to represent the five major activity areas for this roadway carrying capacity analysis (listed with each segment’s corresponding activity area):

1. Kings Canyon Highway west of Cedar Grove — Cedar Grove and the floor of the Kings Canyon
2. Kings Canyon Highway north of Generals Highway — Grant Grove / Big Stump
3. Kings Canyon Highway west of Generals Highway — Grant Grove / Big Stump
4. Generals Highway north of Lodgepole — Wuksachi / Lodgepole / Wolverton
5. Generals Highway south of Lodgepole — Wuksachi / Lodgepole / Wolverton
6. Generals Highway north of Ash Mountain — Ash Mountain
7. Mineral King Road — Mineral King

These segments were selected based on their applicability to the major activity areas examined for this analysis and for the availability of traffic data. In addition, segments 3, 6, and 7 (as

numbered above) would represent the traffic at the three primary entrance stations to the parks.

## Parking Capacity

The impact analysis is based on information in the “Visitor Use Study” on peak occupancy, average duration, and average turnover for 8 lots in the parks. The study gathered data on 11 lots, but 3 lots in the Giant Forest area (Sherman Tree, Crescent Meadow, and Moro Rock) will not retain their current use and configuration, regardless of the alternative chosen.

The assumption is that delays and visitor frustration in being unable to find a parking place would compromise positive visitor experiences. Full parking lots can also contribute to resource damage if visitors park outside delineated parking areas, and to additional roadway operational problems if they park in (and block) traveled ways.

## Effect of Transit on Carrying Capacity

Transit service within the parks has the potential to increase carrying capacity with respect to both parking and roadway operations. The primary benefit would be the reduction of parking congestion at park features. Since roadway congestion is worst at or near the entrance stations, transit service could most effectively improve roadway carrying capacity if visitors in automobiles were intercepted outside the parks. While most roads connecting features inside the park are not congested even at peak times, transit completely internal to the parks would still generate some improvement to roadway operations at more popular features.

Transit would increase parking capacity by using surplus or future parking capacity at areas with less crowded attractions (or none at all) as “park-and-ride” locations for visitors. If visitors had to park only once and visit several attractions, a given level of visitation would generate less vehicle-miles traveled (VMT) in the park and would require substantially fewer parking spaces in the area served by transit.

The effect of the Giant Forest shuttle service has been accounted for in the background carrying capacity estimates because that service is included in all five alternatives. For service to areas other than Giant Forest or expansion of that service, the effects on carrying capacity are considered through general assumptions about service frequency and other parameters.

### Estimating Visitation Growth

Between 1979 and 2000 annual visitation fluctuated considerably, from a high of 2.23 million in 1987 to a low of 1.35 million in 1996. In 2001 the parks had about 1.34 million visits, very near the 20-year low. (As noted in “The Affected Environment,” the method of counting visitors to Kings Canyon changed between 1991 and 1993, and visitation estimates prior to 1994 have not been adjusted to reflect this change.)

The “Visitor Use Study” conducted in 1998 assumed positive visitation growth with a declining rate to estimate 2010 traffic conditions. It also assumed that traffic would grow at the same rate as visitation, as shown in Table 40.

**TABLE 40: TRAFFIC GROWTH ASSUMPTIONS FROM THE 1998 VISITOR USE STUDY**

Year	Percentage Increase	Year	Percentage Increase
1998	2.5	2005	1.4
1999	2.3	2006	1.3
2000	2.1	2007	1.2
2001	2.0	2008	1.1
2002	1.8	2009	1.0
2003	1.7	2010	0.9
2004	1.5		

SOURCE: BRW, Inc., and Lee Engineering 1999.

These growth rates translate to a net visitation growth of just under 23% from 1997 to 2010. Since these estimates were made, the actual annual visitation for the parks has changed as follows: a 6.0% drop from 1997 to 1998, a 2.2% gain from 1998 to 1999, a 4.5% drop from 1999 to 2000, and a 3.2% gain from 2000 to 2001. The net visitation change over these five years is a 5.5% drop. These figures indicate that visitation can fluctuate broadly from year to year. Therefore, the overall growth assumption (just

under 23%) will be carried forward to this analysis for the no-action alternative. For alternatives A, C, and D, relative visitation growth assumptions have been formulated based on a rough judgment of the effects of management actions on visitation on an area-by-area basis. For the purposes of this analysis, from 1997 to 2010 alternative A is estimated to result in 10% less visitation, the preferred alternative and alternative C are estimated to increase visitation by 30%, and alternative D is estimated to increase visitation by 48%.

## CARRYING CAPACITY ESTIMATES

### Roadways

The peak-hour capacity for each segment was examined and converted to a daily roadway traffic limit. For each alternative impacts were analyzed on capacity and projected demand with respect to roadway operations. The roadway carrying capacity for the seven road segments that are analyzed is presented in Table 41. The daily capacity estimates shown in the table assume that the relationship of peak-hour traffic (or “peak-hour proportion”) to total daily traffic remains constant as traffic grows.

Since roadway segments close to the three primary entrance stations are included in the segments analyzed, these volumes and capacities can generally approximate the overall daily capacity for the parks. The existing (1997) total daily traffic volume for the three road segments near entrance stations was 6,420. If half of these vehicles are assumed to be inbound, then the daily park visitation was about 3,210 vehicles. With the same basic assumptions, the daily park visitation capacity (strictly from the roadway standpoint) would be about 6,860 vehicles per day entering the park. Given that this capacity estimate is more than double the actual visitation observed on an August day in 1997 (when some facilities were over capacity), it is quite probable that some factor other than roadway capacity would limit visitation. Examples of such factors could include entrance station capacity, parking congestion, visitor center capacity, and overall resource conditions.

**TABLE 41: ROADWAY CARRYING CAPACITY FOR SELECTED SEGMENTS**

Segment	Existing Volume		Peak-Hour Proportion	Capacity	
	Peak Hour	Daily		Peak Hour*	Daily
Kings Canyon Highway west of Cedar Grove	160	1,040	0.15	669	4,350
Kings Canyon Highway north of Generals Highway	433	3,270	0.13	669	5,050
Kings Canyon Highway west of Generals Highway	468	3,720	0.13	665	5,290
Generals Highway north of Lodgepole	245	1,990	0.12	608	4,940
Generals Highway south of Lodgepole	349	2,340	0.15	537	3,600
Generals Highway north of Ash Mountain	277	2,470	0.11	733	6,540
Mineral King Road	52	230	0.23	425	1,880

NOTE: All volumes and capacities are expressed in numbers of vehicles.  
 \* Peak hour capacity represents LOS D with HCM 2-lane rural road method.

Data from the 1970s show as many as 20,000–25,000 visitors entering the two entrances on a single day on summer holiday weekends. Using three persons per vehicle, this would suggest 6,000–8,000 vehicles entering the parks on a single day. The Big Stump entrance station experiences considerable congestion at existing visitation levels. If it is assumed that existing traffic at the Kings Canyon Highway road segment just inside the park resulted from congestion at the Big Stump entrance station, then the traffic volume observed there would equal the approximate capacity of the entrance station. Therefore, the roadway capacity in that segment could not be achieved without removing the bottleneck at the entrance station. If the roadway carrying capacity was adjusted for this phenomenon (and no existing congestion was assumed at the Ash Mountain or the Mineral King en-

trance station), the daily park carrying capacity with respect to roadway operations would be reduced by the difference between the volume and the capacity of the Kings Canyon Highway west of Generals Highway. This reduction (780 vehicles per day) would lower the estimated daily roadway park carrying capacity to approximately 6,080 vehicles per day.

**Parking Areas**

The following eight lots were counted during the summer 1997 data collection period and would remain open in their current configuration in the no-action alternative:

- Grant Grove visitor center
- Grant Tree
- Wolverton

**TABLE 42: SUMMARY OF PEAK-SEASON DAILY VEHICLE VOLUME ESTIMATES**

Area	Representative Road Segment	Road Segment Length (miles)	Existing (1997)	No-Action: Alternative	Preferred Alternative	Alternative A	Alternative C	Alternative D
Cedar Grove	Kings Canyon Highway west of Cedar Grove	8.8	1,040	1,280	1,350	940	1,350	1,540
Grant Grove / Big Stump	Kings Canyon Highway west of Generals Highway	4.7	3,720	4,580	4,840	3,350	4,840	5,510
Wuksachi/Lodgepole/Wolverton	Generals Highway south of Lodgepole	2.2	2,340	2,880	3,040	2,110	3,040	3,460
Ash Mountain/Foothills	Generals Highway north of Ash Mountain	6.5	2,470	3,040	3,210	2,220	3,210	3,660
Mineral King	Mineral King Road	15.5	230	280	300	210	300	340

SOURCE: URS Corporation.  
 NOTE: Future estimates are for the year 2010.

- Lodgepole general store
- Lodgepole visitor center
- Hospital Rock
- Ash Mountain west lot and east lot

Combined, these lots have approximately 554 spaces during non-snow conditions. Of these, 321 were filled at peak occupancy during the 1997 survey. This total was estimated by adding the peak occupancy at each lot, and assuming all lots were at peak occupancy simultaneously. Peak occupancy at the Grant Grove visitor center was three cars more than the number of spaces available.

Of the 233 unoccupied spaces, 197 were at Wolverton. (The Wolverton parking area was not included in the reserve carrying capacity estimate because it provides replacement parking, not additional capacity.) The new Sherman Tree parking area (497 spaces) and the Wolverton parking area (300 spaces) replaced 18 parking lots that had been spread throughout Giant Forest. During spring and fall the Crescent Meadow and Moro Rock lots can be used for visitor parking when there is no transit service.

Excluding Wolverton, the seven remaining parking areas have 304 spaces, 268 of which were occupied at the peak. These estimates, if considered representative of the overall parking situation in the parks, indicate that the parks' carrying capacity is approximately 13% more vehicles than entered the parks each day during the study period. In the discussion on roadway carrying capacity, 3,210 daily entering vehicles were estimated. Under the assumptions used thus far, the daily capacity of the parks with respect to parking would be approximately 3,640 vehicles.

Given that the Sherman Tree lot replaces a 74-space lot, the increase in daily parking carrying capacity can be estimated. The existing lot has an average summer parking duration of 0.5 hour, and each space is used 12.5 times per day. The

new lot would be used as a primary transit staging lot, and visitors would use the Giant Forest shuttle system to visit multiple destinations. This type of use would increase the parking duration and reduce the average turnover. If each space was used three times per day, the increase in spaces (176) would translate to an additional parking capacity of approximately 530 vehicles per day. Total carrying capacity with respect to parking would be approximately 4,170 vehicles per day. This estimate is 1,910 vehicles per day less than the estimate of the parks' carrying capacity with respect to roadway operations.

## **Transit**

Like many parks, Sequoia has operated a voluntary bus shuttle system to serve busy attraction areas. Transit service in the park has strong potential to increase the number of visitors who can enjoy and experience park features without the attendant impacts of new or expanded roadway and parking facilities. For example, a vehicle visiting three features in a day that are served by transit would require three parking spaces at these different locations; however, only one parking space would be needed with transit service. This consideration is offset by the fact that with transit service, a vehicle would be parked longer while visitors use the transit service to go to features. It is possible that one factor could substantially outweigh the other, and therefore it is conceivable (depending on parking duration) that transit service could result in higher parking space requirements overall. If this was the case, the transit system would still benefit transportation operations by controlling where visitors park, and by potentially improving roadway operations by using buses rather than individual cars to transfer visitors between activity areas.

The transit system at Giant Forest / Lodgepole ceased operation at the end of the 2000 visitor season owing to financial problems. A new transit system is being planned that may include San Joaquin Valley connections.

## IMPACT DEFINITIONS AND INTENSITIES

The transportation analysis looks at the impact of the management alternatives on the parks' carrying capacity with respect to transportation. More specifically, proposed actions are evaluated for their potential to change visitation and the capacity to handle that change. Just as several aspects of park use could govern the level of visitation the park can handle (natural resources, visitor facilities, or visitor transportation), transportation in the park could limit visitor carrying capacity either through roadway or parking capacity constraints. Either way, transportation capacity can affect the quality of visitor experiences.

Impact intensities are analyzed within an area-specific context, while the contribution of the impacts of the proposed actions to cumulative impacts are evaluated in a regional context (i.e., the Sierra Nevada western slope).

The degree to which the ability of an aspect of the parks' transportation capacity is adequate to handle visitation demand is defined by the thresholds in the accompanying text box.

The analysis team used the following terms to evaluate the duration of transportation impacts:

- *Peak-Season Only* — The impact on carrying capacity would only be detectable during peak months. Transportation actions that would improve overall capacity could be seen as having an impact to carrying capacity only during peak seasons, since capacity (and therefore impacts to capacity) is not an issue when visitation levels are low.
- *Year-round* — The impact on carrying capacity would affect visitor experiences for much of the year, especially if negative impacts during peak months had the effect of spreading visitation more evenly throughout the day.

### *Impact Thresholds for Transportation Impacts*

*Negligible* — The impact on carrying capacity in the area would be at the lower levels of detection or would not be measurable.

*Minor* — The impact on carrying capacity would be measurable and could affect the quality of visitor experiences in the area during some peak visitation hours.

*Moderate* — The impact would be clearly measurable and could have an appreciable effect on visitor experiences in the area during most visitation periods.

*Major* — The impact would be severely adverse or exceptionally beneficial. Impacts would have a substantial, highly noticeable, or widespread influence, affecting the quality of visitor experiences during most visitation times.

## CUMULATIVE IMPACTS

The impacts of transportation actions inside the parks in each alternative would be affected by transportation projects and policies of others in the area. These projects and policies are represented on the “supply” side by transportation capacity improvements outside the parks that could increase visitation by lowering the travel time between the parks and the two primary gateway communities. On the “demand” side are actions by others outside the parks that could place additional travel demands on the primary access routes.

Cumulative transportation impacts are described for the transportation systems inside the parks and the nearby sections of California 180 from Fresno and California 198 from Visalia.

The following projects could reduce travel times and affect access capacity to the parks:

- The reconstruction of Generals Highway has been underway since the 1980s and will continue for several more years. Although the reconstruction does not represent a direct capacity improvement (such as additional travel lanes), some features such as

regrading, repaving, and managing roadside pullouts could have small but potentially measurable benefits to vehicle travel on the highway.

- California 180 from Fresno is to be expanded to a six-lane expressway in Fresno and a four-lane expressway as far east as Centerville and Minkler.
- California 65 from Bakersfield is to be widened to a four-lane expressway between Bakersfield and California 198, perhaps extending as far north as Madera County.
- A *Final Environmental Impact Report / Environmental Impact Statement* for high-speed rail transit service connecting central California with both the San Francisco Bay area and the Los Angeles area was released in August 2005.

On the “demand” side the following plans could place additional travel demands on the primary access routes:

- The *Management Plan* for Giant Sequoia National Monument calls for the rehabilitation of portions of California 180, which would improve access to the Cedar Grove area, as well as to various popular destinations on national monument land. The plan also proposes expanded camping opportunities.
- The Hume Lake Christian Camp, which is within the boundaries of Giant Sequoia National Monument, could be expanded. Visitors and staff use California 180 through Grant Grove village.

These are the only two foreseeable “demand” side actions that could present cumulative impacts to transportation in the parks. For both of these actions, the Big Stump entrance station and Grant Grove village are the only areas that would experience cumulative transportation impacts.

## IMPACTS OF THE NO-ACTION ALTERNATIVE

### Analysis

On a parkwide basis the no-action alternative would result in traffic congestion because of changing user groups and increased day use. Currently scheduled transportation improvements would proceed as planned, but no new efforts would be undertaken to address current congestion issues in some activity areas, or to address potential increased congestion resulting from an increase in visitation. Visitation is projected to increase by 23% by 2010.

The current major transportation initiatives in the parks are rebuilding Generals Highway and implementing a transit shuttle system in Giant Forest. The Generals Highway project will upgrade the safety and durability of the roadway and provide minor capacity improvements (mostly related to scenic roadside pullouts). The Giant Forest shuttle system will help alleviate parking and roadway congestion in specific areas such as Crescent Meadow and Moro Rock.

### *Cedar Grove and the Floor of the Kings Canyon*

Cedar Grove would continue to be a relatively quiet destination for backcountry access and a “turnaround point” for visitors to the scenic canyon areas. No transit service to this area would be proposed.

The no-action alternative would not affect vehicle demand or roadway carrying capacity in the Cedar Grove / Kings Canyon floor area.

Parking capacity and utilization were not measured for the 1998 “Visitor Use Study,” but there is no evidence that the area could not support more visitors in terms of parking supply. Maintaining current uses would have no impact on the carrying capacity of the Cedar Grove / canyon floor area.

The no-action alternative would have a negligible, peak-season impact on the transportation carrying capacity in the Cedar Grove area.

**Grant Grove / Big Stump**

As documented in “The Affected Environment,” congestion and delays for visitors passing through the Big Stump entrance station and Grant Grove village are increasing.

Under current conditions the Big Stump entrance station could determine carrying capacity for the parks because it is the busiest entrance. As long as this station continued to serve Hume Lake traffic, visitation growth would result in severe delays for even longer periods than under current conditions. Also, because most Hume Lake traffic goes through Grant Grove, and because Grant Grove is a popular destination, traffic congestion in Grant Grove village would worsen under current conditions.

Two key roadway segments for which daily capacities have been estimated are in the Grant Grove / Big Stump area. Although the entrance stations’ capacity would likely control traffic into the parks, the effects of projected increased visitation for this area on roadway carrying capacity have been examined. As shown in Table 43, traffic forecasts in the 1998 “Visitor Use Study” would not exceed the roadway carrying capacity on either segment in 2010. However, because no improvements would be made to the Big Stump entrance station, it is highly unlikely that the 2010 daily volumes would be realized, especially because recent experience suggests that the entrance station cannot adequately serve existing peak volumes.

Parking capacity would be significantly exceeded (as it often is now) at the Big Stump picnic area (28 spaces), the Grant Grove visitor center (75 spaces), and Grant Tree (53 spaces). The fact that these parking areas are at or near capacity under current conditions implies that

their carrying capacity has been reached. However, annual visitation data are not broken down by activity area, so it would be difficult to accurately quantify the effect on overall park carrying capacity. Nonetheless, it is reasonable to assume that retaining current conditions in the Grant Grove / Big Stump area would subsequently limit visitation because Big Stump is the primary gateway to Kings Canyon, Grant Grove, and several non-park areas.

Under the no-action alternative the viability of local transit service would be assessed, but there is no specific provision to implement such service if it was feasible. If transit service was provided, parking capacity could be increased somewhat because parking areas could support more visitors.

The no-action alternative would have a moderate, adverse impact on transportation carrying capacity in the Grant Grove / Big Stump area during peak seasons, with severe parking shortages at Grant Tree and Grant Grove village, and extensive summer congestion for inbound traffic at the Big Stump entrance station.

**Wuksachi / Lodgepole / Wolverton**

Wuksachi village was under construction during the 1998 “Visitor Use Study,” so transportation data are limited. Under the no-action alternative Wuksachi village would remain a primary lodging, food service, and park operations area. Lodgepole would remain a popular campground, the primary day-use commercial center, and the primary employee housing area.

Two of the key roadway segments for which daily capacity has been estimated are in the Wuksachi / Lodgepole / Wolverton area. Although the entrance station capacity would

**TABLE 43: ROADWAY CARRYING CAPACITY FOR GRANT GROVE ROAD SEGMENTS — NO-ACTION ALTERNATIVE**

Segment	Road Capacity	Daily Volumes	
		Existing	2010 Projected
Kings Canyon Highway north of Generals Highway	5,050	3,270	4,020
Kings Canyon Highway west of Generals Highway	5,290	3,720	4,560

NOTE: All volumes and capacities are expressed in vehicles per day.

likely meter traffic into the parks, these two segments have been examined with respect to how projected visitation for this area would affect roadway carrying capacity. As shown in Table 44, the 2010 projected traffic level would not exceed the roadway carrying capacity on either of these two road segments.

Wuksachi would remain a lodging area rather than an attraction, and all parking to support future buildout has already occurred. Parking at Lodgepole would become a limiting factor for visitation, as peak lot occupancies for the visitor center and the general store (91 spaces combined) have been at or near capacity in recent years. The Wolverton parking area has approximately 300 parking spaces; the 1998 “Visitor Use Study” recorded that no more than 30% of those were occupied in any season. A new parking area would improve parking capacity for the Sherman Tree, and therefore the carrying capacity with respect to parking at the Wolverton area in general. However, this new parking area was included in the background parking carrying capacity estimate because it is common to all alternatives.

All three areas would be served by the Giant Forest shuttle system, which would allow lodging patrons to park their cars at one location and use the shuttle system (including Crescent Meadow and Moro Rock).

The no-action alternative would have a negligible, year-round impact on carrying capacity in the Wuksachi / Lodgepole / Wolverton area, as potential parking constraints should be compensated for by the Giant Forest transit system.

**Ash Mountain**

The two parking areas at Ash Mountain (the visitor center and the picnic area) are currently

at or near capacity during peak times. The no-action alternative would not provide any new parking or transit service, so the carrying capacity would, in theory, be limited to current visitation levels.

The no-action alternative would have a negligible, year-round impact on transportation carrying capacity in the Ash Mountain area.

**Mineral King**

The no-action alternative would maintain the road alignment and width, RVs would be prohibited, and vehicle lengths would be limited on the road.

The carrying capacity of the Mineral King Road is unlikely to limit visitation because the road is long, narrow, winding, and rugged, and the perception of its difficulty probably deters most day-use visitors. Actions under this alternative would not have an impact on carrying capacity, but could keep demand down for certain types of visits.

The carrying capacity of parking areas at Mineral King is difficult to predict in light of the area’s inholdings and permit cabins. The primary park-related attraction in this area is the large selection of backcountry trailheads. The parking capacity at trailhead lots has not been measured, but park staff report parking demand has exceeded supply on some holiday weekends (July 4th and Labor Day), and during some special events cars have been parked illegally in the Mineral King Valley trailhead area. It appears that Mineral King could support additional visitation throughout the use season without substantial facility upgrades, but it is unlikely that demand would increase without new and/or upgraded facilities.

**TABLE 44: ROADWAY CARRYING CAPACITY FOR WUKSACHI / LODGEPOLE / WOLVERTON ROAD SEGMENTS — NO-ACTION ALTERNATIVE**

Segment	Road Capacity	Daily Volumes	
		Existing	2010 Projected
Generals Highway north of Lodgepole	4,940	1,990	2,440
Generals Highway south of Lodgepole	3,600	2,340	2,890

NOTE: All volumes and capacities are expressed in vehicles per day.

No transit service would be provided to Mineral King under the no-action alternative.

The no-action alternative would have a negligible, year-round impact on transportation carrying capacity in the Mineral King area.

### **Other Areas**

Proposed transportation-related actions at several minor activity areas could contribute to changes in visitor demand or capacity. These areas include North Fork, South Fork, and Dillonwood. Roadway traffic and parking data have not been collected for these areas, and no transit service is proposed.

Maintaining the trailhead and small parking area at North Fork, and retaining the old Colony Mill Road as a trail connecting the North Fork area with the Crystal Cave road, would be unlikely to limit or encourage visitation, and therefore should not affect carrying capacity.

The South Fork's small campground and trailhead would be maintained. It is unlikely that visitation would be limited or encouraged, so no effect on carrying capacity is anticipated.

A plan for Dillonwood has not yet been developed.

The no-action alternative would have a negligible, year-round impact on transportation carrying capacity in the other activity areas examined.

### **Cumulative Impacts**

If proposed actions for Giant Sequoia National Monument resulted in significant additional traffic, then cumulative impacts in the Grant Grove / Big Stump area under the no-action alternative would be major and adverse during peak seasons. Specifically, traffic growth beyond that forecast in the no-action scenario without additional roadway capacity and/or access reconfiguration could significantly worsen peak-season congestion at the Big Stump entrance and

result in severe parking shortages and intersection congestion problems in Grant Grove village.

Programmed roadway improvements on California 180 and 198 in the Central Valley could reduce travel times for park visitors, especially if those routes were not congested. However, both routes would continue to be two-lane mountainous roads near the parks, with features such as sharp curves and limited shoulders that limit functional capacity. As such, the cumulative impact of these "supply" side actions on transportation under the no-action alternative would be negligible and adverse.

### **Conclusion**

Under the no-action alternative traffic is projected to increase by 23% by 2010. There would be a negligible, adverse, peak-season impact on transportation carrying capacity in the Cedar Grove area. There would be negligible, year-round impacts at Wuksachi / Lodgepole / Wolverton (potential parking constraints should be compensated for by the Giant Forest transit system), Ash Mountain, and Mineral King. Impacts in the other activity areas examined (North Fork, Colony Mill Road, South Fork, and Dillonwood) would also be negligible. The no-action alternative would have a moderate adverse impact on transportation carrying capacity in the Grant Grove / Big Stump area during peak seasons, with severe parking capacity shortages at Grant Tree and Grant Grove village, and extensive summer congestion for inbound traffic at the Big Stump entrance station.

On a cumulative basis, potential increases in peak-season daily travel through the Big Stump entrance and Grant Grove village as a result of foreseeable actions in Giant Sequoia National Monument could result in a major, adverse impact to roadway operations in those areas during the peak season.

## IMPACTS OF THE PREFERRED ALTERNATIVE

### Analysis

The primary goals of the preferred alternative are to preserve resources and to encourage diverse new user groups while preserving traditional uses in the parks. The preferred alternative would also seek to preserve some of the traditional park character and rustic architecture while containing negative resource impacts. Transit services would be provided in the Wuk-sachi / Lodgepole / Giant Forest area and possibly to locations and intermodal connections outside the parks. Some roads and parking areas would be redesigned to help reduce congestion and to accommodate limited visitation growth. Visitation is projected to increase by 30% by 2010.

#### *Cedar Grove and the Floor of the Kings Canyon*

The vision for this area is to strengthen the identity of Kings Canyon while maintaining a slower pace and lower visitation than at Grant Grove or Giant Forest. Cedar Grove village would be made more efficient, and the variety of overnight accommodations would be increased.

The National Park Service would encourage Caltrans to open the Kings Canyon Highway earlier in the spring and to keep it open longer in the fall, thus extending the visitor use season in Cedar Grove and the canyon. Since this action would not affect travel on a daily basis, it would not affect the daily carrying capacity of the roadway or visitor demand.

As described for the no-action alternative, there is no evidence that the area could not support additional visitation in terms of parking supply. Proposed actions would have no impact on the carrying capacity of the Cedar Grove / canyon floor area. No transit service is proposed to this area.

The preferred alternative would have a negligible, peak-season impact on transportation carrying capacity in the Cedar Grove area.

#### *Grant Grove / Big Stump*

Grant Grove village would continue as a popular destination, but no major transportation enhancements would be made. Facility and visitation growth would be capped to control utility demand. Some parking and roadway circulation elements would be redesigned to reduce congestion.

The Big Stump entrance station would be either relocated to a more appropriate location or redesigned to accommodate increased traffic flow. Either of these actions would increase the actual roadway carrying capacity because the bottleneck at the entrance station would be removed. The capacity analysis for this road segment under the preferred alternative would be the same as for the no-action alternative (see Table 43, page 233). That analysis indicates that the capacity of the roadway at this key location would accommodate about 48% more traffic than allowed into the parks in the summer of 1997, while a 30% traffic increase is projected under the preferred alternative.

Hume Lake traffic would be redirected through Quail Flat, which would reduce the level of traffic through Grant Grove. Existing traffic data appear to indicate that about one third of the daily traffic volume north of the Wye is going to Hume Lake. Also, volumes on Generals Highway are about 15% lower east of the Redwood Mountain / Quail Flat intersection than they are just east of the Wye. If all traffic to Hume Lake used the Quail Flat route, approximately 1,000 vehicle trips per day going to Hume Lake would be removed from the traffic stream on park roads in the Grant Grove village area.

Redirecting Hume Lake traffic through Quail Flat and other transportation actions for the Grant Grove / Big Stump area would increase the carrying capacity of the area with respect to roadway operations.

Parking in Grant Grove village would be redesigned, and parking at Grant Tree would remain at existing levels. While the extent of changes in parking at the Grant Grove visitor center have not been quantified, to estimate impacts it was

assumed that parking capacity would be increased by one third (25 spaces). The resulting net gain in parkwide carrying capacity would be about 163 vehicles per day (or approximately 2.8%). While this amount might not seem major on a parkwide basis, it would relieve an existing congestion problem and allow for some of the forecast growth to be accommodated.

As described for the no-action alternative, the viability of local transit would be assessed. This action would not affect carrying capacity.

Overall, the preferred alternative would have a minor, beneficial impact on transportation carrying capacity in the Grant Grove / Big Stump area in peak seasons with the relocation of the entrance station and some additional circulation and parking improvements.

#### ***Wuksachi / Lodgepole / Wolverton***

Wuksachi village would remain as a primary lodging and food service facility, with residential and park operations areas, in accordance with the concession contract. Lodgepole would undergo minor redesign to separate day and overnight uses and to improve traffic flow and circulation. Wolverton would be the main day-use staging area for backcountry access and expanded winter uses.

No roadway actions would affect carrying capacity. Reconfiguring some access ways within Lodgepole village to facilitate traffic flow would be unlikely to have a noticeable effect on overall roadway operations quality.

There would be minor changes to parking circulation in Lodgepole, with minor upgrades in capacity possible. The impact of this action on overall parking capacity is not quantified, but is expected to be negligible.

Transit service for this area would be the same as described for the no-action alternative, with only a shuttle stop for the Giant Forest shuttle system.

Overall, the preferred alternative would have a negligible, year-round impact on transportation

carrying capacity in the Wuksachi / Lodgepole / Wolverton area.

#### ***Ash Mountain***

Ash Mountain area would continue as the parks' primary administrative and operations center, with increased visitor use opportunities.

No roadway actions are proposed for the Ash Mountain area. Parking areas at the visitor center would be redesigned to improve circulation and reduce congestion. The feasibility of transit service to various park areas and surrounding communities for the public, park staff, and concession employees would be investigated but not definitely implemented. Since transit service would not be proposed, the impacts were not quantified.

The preferred alternative would have a negligible, year-round impact on the transportation carrying capacity in the Ash Mountain area since minor improvements to visitor center parking areas would not substantially affect capacity. While the feasibility of transit service would be studied, the impacts have not been quantified and would probably be relatively limited.

#### ***Mineral King***

The Mineral King Road would continue to provide access to the cabins, resort, and the Sequoia backcountry, and the road would be maintained in its current configuration.

As described for the no-action alternative, maintaining the present alignment and width of the road would likely help limit future visitor use. It appears that parking areas in Mineral King could accommodate more use throughout the visitor season, although probably not on holiday weekends, when shortages have been observed. No transit service is proposed for the Mineral King area.

The preferred alternative would have a negligible, peak-season impact on the transportation carrying capacity in the Mineral King area.

### ***Other Areas***

No proposed actions would affect transportation carrying capacity in the North Fork area, Colony Mill Road, or South Fork. Future public road access to Dillonwood would be determined in long-term planning.

The preferred alternative would have a minor, beneficial, year-round impact on transportation carrying capacity in other activity areas.

### **Cumulative Impacts**

From a transportation standpoint, most of the impacts under the cumulative analysis would be in the Grant Grove village area. More open management of Giant Sequoia National Monument and expansion of the Hume Lake Christian Camp could introduce additional traffic demand beyond the 30% increase forecast for the preferred alternative.

Although redirecting traffic to Hume Lake through Quail Flat would substantially reduce the potential impact to transportation conditions in the Grant Grove area, increases in monument traffic would offset this benefit. In addition, improving or relocating the Big Stump entrance station would not have the same beneficial impact documented above if the cumulative scenario was realized.

As described for the no-action alternative, programmed roadway improvements on California 180 and 198 in the Central Valley could reduce travel times for park visitors, especially if those routes were not congested. However, both routes would continue to be two-lane mountainous roads near the parks, with features such as sharp curves and limited shoulders that limit functional capacity. As such, the cumulative impact of these “supply” side actions on transportation under the preferred alternative would be negligible and adverse.

In combination with the proposed actions in the preferred alternative, the cumulative scenario would result in a negligible overall impact.

### **Conclusion**

Under the preferred alternative traffic is projected to increase by 30% by 2010. The preferred alternative would have a negligible, peak-season impact on transportation carrying capacity in the Cedar Grove area and a minor, beneficial impact in the Grant Grove / Big Stump area in peak seasons as a result of relocating the entrance station and making circulation and parking improvements. The preferred alternative would have negligible, year-round impacts on carrying capacity in the Wuksachi / Lodgepole / Wolverton area, Ash Mountain, and Mineral King. In other activity areas (North Fork, Colony Mill Road, South Fork, and Dillonwood) impacts would be minor and beneficial.

On a cumulative basis the potential minor peak-season benefit of improvements to the Big Stump entrance station and the redirection of Hume Lake traffic through Quail Flat would be offset by increased traffic activity if traffic to Giant Sequoia National Monument increased and the private Hume Lake Christian Camp was expanded.

## **IMPACTS OF ALTERNATIVE A**

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### **Analysis**

Alternative A would scale back visitor-oriented services and provide visitor experiences directly connected to natural resources. It would minimize transportation improvements (and even remove some parking) for the purpose of improving the natural environment. The Generals Highway improvements and Giant Forest transit system would be implemented as described for the no-action alternative. Visitation is projected to decrease by 10% by 2010.

### ***Cedar Grove and the Floor of the Kings Canyon***

No transportation actions under alternative A for this area would affect its carrying capacity or its ability to meet or limit visitation demand. An entrance station would be provided at Cedar Grove. Alternative A would have a negligible

impact on transportation carrying capacity in the Cedar Grove area year-round.

### ***Grant Grove / Big Stump***

Entrance stations would be provided at Cedar Grove for Kings Canyon National Park and at Lost Grove for Sequoia National Park. Hume Lake traffic would be redirected through Quail Flat, which would reduce the level of traffic through Grant Grove. Existing traffic data appear to indicate that about one third of the daily traffic volume north of the Wye is going to Hume Lake. Also, traffic volumes on Generals Highway are about 15% lower east of the Redwood Mountain / Quail Flat intersection than they are just east of the Wye. These two assumptions indicate that daily entrance station traffic would be approximately 2,180 at Cedar Grove and 1,810 at Lost Grove. These levels would be much more manageable than the current level at Big Stump. Removing the Big Stump entrance station would eliminate a considerable bottleneck and allow the roadway capacity on the Kings Canyon Highway to be used more effectively.

Lower visitation is prescribed for the area, but redirecting Hume Lake traffic through Quail Flat and removing the Big Stump entrance station in favor of Cedar Grove and Lost Grove stations would basically allow free access to the attractions and amenities in the Grant Grove area. One result of having no entrance station or fees in the Grant Grove area could be an increase in day use for picnicking and other recreational activities. This situation, when combined with reduced parking at the Grant Tree, for example, could lead to severe local congestion at certain features. Otherwise, the transportation actions for the Grant Grove / Big Stump area would increase the carrying capacity of the area with respect to roadway operations.

The Grant Tree parking area would be reduced to improve resource conditions (although the reduction is not yet quantified). Parking at Grant Tree and the visitor center/store would become a limiting factor in visitation, and congestion could increase in the area because traffic flow

would no longer be restricted by the Big Stump entrance station. No transit service is proposed for the Grant Grove / Big Stump area under alternative A.

Overall, alternative A would have a moderate, beneficial impact on transportation carrying capacity in the Grant Grove / Big Stump area during peak seasons by improving entrance station capacity and reducing overall use in the area.

### ***Wuksachi / Lodgepole / Wolverton***

Alternative A would be the same as the no-action alternative for Wuksachi, but use levels at Lodgepole and Wolverton would be reduced by removing some facilities and activities.

No roadway actions proposed for this area would affect the roadway carrying capacity. Parking areas at Lodgepole would be reduced in size and redesigned to improve resource conditions, but the reduction has not been quantified. To estimate the level of impact, a 20% reduction in parking capacity (18 spaces) would reduce total park carrying capacity by about 90 vehicles per day, or about 1.6%. Transit service for this area would be the same as the no-action alternative.

Alternative A would have a negligible impact on carrying capacity in the Wuksachi / Lodgepole / Wolverton area in peak seasons.

### ***Ash Mountain***

Impacts under alternative A would be similar to those under the no-action alternative. No specific transportation actions are proposed, but visitation would be limited.

No proposed roadway or parking actions would affect the carrying capacity in the Ash Mountain area. Lower-than-existing visitation would reduce the likelihood of parking congestion at the visitor center / picnic area lots. No transit service is proposed for the Ash Mountain / Foothills area under alternative A.

Alternative A would have a minor, beneficial, year-round impact on transportation carrying capacity in the Ash Mountain area by reducing overall use.

### ***Mineral King***

Roadway actions for Mineral King would be similar to those described under the no-action alternative except that roadways and development above West Mineral King would be removed. Since the roadway carrying capacity for Mineral King is represented by the capacity of the access road near the entrance station, this action is not assumed to have any impact on the roadway carrying capacity of the parks. It could result in slightly lower visitation to the area, further reducing the likelihood that roadway capacity would be met or exceeded in the foreseeable future.

Some trailhead parking would be removed to limit resource impacts, but reductions have not been quantified. Parking shortages have occurred in the Mineral King area at trailheads on holiday weekends, so a reduction in parking would affect the area's carrying capacity at peak use. Given the relatively small size and low level of use these trailhead parking areas receive, impacts to the overall parking carrying capacity of the parks are expected to be negligible. No transit service is proposed for the Mineral King area in alternative A.

Overall, alternative A would have a minor, beneficial, year-round impact on transportation carrying capacity in the Mineral King area by reducing overall use.

### ***Other Areas***

As described for the no-action alternative, maintaining the trailhead and small parking area at North Fork, and retaining the old Colony Mill Road as a trail, would not affect overall carrying capacity.

The South Fork campground would be reduced in scale to a trailhead with some campsites. Even though use could drop somewhat, no transpor-

tation actions in this area would affect carrying capacity.

Alternative A would open the Dillonwood sequoia grove to low use levels, but no vehicular access would be allowed. Roads would be converted to trails, and all facilities would be removed. A small parking area and trailhead would be provided outside the gate in cooperation with other land managers. These actions would have no impact to the transportation carrying capacity in Dillonwood.

Overall, alternative A would have a minor, beneficial, year-round impact on transportation carrying capacity in other activity areas area by reducing overall use.

## **Cumulative Impacts**

Projects considered under the cumulative scenario would be in opposition to the goals of alternative A from a transportation standpoint because traffic through the Grant Grove area would increase, not decrease. Removing the Big Stump entrance station in favor of park entrances at Cedar Grove and Lost Grove could worsen the cumulative impact of increased traffic through the Grant Grove area because prospective users of non-park attractions in and near Giant Sequoia National Monument would no longer have a park entrance as a deterrent to their access. In combination with the proposed actions in the alternative A, the cumulative scenario would result in a moderate, adverse, peak-season impact in the Grant Grove / Big Stump area.

As described for the no-action alternative, programmed roadway improvements on California 180 and 198 in the Central Valley could reduce travel times for park visitors, especially if those routes were not congested. However, both routes would continue to be two-lane mountainous roads near the parks, with features such as sharp curves and limited shoulders that limit functional capacity. As such, the cumulative impact of these "supply" side actions on transportation under alternative A would be negligible.

In combination with the proposed actions in alternative A, the cumulative scenario would result in a negligible overall impact.

## Conclusion

Under alternative A traffic is projected to decrease by 10% by 2010. Alternative A would have a negligible, year-round impact on transportation carrying capacity in the Cedar Grove area. Overall, alternative A would have a moderate beneficial impact on transportation carrying capacity in the Grant Grove / Big Stump area during peak seasons by improving the entrance station capacity and reducing overall use in the area. In the Wuksachi / Lodgepole / Wolverton area impacts on transportation carrying capacity in peak seasons would be negligible. Reducing overall use would result in minor, beneficial, year-round impacts on transportation carrying capacity in the Ash Mountain area, the Mineral King area, and other areas (North Fork / Colony Mill Road, South Fork, and Dillonwood) by reducing overall use.

On a cumulative basis, a projected 10% drop in peak-season daily travel in the parks by 2010 would be more than offset by increases in non-park traffic in the Grant Grove / Big Stump area. If the cumulative scenario was realized, the result for this area would be a minor, adverse impact on peak-season transportation operations.

## IMPACTS OF ALTERNATIVE C

### Analysis

Under alternative C developed areas would be redesigned to facilitate transportation and reduce congestion, while retaining the feel of yesterday. The Generals Highway improvements and Giant Forest shuttle system would be implemented as described for the no-action alternative. Visitation is projected to increase by 30% by 2010, the same as the preferred alternative.

### *Cedar Grove and the Floor of the Kings Canyon*

The vision of alternative C for this area is to strengthen the identity of the canyon features while maintaining the area's slower pace and lower visitation compared to Grant Grove or Giant Forest. Cedar Grove village would be slightly expanded, and the variety of overnight accommodations would be increased.

As described for the preferred alternative, the visitor season would be potentially lengthened in the spring and fall by encouraging Caltrans to open the Kings Canyon Highway earlier in the spring and keep it open longer in the fall, thus providing more visitation opportunities. Since this action would not affect travel on a daily basis, it would not affect the daily roadway carrying capacity or visitor demand. As described for the no-action alternative, maintaining current parking areas would have no impact on the carrying capacity of the Cedar Grove / canyon floor area. No transit service would be proposed to this area under this alternative.

Alternative C would have a negligible, year-round impact on transportation carrying capacity in the Cedar Grove area.

### *Grant Grove / Big Stump*

Alternative C would include several actions to expand and improve Grant Grove village, including redesigned facilities and increased use. Redesigning the Big Stump entrance station to facilitate traffic flow would translate directly to improved capacity for the entrance station. Although spatial limitations at the current entrance station site could preclude major improvements in capacity, it is likely that the bottleneck condition could be removed and that roadway capacity on Kings Canyon Highway west of the Wye could be more fully utilized. The capacity analysis for this road segment under alternative C would be the same as for the no-action alternative (see Table 43).

Under alternative C designating Quail Flat Road as California 180 would help direct some traffic around Grant Grove village rather than through

it; however, other strategies would likely be needed to redirect a substantial amount of traffic. The Quail Flat route to Hume Lake and Kings Canyon National Park is slightly longer and more circuitous than the route through Grant Grove. Therefore, increased travel time could be another deterrent to visitors in choosing whether or not to use the Quail Flat route.

The beneficial impact of improving parking capacity in Grant Grove village is unknown since the change has not been quantified. To estimate the level of impact, if parking at the Grant Tree remained at the existing level and parking at the Grant Grove visitor center was increased by one third (25 spaces), the net gain in parking carrying capacity would be about 163 vehicles per day (or approximately 2.8%). While this amount would not be substantial parkwide, it would relieve an existing congestion problem and allow for some of the forecast growth to be accommodated.

A voluntary, local transit system would be implemented, with parking and maintenance functions near the Wye. The system would serve the village and its attractions, as well as shuttle service between local overnight lodging locations such as Hume Lake, USFS campgrounds, and Montecito-Sequoia. This system would have the effect of increasing carrying capacity with respect to parking because the staging area would include additional parking supply for visitors using transit. The effects of this service on carrying capacity would depend on how many visitors used the transit service, which in turn would depend on the comfort, frequency, and cost of this service. If the staging area had 100 parking spaces, it might be reasonable to assume that 100 vehicles per day could be removed from other parking areas along the route served by the transit system. In this event, the transit service would in effect increase the parking carrying capacity by 100 vehicles per day, or approximately 1.7%.

Alternative C would have a moderate beneficial impact on transportation carrying capacity in the Grant Grove / Big Stump area in peak seasons by improving the capacity of the entrance station

and Grant Grove parking areas and implementing a local transit service.

### ***Wuksachi / Lodgepole / Wolverton***

Alternative C would be the same as the no-action alternative for Wuksachi. Lodgepole would be redesigned and expanded, with an emphasis on overnight use. Wolverton would retain its current character, but some back-country and winter operations would be expanded.

No roadway actions under alternative C would affect carrying capacity in this area. Reconfiguring some access ways within Lodgepole village to facilitate traffic flow would probably not affect overall roadway operations. No changes are proposed to the parking capacity in this area. Transit service for this area would be by means of the Giant Forest shuttle system, the same as described for the no-action alternative.

Alternative C would have a negligible, year-round impact on transportation carrying capacity in the Wuksachi / Lodgepole / Wolverton area.

### ***Ash Mountain***

The Ash Mountain area would continue as the parks' primary administrative and operations center, with increased visitor use opportunities.

No roadway actions are proposed for the Ash Mountain area under alternative C. Parking would be expanded to meet increased demand by converting the present picnic site to a parking area. The amount of this increase has not been quantified, but if the parking capacity increased by approximately half (14 spaces) and the turnover rate remained the same as now, the net overall parking carrying capacity would increase by 49 vehicles per day (or about 0.8%).

An employee shuttle service would be provided to reduce staff parking demand in the administrative areas. Details of this service are not prescribed at this time, and the service would not affect visitor carrying capacity.

Alternative C would have a minor beneficial impact on transportation carrying capacity in the Ash Mountain area during peak seasons.

### ***Mineral King***

Under alternative C Mineral King Road would continue to provide access to the cabins, the resort, and the Sequoia backcountry, and it would be preserved in its current configuration, as described for the no-action alternative.

The carrying capacity of parking areas at Mineral King would not change, as described for the no-action alternative, and while demand has exceeded supply on some holiday weekends and during special events, additional visitation could be accommodated throughout the use season without substantial facility upgrades. No transit service is proposed for the Mineral King area under alternative C.

Alternative C would have a negligible, year-round impact on transportation carrying capacity in the Mineral King area.

### ***Other Areas***

The trailhead at North Fork would be improved in alternative C, and the National Park Service would partner with the appropriate agencies to improve the road access. Even though traffic and capacity on this road have not been quantified, improvements in surface, width, and possibly alignment would all improve capacity. The level of use would probably stay relatively low, so the effect on overall park carrying capacity would likely be negligible.

As described for the no-action alternative, maintaining the small campground and trailhead at South Fork would have no effect on carrying capacity.

Road access would be upgraded to Dillonwood in alternative C so that the public could use the trails and primitive camping facilities there.

Alternative C would have a minor beneficial impact on transportation carrying capacity in other activity areas in peak seasons.

## **Cumulative Impacts**

From a transportation standpoint, most of the impacts under the cumulative analysis would be in the Grant Grove village area. More open management of Giant Sequoia National Monument and expansion of the Hume Lake Christian Camp could introduce additional traffic demand beyond the 30% increase forecast for park visitation, similar to the preferred alternative.

Although redirecting traffic to Hume Lake through Quail Flat (by transferring the California 180 route designation) would substantially benefit transportation conditions in the Grant Grove area, traffic increases to the monument and other non-park features in the area would offset that benefit. In addition, improving or relocating the Big Stump entrance station would not have the same beneficial impact documented above if the cumulative scenario was realized.

As described for the no-action alternative, programmed roadway improvements on California 180 and 198 in the Central Valley could reduce travel times for park visitors, especially if those routes were not congested. However, both routes would continue to be two-lane mountainous roads near the parks, with features such as sharp curves and limited shoulders that limit functional capacity. As such, the cumulative impact of these “supply” side actions on transportation under alternative C would be negligible and adverse.

In combination with the proposed actions in alternative C, the cumulative scenario would result in a negligible impact overall.

## **Conclusion**

Under alternative C traffic is projected to increase by 30% by 2010, the same as the preferred alternative. Alternative C would have a negligible, year-round impact on transportation carrying capacity in the Cedar Grove area, the Wuksachi / Lodgepole / Wolverton area, and the Mineral King area because daily traffic capacity would not be changed. There would be a moderate, beneficial impact in the Grant Grove / Big Stump area in peak seasons as a result of im-

proving the capacity of the entrance station and the Grant Grove parking areas and implementing a local transit service. Alternative C would have a minor, beneficial impact on transportation carrying capacity in the Ash Mountain area during peak seasons as a result of increasing parking and establishing an employee shuttle. Improving road access to North Fork and Dillonwood would result in minor, beneficial impacts.

The cumulative scenario could produce additional traffic demand beyond forecast increases in park visitation, which would offset the moderate benefit provided by actions in alternative C. If the cumulative scenario was realized, the result for this area would be a negligible impact on transportation operations.

## **IMPACTS OF ALTERNATIVE D**

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### **Analysis**

Alternative D would encourage diverse new user groups and potentially allow new uses in the parks. Transit services would be provided to all major activity areas and possibly to locations and intermodal connections outside the parks. Some roads and parking areas would be redesigned to help reduce congestion and accommodate visitation growth. Visitation is projected to increase by 48% by 2010.

### ***Cedar Grove and the Floor of the Kings Canyon***

The visitor season would be potentially lengthened in the spring and fall by encouraging Caltrans to open the Kings Canyon Highway earlier in the spring and to keep it open longer in the fall, the same as the preferred action and alternative C. Maintaining current parking areas would have no impact on the carrying capacity of the Cedar Grove / canyon floor area. No transit service would be proposed to this area under the alternative D.

Alternative D would have a negligible impact on transportation carrying capacity in the Cedar Grove area in peak seasons.

### ***Grant Grove / Big Stump***

Under alternative D the Big Stump entrance station would be relocated outside the park. The design of the new station would eliminate the present bottleneck situation and increase traffic flow. The capacity analysis for this road segment would be basically the same as for the no-action alternative (see Table 43), which indicates that the roadway capacity at this key location would accommodate about 48% more traffic than what was accommodated in summer 1997.

Hume Lake traffic would be diverted around the Grant Grove area via a new bypass on Giant Sequoia National Monument land. This action would substantially reduce traffic volumes through the entrance station and Grant Grove village, freeing up additional roadway capacity for park visitors. Although the overall roadway carrying capacity would be the same as estimated previously in this report, approximately 1,000 vehicle trips per day to Hume Lake would be removed from park roads in the Grant Grove / Big Stump area.

The portion of Kings Canyon Highway (California 180) between the north end of Grant Grove village and the park boundary (a distance of about 1 mile) would be closed so that vehicles could not use the Hume Lake bypass to get around the Big Stump entrance station. This action would have a mixed effect on traffic that could be difficult to estimate. Visitors driving from Grant Grove village to Kings Canyon would need to go back south to the Wye, then take either the Hume Lake bypass road or go through Quail Flat and the Hume Lake area itself to get back to the Kings Canyon Highway north of Grant Grove village, and traffic south of Grant Grove would be increased. Trips from Sequoia National Park on Generals Highway would need to divert at Quail Flat, and trips through Grant Grove would be decreased. Caltrans could object to closing this road segment if it created a more circuitous route for canyon visitors and state maintenance vehicles.

As described for the no-action alternative, maintaining current parking areas would have no impact on the carrying capacity of the Grant

Grove / Big Stump area, with the exception that tour buses would be accommodated.

Alternative D would implement a more extensive voluntary day use transit system than under alternative C, with service to destinations such as Big Stump, Grant Tree, Panoramic Point, and national forest sites. The staging area would be near the expanded visitor center. Transit service would also be provided between Grant Grove and Giant Forest, so that visitors could see most of the major destinations by transit. This action could significantly increase the carrying capacity with respect to parking if shuttle service was frequent, reliable, comfortable, and relatively inexpensive to visitors. Although roadway capacity could be increased as well, it is still likely that parking capacity in the area would continue to govern the overall transportation carrying capacity. Like the potential transit staging area proposed in alternative C, if the staging area had 100 parking spaces, it might be reasonable to assume that 100 vehicles per day could be removed from parking areas served by the transit system. In this event, the transit service would in effect increase the parking carrying capacity by 100 vehicles per day, or approximately 1.7%.

Alternative D would have a major, beneficial impact on transportation carrying capacity in the Grant Grove / Big Stump area in peak seasons as a result of a bypass road, additional parking capacity, transit parking near the Wye, and transit service to activity areas.

#### ***Wuksachi / Lodgepole / Wolverton***

Wuksachi would be expanded beyond existing plans, with additional diverse day and overnight uses, picnic areas, trails, and lodging. Lodgepole would be redesigned and expanded, with an emphasis on overnight use. Wolverton would retain its current character, but some backcountry and winter operations would be expanded.

No roadway actions under alternative D would affect carrying capacity. Reconfiguring some access ways within Lodgepole village to facilitate traffic flow would probably not affect overall roadway operations.

At Lodgepole day-use parking would be expanded and relocated. The primary parking action in this area under alternative D would be the construction of a 1,700-car parking structure, which would allow for a high number of vehicles to park and use the Giant Forest shuttle system. If the garage served an average of 1.5 vehicles per space per day, the parks' carrying capacity for parking would increase by 2,550 vehicles per day, or about 44%, which would surpass the overall roadway carrying capacity.

Transit service for this area would be by means of the Giant Forest shuttle system, the same as described for the no-action alternative.

Alternative D would have a moderate, beneficial impact on transportation carrying capacity in the Wuksachi / Lodgepole / Wolverton area in peak seasons due entirely to the substantial increase in parking capacity for the transit system.

#### ***Ash Mountain***

The Ash Mountain area would continue as the parks' primary administrative and operations center, with increased visitor use opportunities. No roadway actions are proposed for the Ash Mountain area under alternative D. Parking would be constructed to accommodate a new visitor center facility in the Potwisha area or outside the park. Since the existing visitor center lot is over capacity at peak times, parking for a new visitor center should at least relieve parking problems at Ash Mountain.

The feasibility of providing transit service to various park areas and surrounding communities for the public, park staff, and concession employees would be evaluated. The impact of this service on carrying capacity would depend on the service area, frequency, cost, and comfort of the system. Since transit system use would be voluntary, no effort has been made in this analysis to quantify the impacts.

Alternative D would have a minor, beneficial, year-round impact on transportation carrying capacity in the Ash Mountain area since the new visitor center would increase parking capacity.

Transit service use, although not quantified, would probably be relatively limited.

### ***Mineral King***

Under alternative D maintaining the current condition of the Mineral King Road would not change the roadway carrying capacity. Parking demand could exceed supply on some holiday weekends and during special events, but additional visitation could be accommodated throughout the use season without substantial facility upgrades. No transit service is proposed for the Mineral King area in alternative D.

Alternative D would have a negligible, year-round impact on transportation carrying capacity in the Mineral King area.

### ***Other Areas***

No proposed actions would affect transportation carrying capacity in the North Fork / Colony Mill Road and South Fork areas. Road access would be upgraded to Dillonwood in alternative D so that the public could use the trails and primitive camping facilities there.

Alternative D would have a minor, beneficial impact on transportation carrying capacity in other activity areas in peak seasons.

## **Cumulative Impacts**

From a transportation standpoint, most of the impacts under the cumulative analysis would be in the Grant Grove village area. More open management of Giant Sequoia National Monument and expansion of the Hume Lake Christian Camp would introduce additional traffic demand beyond the 48% increase forecast for park visitation under alternative D.

Although redirecting traffic to Hume Lake through Quail Flat (by transferring the California 180 route designation) would substantially benefit transportation conditions in the Grant Grove area, increases in traffic to the monument and other non-park attractions in the area would offset that benefit. In addition, improving or

relocating the Big Stump entrance station would not have the same beneficial impact documented above if the cumulative scenario was realized. However, these two actions and the closure of the road link between Grant Grove village and California 180 to the north would probably provide sufficient roadway capacity (and separation between park and non-park road users) to handle even the travel demands under the cumulative scenario.

As described for the no-action alternative, programmed roadway improvements on California 180 and 198 in the Central Valley could reduce travel times for park visitors, especially if those routes were not congested. However, both routes would continue to be two-lane mountainous roads near the parks, with features such as sharp curves and limited shoulders that limit functional capacity. As such, the cumulative impact of these “supply” side actions on transportation under alternative D would be negligible and adverse.

In combination with the proposed actions in alternative D, the cumulative scenario would result in a moderate, beneficial, peak-season impact to transportation service quality in the Grant Grove / Big Stump area.

It is also worth noting that a Grant Grove bypass might not meet the criteria for Giant Sequoia National Monument since no roads are to be allowed other than those in existence at the time of designation. A transportation plan is to be done.

## **Conclusion**

Under alternative D traffic is projected to increase by 48% by 2010. Alternative D would have a major, beneficial impact on transportation carrying capacity in the Grant Grove / Big Stump area in peak seasons as a result of a bypass road (if allowed), additional parking capacity, transit parking near the Wye, and transit service to activity areas. In the Wuksachi / Lodgepole / Wolverton area alternative D would have a moderate beneficial impact on transportation carrying capacity in peak seasons as a result of

the substantial increase in parking capacity for the transit system. Alternative D would have a negligible impact on transportation carrying capacity in the Cedar Grove area in peak seasons, as well as at North Fork, South Fork, and Dillonwood. Impacts in the Ash Mountain area would be minor, beneficial, and year-round since the new visitor center would increase park-

ing capacity; transit service use would probably be relatively limited. The impact in the Mineral King area would be negligible and year-round.

The cumulative impact of potential independent but related actions would be moderate and beneficial during the peak season in the Grant Grove / Big Stump area.

# Visitor Experience

## METHODOLOGY FOR ANALYZING IMPACTS

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The impact analysis evaluates how the visitor experience might vary between alternatives as a result of applying proposed actions and different management zones in the alternatives. The analysis is qualitative rather than quantitative because of the conceptual nature of the alternatives. Consequently, professional judgment was used to reach reasonable conclusions as to the intensity, type, and duration of the potential impact.

The following five broad areas of visitor experience have been analyzed:

1. *Park Character* — How the parks' character would vary as a result of differing management prescriptions and the effect on visitors' experiences under each alternative.
2. *Visitation* — The degree to which each alternative would generally respond to changing visitor demographics and use patterns.
3. *Educational Opportunities* — How each alternative would provide educational facilities, programs, and outreach. Educational facilities such as museums, nature centers, and visitor centers or contact stations provide orientation to the parks and their recreational opportunities, as well as offering educational information. Educational programs include methods of education — from personal services provided by NPS staff (ranger programs / activities and other guided activities) to self-guided activities, and from trail wayside exhibits to park newspapers and publications. Information programs deal with contacting visitors before they reach the parks through methods such as websites, and outreach programs that focus on regional teacher education, local / regional visits and programs by park staff, and school programs in the parks.

4. *Recreational Opportunities* — This section analyzes four aspects of recreational opportunities for each alternative:

- Opportunities to experience a full range of park resources as listed in the parks' purpose and significance statements, for example, sequoia groves, caves, elevation change from the foothills to alpine environments, cultural resources, wild and scenic rivers, and wilderness.
- Opportunities for basic recreational experiences (hiking, camping, front- and backcountry use, skiing, snow play, cave tours, and water play). Opportunities to experience recreation communities within the parks or to visit historic hydroelectric facilities or nonprofit camps are addressed in the "Private Land and Special Use Permits on Park Land" chapter.
- Opportunities for nontraditional or new recreational experiences (new activity assessment, bicycling, watercraft, snowmobile, and air tours).
- Opportunities for stock use.

5. *Visitor Services* — This section analyzes the differences in overnight lodging and camping opportunities and other facilities that the alternatives provide. Other visitor service facilities include restaurants, food service, supply stores, gift shops, and gas stations. Restrooms are discussed in the "Park Management, Operations, and Facilities" chapter.

**Intensity.** Impact intensities for visitor experience are shown in the accompanying text box. Impacts could be temporary or short term (for example, delays and inconvenience caused by the reconstruction of the Generals Highway, or the conversion of Giant Forest to day use) or long term.

Beneficial impacts would provide greater availability or access to park resources, programs, and activities, while adverse impacts would reduce access or availability of these three aspects of the visitor experience.

## IMPACTS COMMON TO ALL ALTERNATIVES

In accordance with the conditions imposed by Congress in Public Law 108-447, the secretary of the interior may allow the continued operation of small-scale, historic hydroelectric facilities on the Marble and Middle Forks of the Kaweah River, and four dams in Mineral King that feed the East Fork of the Kaweah River.

The Mineral King dams are classified as a significant hazard should they fail (NPS 1992b), particularly to the East Mineral King cabins and the Cold Spring campground. Park managers will work with the hydroelectric operator through a regulated permitting process to ensure that the facilities are maintained and operated in a manner that does not impair park resources. In accordance with Public Law 108-447, a reauthorization permit requires that an independent safety assessment be conducted and that any identified deficiencies be corrected. The secretary of the interior may also impose any other reasonable terms and conditions necessary for the management and care of Sequoia National Park and the purposes for which it was established.

With updated mitigation plans and mitigation funding, long-term impacts to public health and safety are expected to be negligible and adverse, while impacts related to continued recreational activities along the access routes would be moderate and beneficial. At the same time, the visual intrusion of structures used for hydroelectric power generation would result in moderate, adverse, long-term impacts on scenic values.

### *Impact Thresholds for Visitor Experiences*

*Negligible* — The impact would not be detectable or would be barely detectable, would not occur in primary resource areas, or would affect few visitors.

*Minor* — The impact would be slight but detectable, would not occur in primary resource areas, or would affect few visitors.

*Moderate* — The impact would be readily apparent, would occur in primary resource areas, or would affect many visitors. The impact would be clearly detectable by visitors and could have an appreciable effect on visitor experiences.

*Major* — The impact would be severely adverse or exceptionally beneficial, would occur in primary resource areas, or would affect the majority of visitors.

## IMPACTS OF THE NO-ACTION ALTERNATIVE

### Analysis

#### *Park Character*

Sequoia and Kings Canyon National Parks would retain their basic rustic character — offering most visitors opportunities to see the many natural and cultural resources for which the parks are significant. The limited amount of development and frontcountry reinforce the parks' natural and rustic character for visitors, maintaining the desired visitor experience. Over 97% of the parks would be managed in accordance with the prescriptions for backcountry zones, offering visitors many opportunities for primitive and unconfined recreation.

Development areas would total approximately 1,745 acres, or less than 0.2% of the total park area (see Table 45). Of that, over 65% would be for park operations. About 11% of development would be residential, over 15% campgrounds, and 7.5% villages. Frontcountry areas reached by roads would constitute just under 2.3% of the parks; of that around 1.8% would be low-use frontcountry.

**TABLE 45: SUMMARY OF MANAGEMENT ZONES BY ALTERNATIVE**

Zone	No-Action Alternative	Preferred Alternative	Alternative A	Alternative C	Alternative D
	Acres / Percentage	Acres / Percentage	Acres / Percentage	Acres / Percentage	Acres / Percentage
Development (including campgrounds, villages, operations and residential areas)	1,745 / 0.20%	1,887 / 0.22%	1,310 / 0.15%	1,986 / 0.23%	2,133 / 0.25%
Frontcountry (high-use scenic driving, low- and high-use frontcountry)	20,004 / 2.31%	17,986 / 2.08%	18,553 / 2.14%	19,477 / 2.25%	31,084 / 3.59%
Backcountry / Wilderness (including designated and potential wilderness, major and secondary trail corridors, and cross-country areas)	843,511 / 97.49%	845,387* / 97.70%	845,398 / 97.70%	843,798 / 97.52%	832,043 / 96.16%

NOTE: Total area in the parks = ±865,260 acres. Acres were quantified using GIS mapping.

\* 40 acres of the Hockett Plateau would be excluded from wilderness to allow for a high Sierra camp

Private vehicles would remain the primary means for visitors to experience the parks, and parking shortages in some areas would contribute to visitor dissatisfaction. All types of resources could continue to be accessed by visitors, with occasional crowding in some high-use, frontcountry areas. Caves, alpine areas, and many trails would remain largely inaccessible to people with disabilities; however, wayside exhibits would provide an alternative way to vicariously experience what the parks offer. The redesign of some facilities to increase capacity would help mitigate the impacts of increased visitation.

The no-action alternative would preserve the low-key, backcountry, and rustic character of the parks, resulting in a minor to moderate, beneficial, long-term impact on visitors' abilities to experience park character because of limited development, guidelines to preserve character, and a vast backcountry.

**Visitor Use**

Traditional use patterns (longer stays by smaller groups) would continue to change as the regional population grows and new user groups discover the parks. Increased day use, short stays, and weekend use would become common, resulting in more summer weekend congestion and incon-

venience to visitors. There appears to be a trend that as the nation's population ages, a smaller percentage of visitors stay in the backcountry for longer than a day.

No visitor use limits would be established. Most use would occur in the high-use scenic driving, high-use frontcountry, and development zones. Increased visitor use and shorter visits would continue to result in minor to moderate, adverse, long-term impacts resulting from seasonal crowding in these zones.

Crowding could occur on summer and holiday weekends, and some visitors might not be able to see major park resources if parking was not available. Delays at entry gates would continue to make experiences less pleasant, and regional use would eventually self regulate. Year-round frontcountry use and lodging would attract more visitors. Grant Grove would continue to experience congestion, with delays at the north entry gate of a half hour or more. Late summer use at the campgrounds in the foothills and along the Middle Fork of the Kaweah River would likely remain high, and parking near the Ash Mountain visitor center would remain inadequate during summer.

The no-action alternative would generally result in minor to moderate, adverse, long-term im-

pacts on visitor use, primarily because of continued congestion.

### **Visitor Information**

As more people use the Internet to plan trips, inadequate staffing could result in minor, adverse impacts, primarily on out-of-state visitors seeking additional pre-trip information. With insufficient staff, many new populations visiting the parks could miss information needed to make their visits safer, more educational, and less impacting to park resources. This situation could worsen somewhat over time.

### **Educational Opportunities**

**Educational Facilities.** Educational facilities are primarily in the high-use frontcountry and development zones, with a few small contact stations in the low-use frontcountry, so that most visitors have opportunities to access educational facilities. Visitor centers at Ash Mountain (Foot-hills) and Grant Grove would be updated as needed to improve education about park interpretive themes, but they would not be able to accommodate demand. Visitor contact stations would continue to provide limited space for education at Cedar Grove and Mineral King. The visitor center at Lodgepole and the Walter Fry Nature Center would have reduced levels of educational staffing in order to support Giant Forest facilities, with resulting inconvenience and unmet demand for many visitors. New educational facilities at the Giant Forest museum and the Beetle Rock education center would fill an important interpretive gap about giant sequoia ecology and provide additional group learning opportunities. Gradual improvements to educational facilities, combined with new facilities in Giant Forest, would have moderate to major, beneficial, long-term impacts on educational opportunities, but inadequate staffing at some facilities would increasingly result in minor, adverse, long-term impacts on visitor experiences.

**Educational Programs.** *Education, Interpretation, and Orientation* — The majority of educational and orientation programs would take place

in the high-use frontcountry and development zones. Programs would continue to focus on visitor safety, basic visitor information, and orientation. The highly valued ranger naturalist programs would still be provided, but they might be inadequate to meet the level requested by visitors at peak times. Some visitor programs and tours would continue to be provided by volunteers or the Sequoia Natural History Association. New trail centers, wayside exhibits, and an education center at Beetle Rock would be added in the high-use frontcountry zone, encouraging more visitors to hike the trail system. Exhibits would be updated in Grant Grove. Despite improvements to educational programs and greater use of volunteers, the impact on visitors would continue to be moderate, adverse, and long term primarily because of the inadequate ranger naturalist program.

*Outreach Education* — A limited outreach educational program would continue to meet some regional needs. Inadequate staffing to provide outreach education would increasingly affect regional populations with user groups who have not traditionally used national parks. Local outreach education has also informed the public about several critical park issues, such as the importance of fire in the ecosystem. Inadequate outreach education would result in minor, adverse, long-term impacts.

### **Recreational Opportunities**

**Opportunities to Experience Park Resources.** Under the no-action alternative most visitors would be able to choose how to experience the diverse range of resources for which the parks are significant, and road access would be provided to many of them. Features in the high-use frontcountry would remain overcrowded, and parking would be difficult to find during the summer; a transit system would be put in place only at Giant Forest, resulting in both more access and less convenience for visitors as they learn to use the system. The likelihood of encountering others would remain similar to today. Some opportunities to experience solitude would remain even in frontcountry areas. A limited amount of development (2.3% of the parks), as

well as park policy and development guidelines, would mean that natural dark would predominate and light sources could even be reduced, allowing visitors to better enjoy the night skies. Wilderness opportunities would remain, and visitors could experience wilderness values such as solitude and freedom from human impacts. Over the long term there would still be minor to moderate, seasonal, adverse impacts on the ability of visitors to experience park resources because of continued congestion.

**Opportunities for Basic Recreational Experiences.** *Trails and Hiking* — Without resources to actively maintain many frontcountry trails in both low- and high-use areas, visitor experiences would likely be less than satisfactory. Some visitors get lost on the trail system due to lack of signs, redundant trails, or the presence of visitor-created trails not on trail maps; this situation would likely worsen with increasing visitation.

Long-distance trails, as well as shorter trails in the frontcountry, would continue to be provided. The majority of the parks would remain backcountry, and while there is an extensive trail system, most of the backcountry would be without trails.

Trail conditions affect most visitors wanting to hike, resulting in moderate, adverse, long-term impacts because park staff cannot adequately maintain the extensive frontcountry trail system.

*Camping* — The 14 frontcountry campgrounds would be gradually rebuilt to improve visitor experiences. RV dump stations would be retained unless they did not comply with state regulations. Most frontcountry campgrounds would be multi-purpose and would contain RV sites. In backcountry areas, camping would continue by permit, and some areas would provide designated campsites.

- At Cedar Grove each campground would be limited to 250 sites, and the free RV dump station would remain, resulting in negligible to minor, beneficial, long-term impacts as a result gradual improvements to campgrounds.

- At Lodgepole the campgrounds would be redesigned, and an RV dump station would be retained, with minor to moderate, beneficial, long-term impacts as a result of improvements to the parks' most popular campgrounds.
- In the foothills, the Potwisha and Buckeye Flat campgrounds would be retained, resulting in minor, beneficial impacts on foothills campers as the campgrounds were improved over time.
- The Cold Spring and Atwell Mill campgrounds would remain at Mineral King, resulting in negligible to minor, beneficial, long-term impacts as the campgrounds were gradually improved. Atwell Mill would remain the only campground within a sequoia grove, offering visitor opportunities, but continuing some risk to users due to the potential of sequoia trees or limbs falling without notice. Retaining the Mineral King dams will continue the potential adverse impact on human life and downstream development at the Cold Spring campground, as discussed on page 249.
- In the backcountry the Bearpaw Meadow high Sierra camp and designated campsites would continue to provide some camping or overnight support facilities, such as toilets and bear-proof storage boxes. Those backcountry users desiring greater freedom and no support facilities for their overnight backpacking or stock experience would also have many opportunities. The impact of retaining the popular Bearpaw Meadow camp would be negligible to minor, beneficial, and long term because diverse lodging opportunities would be provided for a small number of backcountry visitors seeking that experience.

Over the long term camping opportunities would be improved, resulting in negligible to minor, beneficial impacts on visitors wanting to camp.

*Water Play* — Summer water play in rivers at Cedar Grove, Lodgepole, and the foothills would continue when water conditions are safe and would likely become increasingly popular, par-

ticularly with regional day use visitors. Impacts such as littering, riverbank erosion, unwanted visitor-created trails, and vegetation loss would occur in heavily used areas, resulting in localized visitor-generated resource degradation, with minor, adverse, long-term impacts. Despite degradation, the impact on visitor enjoyment would be negligible and beneficial since waterplay opportunities would remain readily available.

*Cave Tours* — Offering low-cost, guided tours at Crystal Cave would allow many visitors to experience this resource. Several types of tours are provided. With increased park visitation, visitors might have more difficulty obtaining tickets in advance. An unknown number of visitors who might not be able to get advance tickets would be denied this experience. Wayside exhibits would provide an alternative way for disabled visitors or those unable to procure tickets to vicariously experience park caves. Allowing access to other caves by permit would allow cave enthusiasts many opportunities for park cave exploration. The impact on those seeking to visit caves would be negligible, beneficial, and long term since various opportunities would continue.

*Fishing* — Fishing would continue to be highly regulated. No facilities to support fishing would be provided. The parks would continue to restore native populations and to eliminate non-native species. Despite increasing visitation, the impact on fishing would continue to be negligible, beneficial, and long term.

*Winter Use* — Winter use of the parks would continue to attract more people. Snowplay areas would remain popular with families and would likely become increasingly crowded on winter weekends with more regional day users, resulting in some minor, adverse, long-term impacts. Cross-country skiing and snowshoeing opportunities would remain in the Giant Forest and Grant Grove areas. Crowding and a lack of rental equipment during holiday weekends would result in some minor, adverse, short-term impacts. The impact of the no-action alternative on winter recreational opportunities would generally be minor, beneficial, and long term since many opportunities would continue to be provided,

and concessioner equipment rentals would likely increase to meet demand.

**Opportunities for Nontraditional Recreational Experiences.** New activities, such as kayaking, would be assessed in accordance with NPS and park policies and resource concerns to determine their appropriateness. This would result in minor, adverse, short-term impacts on those who would like to freely recreate in the parks.

*Bicycle Use* — Bicycle use would continue to be allowed on park roads in development, high-use scenic driving, and high- and low-use front-country zones, but not on trails or in the back-country. Bicycling would be a limited recreational activity and would not provide an alternate means of transportation within the parks. Bike lanes would not be striped, and family bike use would be primarily limited to campgrounds since bicyclists would need to share narrow roads with motorists, a situation likely to make many visitors feel unsafe. Bicycling with vehicular traffic would likely be experienced primarily by road cyclists. The impact on those seeking bicycling opportunities would be minor, adverse, and long term since most bicycling would continue to be on roads also used by motor vehicles.

*Snowmobiles / Snow Machines* — The use of snowmobiles and snow machines would only be allowed on roads by private inholders and permit holders to access their cabins (in Wilsonia and Mineral King), in accordance with regulations at 36 CFR 2.18 and 7.8. Recreational snowmobiling is not allowed in the parks because it adversely impacts the park values of solitude and natural quiet, but it is allowed on USFS land. Because most of the parks are wilderness, motorized equipment is prohibited, so snowmobiles are confined to frontcountry roads, where their use may pose safety concerns for other winter users. Because snowmobile use is limited to a few areas, and because opportunities are provided on adjacent public lands, the impact of this general prohibition would be minor, beneficial, and long term for the majority of park winter users.

*Watercraft* — Nonmotorized watercraft use would continue to be allowed except on the South Fork of the Kings River in the Cedar Grove area. On rivers where use is allowed, it would not be regulated. The resulting impact would be negligible to minor, beneficial, and long term for those seeking this type of experience.

*Air Tours* — Potential impacts would be analyzed in an air tour management plan prepared jointly by the National Park Service and the Federal Aviation Administration. No air tour companies currently operate in the parks, resulting in the preservation of natural quiet and sounds for the enjoyment of visitors.

**Opportunities for Stock Use.** The 100-year tradition of using horses and other stock would continue under the no-action alternative, in accordance with current regulations, which would be refined based on use surveys and resource monitoring. Commercially provided horse / pack trips, as well as the corrals at Cedar Grove, Grant Grove, and Mineral King, would continue but at reduced levels because use trends have decreased. A new location to replace the commercial Wolverton pack station would be identified. Any new commercial location would need to be convenient for visitors, the National Park Service, and operators, as well as safe. Also, desired resource conditions would need to be achieved, and any needed facilities would have to be sustainable. About 12 additional commercial operators would continue to provide pack services. A “Preliminary Draft Franchise Fee / Feasibility Analysis of Current Saddle Horse Ride and Pack Stations” (NPS 2004) indicates new or existing commercial pack station / stock ride operations might become increasingly infeasible without government-provided infrastructure, such as roads, utilities, and buildings. This is primarily due to rising insurance costs and projected costs for additional resource protection requirements, such as weed-free feed, waste removal, and equipment costs for waste removal.

Stock use provides traditional opportunities to enjoy the parks and could hypothetically provide

access for visitors with disabilities. Based on the number of permits currently issued and discussions with backcountry rangers, there is little use of stock by visitors with disabilities.

Undesired stock impacts on hikers (odor, feces, urine, dust, and eroded trails) would continue at the same level, a minor, adverse, long-term impact on some backcountry hikers. This impact would be mitigated through regulation and education of stock users.

Continuing stock use would provide diverse visitor opportunities to many regional stock groups and general park visitors, and increased regulation would somewhat mitigate stock impacts. The result would be minor, beneficial, long-term impacts on those wanting to use stock, but at the same time generating minor to moderate, adverse impacts on hikers in locations where trails are shared.

#### *Visitor Facilities and Services*

Visitors would continue to have access to all present facilities, with overnight lodging, as well as camping, opportunities provided in the development, low-use frontcountry, and backcountry zones. All existing overnight facilities would remain in the parks.

- At Cedar Grove seasonal use would continue; the small lodge would remain, as would food service and the store. Visitors would retain the same types of services as today, with negligible to minor, beneficial, long-term impacts as a result of gradual improvements.
- At Grant Grove lodging would be expanded by adding nine cabins and renovating 19 cabins and some central baths. The existing mix of cabins and lodges would remain. Visitors would have access to the same types of services as today, with minor to moderate, beneficial, long-term impacts as a result gradual improvements to lodging.
- At Lodgepole the gas station would be studied for retention, adaptive use, or removal. Other facilities (store, post office, showers, laundry, food service) would be

retained. There could be an increasing demand for food service since none is provided in the Giant Forest area. Lodgepole visitors would retain the same types of services as today, with minor to moderate, beneficial impacts as a result of improvements over the long term.

- At Wuksachi 312 additional lodge rooms would be constructed to replace lodging removed from Giant Forest. An amphitheater would be built, and food service and other services expanded. Wuksachi visitors would have increased lodging, food service, and other services compared to today, with moderate, beneficial, long-term impacts for visitors seeking lodging in the parks.
- At Wolverton the concession building for winter use, the picnic area, and the Boy Scout camp would remain. The shuttle system would provide Giant Forest visitors an improved experience, since congestion would be reduced. However, the corral has been removed, reducing recreational opportunities. Services at Wolverton would be improved compared to today, resulting in major, beneficial, long-term impacts since most visitors spend time in the Giant Forest and parking would be more convenient. At the same time, because the corral has been removed and a new location has not been identified, the impact on the relatively small number of visitors seeking a riding experience in the Giant Forest would be minor, adverse, and short term since the service would be provided at another location.

Overall, maintaining and gradually improving present facilities and services, along with the planned expansion of concession facilities and new facilities at Giant Forest, would result in minor to moderate, beneficial, long-term impacts on visitor experiences.

### **Cumulative Impacts**

Lodging, food service, and additional types of recreational opportunities are provided in surrounding communities, such as Three Rivers. Most motels provide swimming pools, and there

is also a golf course and a spa. Seasonal river rafting are offered. It is likely that a similar type and number of services would be provided in the future.

Giant Sequoia National Monument, designated in April 2000 from portions of national forest land to further protect giant sequoia groves, is expected to have a negligible impact on existing types of visitor uses. Visitor services, such as lodging, camping, gas, and food, are provided in several locations in Giant Sequoia National Monument, meeting the needs of both monument and park visitors. However, national monument status is likely to attract more visitors, which could add to existing congestion in the parks. Visitors to the national parks overlap with visitors to Giant Sequoia National Monument, since they can only get to the northern unit by way of the Big Stump entrance station, and visitors drive along the Generals Highway through the monument between Sequoia and Kings Canyon National Parks. Monument status could further emphasize resource values and recreational opportunities, broadening some interpretive stories that could be jointly told. There is some visitor confusion about how management regulations differ between the U.S. Forest Service and the National Park Service and the types of recreational opportunities that can be offered (for example, hunting and snowmobiling are allowed in nonwilderness forest areas). This confusion could be mitigated with education.

Terminus Dam on Lake Kaweah has recently been raised to increase storage, resulting in some loss or relocation of recreation facilities, such as boat ramps and picnic areas. While these kinds of facilities are not provided in the parks, they primarily serve local and regional users, so this action would have a negligible, adverse, long-term impact on recreational opportunities for park visitors.

Past actions in the parks (from the 1950s to 1999) that have affected visitor experiences include the following:

- The removal of Giant Forest facilities (roads, parking lots, lodging, dining facilities, the general store, informal food

service, the photo studio, park and concession housing, the Hazelwood picnic area, the corral, and several campgrounds). Eventually development at Wuksachi village will replace the same amount of visitor lodging that was removed. A future project is the relocation of an underground electric power line running through the center of the sequoia grove to follow the Crescent Meadow road. All these actions are intended to preserve and improve the condition of the Giant Forest sequoia grove.

- The rebuilding of Generals Highway to preserve its scenic historical character and slower mountain driving opportunities.
- The replacement of utility systems to meet state standards. In some locations comfort stations are being replaced with vault toilets.
- The updating of exhibits at the Grant Grove and Ash Mountain visitor centers.

The no-action alternative, in conjunction with past, present, and reasonably foreseeable actions in the region, would result in visitor opportunities remaining much as they are today. Impacts on visitors to the parks and to Giant Sequoia National Monument would be moderate, beneficial, and long term.

## Conclusion

Continuing current management practices and policies would maintain visitors' present experiences, with some change as facilities were replaced. Crowding would persist in some areas, trails would continue to deteriorate, and educational opportunities would remain inadequate. Transit would be limited to Giant Forest, and bicycling would continue to be mixed with traffic on park roads. At the same time, gradual improvements of existing facilities would continue to occur in all areas of the parks, as would the planned expansion of concession facilities and new facilities at Giant Forest. Despite minor to moderate, beneficial, long-term impacts on visitors from gradually improving facilities and continued opportunities, traffic congestion in the

most popular areas would generally result in moderate, adverse, long-term impacts.

The no-action alternative, in conjunction with past, present, and reasonably foreseeable actions in the region, would continue visitor opportunities much as they are today. This would result in moderate, beneficial, long-term impacts on visitors to the parks and to Giant Sequoia National Monument.

## IMPACTS OF THE PREFERRED ALTERNATIVE

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### Analysis

#### *Park Character*

The parks would retain their basic rustic character, offering most visitors opportunities to see the many natural and cultural resources for which the parks are significant. The limited amount of development and frontcountry zones would reinforce the parks' natural and rustic character for visitors, helping maintain the desired visitor experience. Over 97% of the parks would continue to be managed in accordance with the prescriptions for backcountry zones, offering visitors many opportunities for primitive and unconfined recreation.

Development areas would constitute less than 1% (0.22%) of the total park area and include approximately 1,887 acres. Of that, over 65% would be for park operations (primarily wastewater treatment), over 15% for campgrounds, about 11% for residential uses, and 7.5% villages. Frontcountry areas reached by roads would amount to about 2.1% of the park, 1.6% of which would be low-use frontcountry.

Compared to the no-action alternative, the preferred alternative would also preserve the low-key, rustic character of the parks because of limited development, guidelines to preserve the rustic character, and the vast backcountry. However, improved circulation and education about the parks would result in moderate, beneficial, long-term impacts because congestion would be reduced and visitors would have more opportunities to learn about park resources.

### **Visitor Use**

Traditional use patterns would continue to be altered as the regional population grows and new user groups discover the parks. Frontcountry visitation would not need to be restricted at the entrance gates in order to ensure high-quality experiences. Day use, short stays, and weekend use would likely become more common, and visitation during the spring and fall shoulder seasons would be encouraged. Private vehicles would remain the primary means to enter the parks, but transit would offer a pleasant way to get around. The Big Stump entrance station would be redesigned or relocated to facilitate traffic flow, reducing wait times and making visitor experiences more pleasant. Year-round frontcountry use and lodging would attract more visitors. The number of parking spaces would be increased by redesigning existing lots.

The majority of visitation would occur in the high-use scenic driving, high-use frontcountry, and development zones. Visitors would continue to have access to diverse natural and cultural resources for which the parks are significant, and improved circulation patterns and transit systems would result in less frequent seasonal crowding in popular areas. Traditional activities such as hiking, camping, lodging, backcountry use, and scenic driving would remain. Park developed areas would be nearly the same size as they are today, and they would be rebuilt as needed. Over the long term, however, more facilities could be provided outside the parks in collaboration with other entities.

While backcountry use would remain low, expanded educational programs would help more visitors gain the skills necessary to visit the backcountry. Additional recreational opportunities in the foothills would be provided along the Middle and North Forks of the Kaweah River and at Ash Mountain. Caves, alpine areas, and many trails would remain largely inaccessible to people with disabilities; however, wayside exhibits would provide an alternative way to vicariously experience what the parks offer.

Accommodating more diverse visitation and day use, combined with transit and circulation improvements, would result in moderate, beneficial, long-term impacts on the ability of visitors, including new user groups, to visit and enjoy the parks.

### **Visitor Information**

People would have additional opportunities to learn about the parks before their visits by means of the Internet. This would allow them to plan their visits to make the best use of their time, resulting in a minor, beneficial, long-term impact.

### **Educational Opportunities**

**Educational Facilities.** Facilities would be located primarily in the high-use frontcountry and development zones. Orientation and exhibits could be installed at transit stops. Additional educational opportunities outside the parks could be pursued with the U.S. Army Corps of Engineers, the U.S. Forest Service, and others.

- A new, small-scale visitor center at Cedar Grove would meet visitor needs, resulting in minor, beneficial impacts to visitors as a result of improved educational facilities.
- The Foothills and Grant Grove visitor centers would be expanded and updated. Increased opportunities to learn about the history of the parks and the region would be provided at Grant Grove, either by redesigning the visitor center or by adaptively reusing sites or structures (such as the gas station). This would result in moderate to major, beneficial, long-term impacts on educational opportunities in these highly visited areas.
- The visitor center at Lodgepole would emphasize backcountry and wilderness themes, resulting in moderate, beneficial, long-term impacts since more visitors would be informed about backcountry / wilderness values and recreational opportunities. The Walter Fry Nature Center would be eliminated; however, a diverse and more flexible array of educational

opportunities in the Giant Forest / Lodgepole area would be provided to mitigate that minor, adverse impact. The result of actions at Lodgepole on visitor education would generally be moderate, beneficial, and long term.

- New educational facilities at the Giant Forest museum and the Beetle Rock education center would be completed, filling an important gap in interpretation about giant sequoia ecology and providing additional group learning opportunities for most park visitors. The result of these actions on visitor education would be major, beneficial, and long term.
- The Mineral King visitor contact station would be improved, resulting in minor, beneficial, long-term impacts on educational opportunities in this area.
- At Dillonwood there has been no visitor use, but further planning would determine the levels and types of use.

Improvements to educational facilities would generally result in moderate to major, beneficial, long-term impacts for park visitors since improvements would occur in developed areas throughout the parks.

**Educational Programs.** *Education, Interpretation, and Orientation* — Educational programs would focus on learning about park resources, instilling park stewardship values, leave-no-trace ethics, and backcountry skills, in addition to basic visitor orientation and safety information. Park orientation would be expanded, with more information about recreational opportunities and skills needed for safe enjoyment. Additional educational staff would result in a greater variety and amount of programs, so more visitors would have access to programs and activities. Park exhibits would be updated, and the park newspaper and publications would continue. New trail centers, wayside exhibits, orientation, and trail information would be provided. The preferred alternative would have moderate, beneficial, long-term impacts on the ability of park visitors, as well as local and regional populations, to participate in popular educational programs

because additional, diverse programs would be provided.

*Educational Outreach* — Outreach programs for diverse publics would be expanded, and participation in regional classrooms would be encouraged by increasing park staff involved in outreach. A classroom-focused website would provide additional educational opportunities, and numerous volunteer and partnership efforts would be developed. The result would be a minor to moderate, beneficial, long-term impact on park educational opportunities.

### ***Recreational Opportunities***

**Opportunities to Experience Park Resources.** Under the preferred alternative visitors would have a choice of opportunities to experience the diverse resources for which the parks are known, and road access would be provided to many of them. Features in the high-use frontcountry zone would continue to be crowded occasionally during peak times. Redesigning the circulation system in Grant Grove and continuing the transit system in the Giant Forest area would improve opportunities for visitors to experience park resources. The likelihood of encountering others would remain similar to today. Some opportunities to experience solitude would remain, even in frontcountry areas.

Limited development in the parks, as well policies and development guidelines, should help preserve opportunities for visitors to enjoy the night skies without inference from artificial light sources, and opportunities could be gradually improved. Many backcountry and wilderness opportunities would remain, and visitors could experience wilderness values such as solitude and freedom from human impacts.

Compared to the no-action alternative, opportunities to experience diverse park resources would be similar to those today; however, improved circulation would result in negligible to minor, beneficial impacts on visitor access to park resources.

**Opportunities for Traditional Recreational Experiences. *Trails and Hiking*** — There would be numerous recreational trail opportunities in all park environments. Frontcountry trails currently receive the most use, and they would continue to be most popular, with gradually increasing visitation. Trail conditions in both low- and high-use areas would be improved, and the system would be somewhat expanded, visitor-created trails and redundant trails would be removed, and additional trail information would be provided. Improving hiking trails and building a footbridge near Hospital Rock would result in moderate, beneficial, long-term impacts in terms of hiking opportunities in the foothills.

The majority of the parks would remain backcountry, with an extensive trail system, and long-distance trails would continue to be provided. The backcountry trail system would remain similar to today, with no trails in most of the backcountry.

The preferred alternative would have moderate to major, beneficial, long-term impacts on hiking and trail use for most visitors because of an improved trail system, better conditions, and additional directional signs.

***Camping*** — A variety of camping options would continue to be provided. Twelve frontcountry campgrounds would be gradually rebuilt to improve visitor experiences, to accommodate diverse user groups, and to separate differing user types. Campgrounds would generally be configured for about 250 sites. A few small primitive campgrounds could be provided to offer more diverse camping choices. RV dump stations could be eliminated to protect park resources if they did not meet state standards.

- Campgrounds at Cedar Grove would be redesigned to improve camping experiences, with more separation between sites and discrete areas for different types of uses, resulting in minor, beneficial, long-term impacts.
- The Crystal Springs campground in Grant Grove would be converted to a day use function, resulting in moderate, adverse,

long-term impacts. However, park staff would work with Giant Sequoia National Monument staff to increase camping opportunities in the vicinity of Grant Grove, so opportunities might remain similar to those today.

- Campgrounds at Lodgepole, Dorst, and South Fork would be upgraded as needed, resulting in negligible, beneficial, long-term impacts.
- In the foothills the Potwisha and Buckeye Flat campgrounds would be retained, and a new primitive campground would be added in the North Fork area, resulting in minor, beneficial, long-term impacts on those seeking a more primitive camping experience in the vicinity of Three Rivers.
- The Cold Spring campground at Mineral King would be expanded to replace campsites removed from Atwell Mill, and primitive sites would be added. Improved camping at Mineral King would generally result in minor, beneficial, long-term impacts, even though there would be minor, adverse, long-term impacts on those visitors wanting to camp in a sequoia grove. Removing overnight camping from Atwell Mill would be consistent with actions in other sequoia groves to eliminate overnight use and thus provide a safer visitor experience because users would be at less risk from being injured by falling trees or limbs. Retaining the Mineral King dams will continue the potential adverse impact on human life and downstream development at the Cold Spring campground, as discussed on page 249.
- In the backcountry the Bearpaw Meadow tent-hotel (high Sierra camp) and designated campsites provide some camping or overnight support facilities such as toilets and bear-proof storage boxes. The possibility of providing an additional high Sierra camp would be explored. The impact of retaining the camp would be negligible to minor, beneficial, and long term in terms of providing diverse opportunities for the

small number of backcountry visitors seeking this type of experience.

- In backcountry areas camping by permit would continue, and some areas would provide designated campsites, including stock campgrounds. Educational programs and enforcement efforts by park rangers would be enhanced to make sure hikers and backpackers understand how to protect their food supplies from black bears. The resulting impact on backcountry camping would be negligible, beneficial, and long term as a result of more education about avoiding bear/human conflicts.

The preferred alternative would generally provide minor to moderate, beneficial, long-term impacts in terms of camping opportunities.

*Water Play* — Seasonal summer water play in rivers at Cedar Grove, Lodgepole, and the foothills would continue and could become increasingly popular with more regional visitors. River access points, parking areas, trails, and trailheads would be defined in popular areas to reduce bank and vegetation damage, as well as use impacts such as littering. This would result in minor, beneficial, long-term impacts as a result of improved river access for a small number of visitors.

*Cave Tours* — Low-cost, guided cave tours of various types would continue to be offered by the Sequoia Natural History Association at Crystal Cave. With increased park visitation, visitors might have to plan farther in advance to obtain tickets. An unknown number of visitors who might not be able to get tickets would be denied this experience. Due to the 0.5-mile steep access trail, the cave would not be accessible to those visitors in wheelchairs or those unable to negotiate the terrain. Access by means such as educational waysides and photographs of the cave could help illustrate cave resources to visitors who could not access the cave. Restrooms would remain at the parking lot; they would only be provided at the cave if it became technologically and economically feasible to meet state wastewater standards with sustainable facilities. The preferred alternative would result in negli-

gible, beneficial, long-term impacts on guided cave tours since the tour would remain similar to what is offered.

To better protect park resources, access to other caves would be restricted to cave specialists with permits. The preferred alternative would have a negligible, beneficial, long-term impact on opportunities for the general public to experience cave resources, and a minor, adverse, long-term impact on opportunities for the small number of recreational cavers and spelunkers to experience park caves.

*Fishing* — Fishing would continue to be highly regulated. No fishing support facilities would be provided to the limited number of anglers in the parks. The National Park Service would continue to restore native populations and eliminate nonnative species. Impacts would be negligible, beneficial, and long term for the few anglers in the parks.

*Winter Use* — Expanded winter use would be encouraged so visitors could enjoy park resources year-round. Snowplay areas would be provided at Grant Grove and Wolverton, with equipment rentals, limited food service, and restrooms being made available. Crowding would still be common at snowplay sites during weekends and holidays. Cross-country skiing and snowshoeing would continue to offer opportunities to have a quieter experience within superb front and backcountry park settings. Winter camping would be provided in several campgrounds, in addition to backcountry opportunities. The preferred alternative would result in minor, beneficial, long-term impacts for visitors to participate in winter activities as a result of slightly expanded opportunities and services.

**Opportunities for Nontraditional Recreational Experiences.** *New Activities* — New activities would be assessed against policy and resource concerns to determine potential impacts. Low-impact activities that did not impair park resources and were related to park settings would be allowed. The parks would encourage basic activities. Measures to separate some activities that would infringe on the experiences of other

visitors would enhance overall park enjoyment for as many visitors as possible. The preferred alternative would have minor, beneficial, long-term impacts for visitors to experience new activities deemed appropriate.

*Bicycle Use* — Under the preferred alternative bicycle use would continue to be allowed on park roads in the development, high-use scenic driving, and high- and low-use frontcountry zones, but not on trails or in the backcountry. Bicycling would provide another method of transportation at Cedar Grove, where bike lanes on existing roads and / or separate bike routes would be provided. In other areas, bike lanes would not be striped, and family bike use would be primarily limited to campgrounds since bicyclists would need to share narrow roads with motorists, a situation likely to make many visitors feel unsafe. Thus, bicycling on Generals Highway or Kings Canyon Highway with vehicular traffic would probably be primarily by road cyclists. The Shepherd Saddle Road near Ash Mountain would offer a circular bicycling route connecting with the North Fork area. Taken as a whole, the preferred alternative would have minor, beneficial, long-term impacts for bicycling in the parks as a result of striped lanes along with cycling opportunities on Shepherd Saddle Road.

*Snowmobiles / Snow Machines* — As described for the no-action alternative, the use of snowmobiles and snow machines would only be allowed on roads by private inholders and permit holders for access to their cabins (in Wilsonia and Mineral King). Recreational snowmobiling is not allowed in the parks because it adversely impacts the park values of solitude and natural quiet, but it is allowed on USFS land. Because most of the parks are designated wilderness, motorized equipment is prohibited, so snowmobiles are confined to frontcountry roads where their use may pose safety concerns for other winter users. Because snowmobile use is limited to a few areas, and because opportunities are provided on adjacent public lands, not allowing recreational snowmobile use in the parks would have minor, beneficial, and long-term

impacts on the majority of park users during the winter.

*Nonmotorized Watercraft* — Nonmotorized watercraft would continue to be allowed except on the South Fork of the Kings River. Watercraft use (primarily kayak) would be monitored on the Middle Fork of the Kaweah River, and no commercial use would be allowed. Developed river access points at popular waterplay areas, which would reduce bank erosion, vegetative impacts, and littering, could also provide access for non-motorized watercraft users since the recreational waterplay and watercraft seasons do not overlap. As such, the preferred alternative would have minor, beneficial, long-term impacts on those few visitors seeking opportunities to use non-motorized watercraft on park rivers.

*Air Tours* — Potential air tours in the future would be regulated in accordance with the provisions of the National Parks Air Tour Management Act of 2000. The act directs the Federal Aviation Administration, in cooperation with the National Park Service, to develop an air tour management plan whenever a person applies for authority to conduct a commercial air tour operation over a unit of the national park system if such a plan does not already exist for that park unit. The purpose of the plan would be to provide acceptable and effective measures to mitigate or prevent adverse impacts of commercial air tour operations on natural and cultural resources and visitor experiences. No air tour companies currently operate in the parks, although two companies have applied for operating authority.

**Opportunities for Stock Use.** Under the preferred alternative horses and other stock use would continue at present levels, with reasonable regulations and enhanced monitoring. (Present use levels are much lower than historical levels.) Areas would be open or closed to stock use depending on resource conditions and the capability of the resource to withstand use. This sustainable approach has substantially reduced stock-related impacts. It is expected that as leave-no-trace / sustainable stock practices and use of supplemental feed increased, resource

conditions would continue to improve. This would result in minor, beneficial, long-term impacts for stock users.

Stock use provides traditional opportunities to enjoy the parks and could provide access for visitors with disabilities. Currently there is a small amount of stock use by visitors with disabilities, so the impact would be negligible.

Concession stables / corrals providing day and overnight trips would continue at Cedar Grove, Grant Grove, and Mineral King. About 20 additional commercial operators would continue to provide pack services. A new, sustainable location to replace the Wolverton corral would be explored in the Dorst, Wuksachi, Lodgepole, and Wolverton areas. A “Preliminary Draft Franchise Fee / Feasibility Analysis of Current Saddle Horse Ride and Pack Stations” (NPS 2004) indicates new or existing commercial pack station / stock ride operations might become increasingly infeasible without government-provided infrastructure, such as roads, utilities, and buildings. This is primarily due to rising insurance costs and projected costs for additional resource protection requirements, such as weed-free feed, waste removal, and equipment costs for waste removal.

Impacts of horse use (feces, eroded trails, dust) would continue to cause minor, adverse, long-term impacts to some backcountry hikers, but increased regulation and stock-free areas, which would be determined in the forthcoming wilderness stewardship and stock use plan, would mitigate this impact.

Despite adverse impacts on hikers, providing stock opportunities would result in minor, beneficial, long-term impacts because a traditional use would continue. Monitoring, regulation, and education would gradually improve trail and backcountry conditions.

### ***Visitor Facilities and Services***

Overnight lodging as well as camping opportunities would be provided in the following zones — development, low-use frontcountry,

and backcountry. All existing overnight facilities would remain in the four lodging areas, along with 12 campgrounds and the high Sierra tent-hotel. (Camping facilities are discussed on page 259).

- At Cedar Grove seasonal use would continue (food service, the store, and the free RV dump station), along with modestly expanded and more types of lodging. Impacts would be the same as the no-action alternative; however, facilities would be gradually improved, resulting in minor, beneficial, long-term impacts on visitor experiences.
- At Grant Grove lodging would be expanded with 9 additional cabins; 19 cabins would be renovated and some central baths would be provided. The existing mix of cabins and lodges at Grant Grove would remain, but improved facilities would result in negligible to minor, beneficial, long-term impacts to visitors wanting to stay at Grant Grove.
- At Lodgepole the gas station would be analyzed for retention, adaptive use, or removal. Other facilities (store, post office, showers, laundry, food service) would be retained to provide for both day use and camper needs. Demand for food service could increase since none is provided in the Giant Forest area, and concessioners would likely adapt to the demand. A redesigned circulation system could help visitors find food and other services more easily. There would be moderate, beneficial, long-term impacts because of improvements to services.
- At Wuksachi 312 additional lodge rooms would be constructed to replace lodging removed from Giant Forest. An amphitheater would be built, and food service and other services would be expanded. Similar to the no-action alternative, this alternative would result in moderate, beneficial, long-term impacts because of additional lodging opportunities within the parks.
- At Wolverton the concession building for winter use and the picnic area would remain. The Boy Scout camp would be converted to a camp for volunteers. Services at

Wolverton would be improved compared to today, resulting in major, beneficial, long-term impacts since most visitors spend time in the Giant Forest and parking would be more convenient. The removal of the corral (with no new location yet identified) would adversely affect a relatively small number of visitors seeking a riding experience in the Giant Forest, resulting in a minor, adverse, short-term impact until the service was replaced at another location.

Generally providing a variety of improved facilities and services would enhance visitor experiences and better meet the changing needs of visitors, resulting in minor to moderate, beneficial impacts on visitor experiences over the long term.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable actions in the region would be the same as those described for the no-action alternative. Lodging, food service, and additional types of recreational opportunities are provided in surrounding communities, such as Three Rivers. Most motels provide swimming pools, and there is also a golf course, spa, and seasonal river rafting. It is likely that a similar type and number of services will be provided in the future.

Giant Sequoia National Monument is expected to have a negligible impact on existing types of visitor uses. Visitor services (such as lodging, camping, gas, and food) are provided in several locations in the monument, meeting the needs of both monument and park visitors. However, national monument status is likely to attract more visitors, which could add to existing congestion in the parks. Visitors to the national parks overlap with those to the national monument since they can only get to the northern unit by way of the Big Stump entrance station and visitors drive along the Generals Highway through the monument between Sequoia and Kings Canyon National Parks. Monument status could further emphasize resource values and recreational opportunities, broadening some interpretive stories that could be jointly told. Some visitor confusion about how management

regulations differ between the Forest Service and the Park Service and the types of recreational opportunities that can be offered (for example, hunting and snowmobiling are allowed in non-wilderness forest areas) could be mitigated with education.

Terminus Dam on Lake Kaweah has recently been raised to increase storage, resulting in some loss or relocation of recreation facilities, such as boat ramps and picnic areas. While these kinds of facilities are not provided in the parks, they primarily serve local and regional users, this action would have a negligible, adverse, long-term impact on recreational opportunities for park visitors.

As described for the no-action alternative, past actions in the parks that have affected visitor experiences include the following:

- removing Giant Forest facilities, with replacement lodging at Wuksachi village, and in the future relocating an underground electric power line running through the center of the sequoia grove to follow the Crescent Meadow road; these actions are intended to preserve and improve the condition of the Giant Forest sequoia grove
- rebuilding the Generals Highway to preserve its scenic historical character and slower mountain driving opportunities
- replacing utility systems to meet state standards, with comfort stations in some locations being replaced by vault toilets.
- updating exhibits at the Grant Grove and Ash Mountain visitor centers

The preferred alternative, in conjunction with past, present, and reasonably foreseeable actions in the region, would be expanded somewhat, resulting generally in moderate, beneficial, long-term impacts on park visitors due to improved facilities and opportunities in the parks and the attraction of Giant Sequoia National Monument.

### **Conclusion**

The preferred alternative would enhance visitor recreational and educational opportunities to

enjoy and understand the parks while retaining their basic character and accommodating some growth in visitation. Limited facility expansion and redesign would offer visitors more choice and convenience, while improving access to park resources. Taken together, the actions in the preferred alternative would have moderate to major, beneficial, long-term impacts on experiences for all visitors. The following actions would specifically contribute to the beneficial impacts:

- improved diverse and comprehensive visitor orientation and educational programs, upgraded educational facilities, more ranger naturalist programs, focus on park values and learning outdoor skills, and expanded outreach
- redesigned and more efficient visitor circulation systems, including transit
- improved trail systems
- more choices in lodging
- facility improvements — a new, small-scale visitor center and bike routes at Cedar Grove; an improved visitor center, historic museum and redesigned circulation at Grant Grove; new facilities at Giant Forest; an improved Ash Mountain visitor center, with added bicycling, hiking, and camping opportunities in the foothills
- enhanced ability to meet the needs of diverse visitor groups and increased accessibility to park resources by visitors with disabilities

The preferred alternative, in conjunction with past, present, and reasonably foreseeable actions in the region, would generally result in moderate, beneficial, long-term impacts on park visitors because of improved facilities and expanded opportunities in the parks and the attraction of Giant Sequoia National Monument.

## IMPACTS OF ALTERNATIVE A

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### Analysis

#### *Park Character*

The parks would retain their basic rustic character, but a limited number of visitors would have opportunities to see the many natural and cultural resources for which the parks are significant. The majority of the parks would be managed in accordance with three backcountry prescriptions. Development areas would amount to 0.15% of the total park area and include approximately 1,310 acres, a reduction of around 435 acres from the no-action alternative. Of that development, park operations would occupy around 60%, residential 10%, campgrounds over 20%, and villages about 8%. Frontcountry areas reached by roads would amount to 2.1% of the parks, and around 1.7% of that would be low-use frontcountry. About 97.7% of the parks would be managed as backcountry, slightly more than now.

Compared to the no-action alternative, this alternative would preserve the low-key, rustic character of the parks by limiting development, with guidelines to preserve rustic character and the vast backcountry. However, reduced development would result in a minor to moderate adverse impact on opportunities to conveniently experience the parks' character over the long term.

#### *Visitor Use*

Traditional use patterns would continue to be altered as the regional population grows and as new user groups continue to discover the parks, which would increasingly contrast with the surrounding developed area. Day use, short stays, and weekend use would become more common. Private vehicles would remain the primary way to experience the parks. Crowding would be less common in many frontcountry areas except for Grant Grove, which would remain very congested because Hume Lake traffic would still be routed through the village. Use limits and resulting gate closures would deprive some people of opportunities to visit. Caves, alpine areas, and

many trails would remain largely inaccessible to people with disabilities, so wayside exhibits would provide an alternative way to see what the parks offer. Many types of visitor facilities would be moved out of the parks, and fewer services would be available to visitors. Year-round frontcountry use and lodging would continue to attract visitors.

Visitor use would be limited. The high-use scenic driving, development, and high-use frontcountry zones would see the most visitation. Crowding would be reduced on weekends, and those visitors who could enter and find parking would be able to see major park resources in a more relaxed, less crowded atmosphere. Relocated north entry gates would facilitate park entry but would exempt the Grant Grove area from use limits, so that area would remain congested since most traffic to Hume Lake and Cedar Grove passes through the village. Additional planning would be required to visit the parks. With reduced visitation, the quality of visitor experiences would improve.

While limits on the number of visitors allowed into the parks would have major, adverse, long-term impacts on all visitors to freely access the park, the subsequent improved visitor experiences would result in minor, beneficial, long-term impacts.

### **Visitor Information**

Information programs would be expanded, using numerous volunteers and partners, and a website would be established. The result would be a minor, beneficial, long-term impact for those seeking information before they visit.

### **Educational Opportunities**

**Educational Facilities.** Educational facilities would continue to be primarily provided in the development and high-use frontcountry zones, but the amount of facilities would be reduced.

- Limited and inadequate education would be provided at Cedar Grove in the contact station, and no visitor center would be provided. Compared to the no-action alterna-

tive, impacts would be negligible and adverse over the long term.

- The Walter Fry Nature Center would be removed, and the Lodgepole visitor center functions would be moved to the new Giant Forest museum. While new facilities and exhibits would be present, alpine interpretation would no longer be the focus. The Beetle Rock education center would provide new group educational opportunities. Fewer educational facilities and opportunities would result in minor to moderate, adverse impacts to visitor experiences over the long term.

Taken as a whole, this alternative would result in a minor to moderate, adverse, long-term impact on visitors' opportunities to use educational facilities in the parks.

**Educational Programs.** *Education, Interpretation, and Orientation* — Educational efforts would focus on visitor safety, orientation, and leave-no-trace programs, with a shift to written materials and exhibits. Guided educational activities would generally no longer be available. Reduced educational opportunities would have moderate to major, adverse, long-term impacts on most visitors.

*Educational Outreach* — Outreach programs would focus on resource protection. They would be enlarged, utilizing numerous volunteers and partners, and a Website would be established. The result would be a minor, beneficial, long-term impact on park educational programs.

### **Recreational Activities**

**Opportunities to Experience Park Resources.** Under alternative A visitors would have fewer choices to experience the range of park resources, although most types of resources could still be accessed by all visitors gaining entrance to the parks. Fewer people could visit since daily visitation would be limited. Providing fewer facilities would result in less convenience and less choice, as well as more of a need for visitors to plan their visits in advance. Smaller park developed areas would be less crowded than in

other alternatives because lodging and services would be reduced. With less visitation, the quality of visitor experiences could improve for some visitors, but features would remain busy because less parking would be provided and the transit system would be more limited. There would be fewer frontcountry trails, so the likelihood of encountering others would remain similar to today. Frontcountry subalpine motorist access in Mineral King would be curtailed, but pedestrians could still visit the valley. Waterplay opportunities might be restricted to protect resources. Winter use would be allowed at current levels, but fewer rentals would be available.

Reduced party sizes would mean that backcountry visitors would have more opportunities to experience solitude and other wilderness values, as well as wilderness recreational opportunities.

Because of steep terrain, caves, alpine areas, and many trails would remain largely inaccessible to people with disabilities. However, wayside exhibits would provide an alternative way for these individuals to see what the parks offer.

Since opportunities to experience the range of park resources would remain, alternative A would have a minor, adverse, long-term impact on how visitors experience the range of park resources. However, fewer visitors would enhance the quality of the overall visitor experience, as well as park values of wilderness and solitude, resulting in minor, beneficial, long-term impacts.

**Opportunities for Traditional Recreational Experiences.** *Trails and Hiking* — As described for the preferred alternative, conditions of frontcountry trails in both low- and high-use areas would be improved, but the amount of frontcountry trails would be reduced. An extensive trail system would continue to be provided, including long-distance, backcountry trails. However, most of the backcountry would remain trailless.

Alternative A would have minor to moderate, beneficial, long-term impacts for hiking and trail use because trail conditions would be improved.

*Camping* — Camping would generally offer more variety, and campgrounds would be redesigned to increase spaces between sites. The size of campgrounds would be capped at 200 sites, and most campgrounds would be reduced in size. Types of camping would be designated, thus improving the overall camping experience.

- At Cedar Grove campgrounds would be reduced in size and designated for certain types of uses, resulting in minor to moderate, adverse, long-term impacts to those wanting to stay overnight at Cedar Grove.
- At Grant Grove campgrounds would be redesigned to reduce the number of sites and to provide more day use space, resulting in minor, adverse impacts on those who could not find camping in the area.
- At Lodgepole and Dorst the campgrounds would be reduced in size, improving camping conditions, but resulting in minor, adverse impacts on those who could not find campsites in the area.
- In the foothills, the Potwisha campground would be removed, and South Fork would be converted to a trailhead campground, resulting in moderate, adverse impacts on those who could not find camping in these areas.
- The Cold Spring campground at Mineral King would be expanded to accommodate sites from Atwell Mill, resulting in negligible, beneficial, long-term impacts since a similar number of campsites would be provided, but minor, adverse impacts on those seeking to camp in a sequoia grove. Removing overnight camping from Atwell Mill would be consistent with actions in other sequoia groves to eliminate overnight use and thus provide a safer visitor experience because users would be at less risk from being injured by falling trees or limbs. Retaining the Mineral King dams will continue the potential adverse impact on human life and downstream development at

the Cold Spring campground, as discussed on page 249.

- The high Sierra camp at Bearpaw Meadow would be removed, resulting in minor, adverse, long-term impacts on the small number of visitors wanting this type of backcountry experience.
- For backcountry campers educational programs and enforcement efforts by park rangers would be enhanced in order to protect black bears from hiker and backpacker food supplies.

This alternative would generally result in minor, beneficial, long-term impacts on most camping experiences, with a moderate, adverse, long-term impact due to the removal of the Potwisha campground in the foothills area.

*Water Play* — Seasonal summer water play in rivers at Cedar Grove, Lodgepole, and the foothills would continue, but limited access could concentrate more people in some areas, with minor, adverse, long-term impacts on visitors. Reducing the number of river access points, parking areas, trails, and trailheads would decrease bank and vegetation damage, as well as use impacts such as littering. As a result of improved conditions, despite more limited access, there would be minor, beneficial, long-term impacts on waterplay opportunities.

*Cave Tours* — Low-cost, guided cave tours of various types would continue to be offered by the Sequoia Natural History Association at Crystal Cave. With decreased park visitation, it might be easier to obtain tickets in advance. An unknown number of visitors who might not be able to get advance tickets would be denied this experience. Due to the 0.5-mile steep access trail, the cave would not be accessible to those visitors in wheelchairs or those unable to negotiate the terrain. Educational waysides and photographs of the cave could help illustrate cave resources to visitors who could not access the cave. Restrooms would remain at the parking lot. Alternative A would result in negligible, beneficial, long-term impacts on guided cave

tours since the tour would remain similar to what is offered now.

To better protect park resources, access to other caves would be restricted to cave specialists with permits. Alternative A would have negligible, beneficial, long-term impacts on opportunities for the general public to experience cave resources, and minor, adverse, long-term impacts on opportunities for the small number of recreational cavers and spelunkers to explore park caves.

*Fishing* — Sportfishing would be more restricted so as to allow the restoration of native populations and to eliminate nonnative species. The resulting impact would be minor, long term, and adverse for those anglers seeking nonnative species.

*Winter Use* — Winter use demand would continue to expand, and crowding and lack of rental equipment would continue to occur during holiday weekends. Not providing winter use facilities at Wolverton would have minor to moderate, adverse, long-term impacts since fewer facilities and less rental equipment would be available.

**Opportunities for Nontraditional Recreational Experiences.** *New Activities* — New activities would be prohibited, even those with potentially no impact. The result would be minor, adverse, long-term impacts for those visitors desiring to try new or extreme activities within the parks since there would be a comprehensive prohibition.

*Bicycle Use* — Under alternative A bicycle use would be allowed only on park roads, the same as the no-action alternative. Safety would not be improved by striping bike lanes. The result would be minor, adverse, long-term impacts to bicyclists due to safety concerns.

*Snowmobiles / Snow Machines* — The use of snowmobiles and other snow machines would be prohibited, resulting in minor, adverse impacts over the short and long terms for private inholders and cabin permit holders who use these ma-

chines to access their cabins during the winter. However, all park users would be equally subject to restrictions. Because snowmobile use is currently limited to a few areas, and because opportunities are provided on adjacent USFS lands, not allowing recreational snowmobiling in the parks would have minor, beneficial, long-term impacts on the majority of park visitors during the winter.

*Nonmotorized Watercraft* — Nonmotorized watercraft would be discouraged, resulting in negligible to minor, adverse, long-term impacts on recreational opportunities since the number of visitors enjoying this activity is low but has been growing in recent years.

*Air Tours* — Potential impacts would be analyzed in an air tour management plan prepared jointly by the National Park Service and the Federal Aviation Administration.

**Opportunities for Stock Use.** Prohibiting horses and other stock throughout the parks under alternative A would result in moderate, adverse, long-term impacts to the relatively small number of visitors seeking this use. Commercially provided horse and pack trips would also be eliminated, and the corrals at Cedar Grove, Grant Grove, and Mineral King would be closed. Permits and discussion with backcountry rangers show little or no current use of stock by visitors with disabilities, so the impact on them would be negligible.

### *Visitor Facilities and Services*

Fewer facilities would be provided in the development and the low- and high-use frontcountry zones under alternative A. Some facilities would be moved outside the parks, resulting in less convenience and choice for visitors. For example, gasoline and RV dump stations would not be provided within the parks, and there would be less lodging and camping.

- At Cedar Grove seasonal use would continue, but public lodging would be removed, resulting in minor to moderate, adverse, long-term impacts to those wanting to stay overnight here.

- At Grant Grove there would be no change in the amount of cabins and other lodging provided, resulting in negligible, beneficial, long-term impacts to those wanting to stay overnight here.
- At Lodgepole the nature center and post office would be removed, with minor to moderate, adverse, long-term impacts due to fewer amenities.
- At Wolverton the picnic area would remain, but the winter concession building and the Boy Scout camp would be removed and the areas restored to more natural conditions. Services at Wolverton would be reduced compared to today, resulting in moderate, adverse, long-term impacts on winter use since support facilities would be removed. At the same time there would be major, beneficial, long-term impacts on visitation since most visitors spend time in the Giant Forest and parking would be more convenient.
- Like the other alternatives, new visitor service facilities would be provided in Giant Forest (the museum, the Beetle Rock education facility, and transit shuttle facilities), resulting in major, beneficial, long-term impacts on visitor experiences.

This alternative would generally result in minor to moderate, adverse, long-term impacts on visitor experiences as a result of fewer facilities.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable actions in the region would be the same as those described for the no-action alternative. Lodging, food service, and additional types of recreational opportunities are provided in surrounding communities, such as Three Rivers. It is likely that a similar type and number of services will be provided in the future.

Giant Sequoia National Monument is expected to have a negligible impact on existing types of visitor uses. Visitor services (such as lodging, camping, gas, and food) are provided in several locations in the monument, meeting the needs of

both monument and park visitors. More visitors to the monument could add to congestion in the parks because these visitors can only get to the northern unit by way of the Big Stump entrance station and visitors drive along the Generals Highway through the monument between Sequoia and Kings Canyon National Parks. Some visitor confusion about how management regulations differ between the Forest Service and the Park Service and the types of recreational opportunities that can be offered (for example, hunting and snowmobiling are allowed in USFS nonwilderness forest areas) could be mitigated with education.

Raising Terminus Dam to increase the level of Lake Kaweah has resulted in some loss or relocation of recreation facilities, such as boat ramps and picnic areas. While these kinds of facilities are not provided in the parks, they primarily serve local and regional users, so this action would have a negligible, adverse, long-term impact on recreational opportunities for park visitors.

Past actions in the parks that have affected visitor experiences include the following:

- removing Giant Forest facilities, with replacement lodging at Wuksachi, and in the future relocating an underground electric power line through the center of the sequoia grove to follow the Crescent Meadow road; all these actions are intended to preserve and improve the condition of the Giant Forest sequoia grove
- rebuilding the Generals Highway to preserve its scenic historical character and slower mountain driving opportunities
- replacing utility systems to meet state standards, and replacing comfort stations with vault toilets in some locations
- updating exhibits at the Grant Grove and Ash Mountain visitor centers

Alternative A, in conjunction with past, present, and reasonably foreseeable actions in the region, would likely result in less choice and more limited visitor opportunities than are currently

provided. This would result in a moderate, adverse, long-term impact on park visitors due to reduced facilities and opportunities in the parks, despite the attraction of Giant Sequoia National Monument.

## Conclusion

Since the focus of alternative A is to reduce use and development, the general impact on visitor experiences would be moderate, long term, and adverse. New facilities at Giant Forest would improve education, park experiences, and accessibility for physically disabled visitors. But on the whole, the parks would be less convenient and offer less choice, more restrictions, a loss of traditional activities, and fewer facilities to a limited number of visitors.

Alternative A, in conjunction with past, present and reasonably foreseeable actions in the region, would likely result in less choice and more limited visitor opportunities than are currently provided. This would result in moderate, adverse, long-term impacts on park visitors because of fewer facilities and opportunities in the parks, despite the attraction of Giant Sequoia National Monument.

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## IMPACTS OF ALTERNATIVE C

### Analysis

#### *Park Character*

Alternative C focuses on retaining the parks' basic rustic character and restoring traditional use patterns, which may not be realistic with changes in society. Development areas would increase slightly to around 1,986 acres (0.23% of the total park area), an increase of 241 acres compared to the no-action alternative. Within the development zone, park operations would occupy around 55% of the area, campgrounds 19%, residential areas 16%, and villages 10%. Frontcountry areas accessible by roads would amount to 2.25% of the park, with around 2% being low-use frontcountry. About 97.5% of the parks would be managed as backcountry and wilderness.

Compared to the no-action alternative, alternative C would also preserve the low-key, rustic character of the parks through limited development, guidelines to preserve the rustic character, and the vast backcountry. However, improved parking and circulation would result in a minor to moderate, beneficial impact over the long term because it would be more convenient for visitors to experience the parks.

### ***Visitor Use***

Traditional use patterns would be emphasized, and the parks would meet the needs of a growing regional population. However, new user groups might find that the parks do not offer opportunities that meet their family or cultural needs. Private vehicles would remain the primary means for experiencing the parks. Redesigning the entrance station at Grant Grove would reduce wait times and make visitor experiences more pleasant. Visitor use would not be limited, and visitors could access all types of park resources. Longer stays would be encouraged through an expanded in-parks education program, despite recreation trends toward shorter stays and more day use. The high-use scenic driving, development, and high-use frontcountry zones would see the largest increase in visitation.

Crowding and traffic congestion during the peak season would remain common in high-use frontcountry and development areas, and some visitors would not be able to see primary park resources because of inadequate parking facilities during peak periods. Redesigning developed areas and circulation patterns as needed would somewhat improve the quality of visitor experiences even with more visitors. Existing river use and winter use levels would continue, but areas could be modified to reduce or contain resource impacts.

Cultural resources would be highlighted, and slightly more visitors would have opportunities to see the many natural and cultural resources for which the parks are significant. Caves, alpine areas, and many trails would remain largely inaccessible to visitors with disabilities, so wayside exhibits would provide an alternative

way to experience what the parks offer. Small groups would be encouraged to visit the backcountry, but on a dispersed basis.

The overall result of alternative C would be moderate, beneficial, long-term impacts on visitor experiences.

### ***Visitor Information***

The emphasis on in-park ranger programs would possibly make it harder for visitors to get information to plan their trips to the parks, a moderate, adverse impact on regional park users and those planning to come to the parks.

### ***Educational Opportunities***

**Educational Facilities.** Additional visitor educational facilities would be developed, and others would be consolidated.

- A new, small-scale visitor center would be provided at Cedar Grove, with minor, beneficial, long-term impacts due to improved educational opportunities for the small number of visitors here.
- The visitor center at Grant Grove would be updated as needed, resulting in minor, beneficial, long-term impacts on visitor educational opportunities.
- The visitor center at Lodgepole and the Walter Fry Nature Center would be removed, with functions concentrated in the new Giant Forest facilities. Some educational and nature activities would be provided at the shuttle stop. Removing popular facilities would result in moderate, adverse, long-term impacts to Lodgepole visitors. This impact would be somewhat mitigated by more educational opportunities at shuttle stops and the new facilities at Giant Forest.
- New educational facilities at the Giant Forest museum and the Beetle Rock education center would fill an important interpretive gap about giant sequoia ecology and provide additional group-learning opportunities. Like all the alternatives, these actions would result in major, bene-

ficial, long-term impacts since the majority of park visitors stop at Giant Forest.

- A new or enlarged visitor center would be built at Ash Mountain, providing more opportunities to learn about the foothills environment. With these new opportunities near a main park entrance, the impact on visitor educational opportunities would be moderate to major, beneficial, and long term.
- A visitor contact station would continue to provide limited space for education at Mineral King, resulting in negligible, beneficial, long-term impacts on visitors in this area.

The overall impact on visitor educational opportunities of improved and new educational facilities would be moderate to major and beneficial over the long term.

**Educational Programs.** *Education, Interpretation, and Orientation* — Increasing orientation programs and providing more of the popular ranger naturalist programs would enhance the learning environment for visitors with regard to resource protection and cultural resources. Additional education about Native American uses of the park and the history of recreation communities would be provided. The result would be moderate, beneficial, long-term impacts on most visitors.

*Educational Outreach* — Focusing educational programs within the parks and eliminating park outreach programs in favor of an expanded ranger program would result in long-term, moderate, adverse impacts on regional park users.

### **Recreational Activities**

**Opportunities to Experience Park Resources.** Under alternative C opportunities would continue to be provided so visitors could experience the range of resources for which the parks are significant, although the number of frontcountry trails leading to resources would be consolidated to eliminate redundant trails and to protect resources. There would be more opportunities to visit park caves, but because of steep terrain,

caves would still be inaccessible to some visitors; however, wayside exhibits would provide an alternative way to vicariously experience what the parks offer. Portions of facilities and park roads would be redesigned to accommodate more visitors. Developed areas in the parks would have more diverse types of lodging, including traditional cabins. Regulations would be used to maintain traditional activities, thus improving the quality of experiences for most visitors. Features and attractions in the high-use frontcountry zone would remain crowded at times, and a limited transit system would be used to improve circulation at these sites. Consolidating frontcountry trails in both low- and high-use areas would increase the likelihood of visitors encountering others on the trails. Access to heavily used waterplay areas would likely be redesigned to reduce impacts on natural resources, somewhat restricting visitor freedom. Winter use would expand, with more opportunities for snow play, as well as designated cross-country and snowshoe trails.

Areas managed as backcountry, including designated wilderness, would be similar to what is available today. Reduced party-size requirements and more regulation would adversely affect backcountry experiences for some visitors.

While opportunities to experience the range of park resources would remain, there would be a number of visitor impacts. Less choice and consolidated facilities would result in minor, adverse, long-term impacts on visitors' abilities to experience the range of park resources. There would also be negligible to minor, adverse, long-term impacts on opportunities to enjoy frontcountry solitude as a result of consolidating trails. Overall, there would be negligible to minor, beneficial, long-term impacts on the quality of visitor experiences.

**Opportunities for Traditional Recreational Experiences.** *Trails and Hiking* — Trails would be consolidated, resulting in improved conditions, but fewer choices for hiking. However, the overall impacts would be moderate, beneficial, and long term because of better trail conditions.

*Camping* — Camping would generally offer more variety.

- At Cedar Grove campgrounds would be redesigned to better fit family groups, and campgrounds would be designated for certain types of camping. The RV dump station would be retained. Impacts on campers at Cedar Grove would be minor, beneficial, and long term.
- At Grant Grove popular campgrounds would be redesigned to provide more space between sites, resulting in moderate beneficial, long-term impacts because of improved experiences.
- The Dorst campground would continue, with a negligible impact on camping opportunities.
- At Lodgepole the popular campgrounds would be reduced in size, resulting in improved camping experiences, but a moderate, adverse, long-term impact on the amount of camping in this area.
- The Potwisha and Buckeye Flat campgrounds would be upgraded, and the South Fork campground would be retained, resulting in negligible, long-term impacts on foothills campers.
- The Atwell Mill campground would be redesigned, and the Cold Spring campground would be retained at Mineral King, resulting in negligible, beneficial, long-term impacts on visitors who want several camping opportunities at Mineral King. Expanding overnight camping at Atwell Mill would be inconsistent with actions in other sequoia groves to eliminate overnight use and thus provide a safer visitor experience, with less risk of human injuries from falling trees and limbs. Retaining the Mineral King dams will continue the potential adverse impact on human life and downstream development at the Cold Spring campground, as discussed on page 249.
- Continuing the high Sierra camp at Bearpaw Meadow would retain more camping choices for visitors, resulting in negligible, beneficial, long-term impacts on visitors

seeking this type of backcountry experience.

This alternative would generally result in minor to moderate, beneficial, long-term impacts for visitors who are camping, despite fewer campsites.

*Water Play* — Seasonal summer water play in rivers at Cedar Grove, Lodgepole, and the foothills would continue. Similar to the preferred alternative, river access points, parking areas, trails, and trailheads would be defined in popular areas to reduce bank and vegetation damage, as well as littering. Improved and defined access would result in minor, beneficial, long-term impacts for a small number of visitors.

*Cave Tours* — Low-cost, guided tours at Crystal Cave, with advance ticket sales, would allow some visitors to experience this resource. As described for the no-action alternative, an unknown number of visitors might not be able to get permits, thus being denied this experience. Guided tours would be provided at other caves. Generally, making more cave opportunities available for visitors wanting such experiences would have minor, beneficial, long-term impacts.

*Fishing* — Sportfishing would continue to be highly regulated. No facilities to support fishing would be provided. The park would continue to restore native populations and to eliminate non-native species. The impact on fishing would be negligible, beneficial, and long term since fishing opportunities would continue.

*Winter Use* — Winter recreational opportunities would be expanded so visitors could better enjoy park resources year-round. Snowplay areas would be provided at Grant Grove and Wolverton, with equipment rentals, limited food service, and restrooms being made available, similar to the preferred alternative. Crowding would continue to be common at snowplay sites during weekends and holidays. Cross-country skiing and snowshoeing would continue to offer opportunities for quieter experiences within superb front- and backcountry park settings. Winter camping would be provided in several camp-

grounds, in addition to backcountry opportunities. Like the preferred alternative, alternative C would result in minor, beneficial impacts for winter use opportunities over the long term because of slightly expanded opportunities and services.

**Opportunities for Nontraditional Recreational Experiences.** *New Activities* — Traditional basic activities would be encouraged, as would activities related to the parks’ purposes. The result would be negligible, adverse impacts for those few visitors desiring to try new or extreme activities within the parks. For other visitors this policy would result in minor, beneficial impacts over the long term because the parks’ traditional character would be preserved.

*Bicycle Use* — Under alternative C bicycle use would be facilitated at Cedar Grove and Grant Grove by means of striping bike lanes, giving bicyclists a dedicated portion of the roadway to use. Opening Shepherd Saddle Road to bicycle use would result in additional recreational opportunities, and the absence of vehicles would create a safer experience for visitors. Overall, impacts would be minor, beneficial, and long term to the relatively small number of bicycle-riding visitors.

*Snowmobiles / Snow Machines* — Like the no-action and preferred alternatives, the use of snowmobiles and other snow machines would only be allowed on roads for private inholders and permit holders to access their cabins (in Wilsonia and Mineral King). Because most of the parks are wilderness and motorized equipment is prohibited, snowmobiles are confined to frontcountry roads, where their use may pose safety concerns for other winter users. Because snowmobile use is limited to a few areas, and because opportunities are provided on adjacent USFS lands, impacts on the majority of park users during the winter would be minor, beneficial, and long term.

*Nonmotorized Watercraft* — Nonmotorized watercraft would be allowed with regulation on park rivers, with minor, beneficial, long-term impacts on watercraft users.

*Air Tours* — Similar to the preferred alternative, potential impacts would be analyzed in an air tour management plan prepared jointly by the National Park Service and the Federal Aviation Administration.

**Opportunities for Stock Use.** Under alternative C the use of horses and other stock would continue as a traditional use in the parks, but with regulation and reduction in party sizes. The result would be minor, long-term, and beneficial for stock users since the use would continue to be allowed, but the impact would be adverse for backcountry stock users accustomed to traveling in large groups.

Continuing to provide commercial horse and pack trips, and keeping the corrals at Cedar Grove, Grant Grove, and Mineral King open, would result in minor, beneficial, long-term impacts for visitors enjoying this type of activity. A new, sustainable location to replace the Wolverton corral would be explored at Dorst, Wuksachi, Lodgepole, and Wolverton. Added stock support would be provided at Dillonwood and in the foothills. A “Preliminary Draft Franchise Fee / Feasibility Analysis of Current Saddle Horse Ride and Pack Stations” (NPS 2004) indicates that new or existing commercial pack station / stock ride operations might become increasingly infeasible without government-provided infrastructure, such as roads, utilities, and buildings. This is primarily due to rising insurance costs and projected costs for additional resource protection requirements, such as weed-free feed, waste removal, and equipment costs for waste removal.

Continuing stock use is expected to have a negligible, beneficial impact for visitors with physical disabilities because this would provide another means for them to access various resources in the parks.

Impacts of horse use (feces, eroded trails, dust) could be reduced by education, smaller party sizes, and regulation enforcement, but hikers would continue to be adversely affected to a minor degree.

Despite minor, adverse impacts on hikers, opportunities for continued traditional stock use with regulations and monitoring to improve visitor experiences for all would generally result in minor, beneficial impacts over the long term.

### ***Visitor Facilities and Services***

Overnight lodging and camping would be accommodated in the development, low-use front-country, and backcountry zones. Slightly more overnight facilities would be provided than under the no-action alternative, resulting in more convenience and choices for visitors. Developed areas would not include gas stations. As previously described, campgrounds would generally offer more variety.

- At Cedar Grove a longer use season and cabins would be added to offer more choices in public lodging, resulting in minor, beneficial, long-term impacts.
- At Grant Grove lodging would be expanded within the limits of current concession contracts and would include a traditional mix of cabins and lodges. Impacts of more lodging choices on visitors would be minor and beneficial over the long term.
- At Wuksachi a gas station would be provided, and lodging and visitor services would be expanded within the concession contract limits and an amphitheater provided, resulting in minor to moderate, beneficial, long-term impacts on visitors.
- At Lodgepole facilities meeting overnight needs (e.g., laundry / showers, groceries) would remain, resulting in minor, beneficial impacts over the long term.
- At Wolverton the concession building for winter use and the Boy Scout camp would be retained, and picnic facilities would be provided at shuttle stops and new parking areas. Pending the selection of a new corral site, the impact on the relatively small number of visitors seeking a Giant Forest riding experience would be minor, adverse, and short term. Services at Wolverton would be improved compared to today, resulting in major, beneficial, long-term impacts since

most visitors spend time in Giant Forest and parking would be more convenient.

For visitors this alternative would generally result in minor to moderate, beneficial, long-term impacts in terms of facilities, visitor convenience, and choices of lodging.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable actions in the region would be the same as those described for the no-action alternative. Lodging, food service, and additional types of recreational opportunities are provided in surrounding communities, such as Three Rivers. It is likely that a similar type and number of services will be provided in the future.

Giant Sequoia National Monument is expected to have a negligible impact on existing types of visitor uses. Visitor services (such as lodging, camping, gas, and food) are provided in several locations in the monument, meeting the needs of both monument and park visitors. However, national monument status is likely to attract additional visitors, which could add to congestion in the parks because visitors can only get to the northern unit by way of the Big Stump entrance station and they drive along Generals Highway through the monument between Sequoia and Kings Canyon National Parks. Some visitor confusion about how management regulations differ between the Forest Service and the Park Service and the types of recreational opportunities that can be offered (for example, hunting and snowmobiling are allowed in non-wilderness forest areas) could be mitigated with education.

Raising the level of Terminus Reservoir has resulted in some loss or relocation of recreation facilities, such as boat ramps and picnic areas. While these kinds of facilities are not provided in the parks, they primarily serve local and regional users, so this action would have negligible, adverse, long-term impacts on recreational opportunities for park visitors.

Past actions in the parks that have affected visitor experiences include the following:

- removing Giant Forest facilities, with replacement lodging at Wuksachi, and in the future relocating an underground electric power line running through the center of the sequoia grove to follow the Crescent Meadow road; these actions are intended to preserve and improve the condition of the Giant Forest sequoia grove
- rebuilding the Generals Highway to preserve its scenic historical character and slower mountain driving opportunities
- replacing utility systems to meet state standards, and in some locations replacing comfort stations with vault toilets
- updating exhibits at the Grant Grove and Ash Mountain visitor centers

Alternative C, in conjunction with past, present, and reasonably foreseeable actions in the region, would improve facilities and opportunities in the parks, in addition to the attractions of Giant Sequoia National Monument, resulting in moderate, beneficial, long-term impacts on visitor experiences.

## Conclusion

Compared to the no-action alternative, alternative C would provide improved visitor opportunities, characterized by moderate, beneficial impacts over the long term. The differences from the preferred alternative include fewer day use facilities, in-park educational programs focused on ranger naturalist programs, and the elimination of an outreach program. The actions in alternative C that would generally contribute to moderate, beneficial, long-term impacts on visitor experiences include:

- new educational facilities at Giant Forest, Cedar Grove, and Ash Mountain
- expanded ranger naturalist programs
- a limited, voluntary shuttle system
- improved campgrounds, frontcountry trails, and bicycling opportunities
- more lodging

Alternative C, in conjunction with past, present, and reasonably foreseeable actions in the region, would improve visitor facilities and opportunities, generally resulting in moderate, beneficial, long-term impacts on visitors to the parks and to Giant Sequoia National Monument.

## IMPACTS OF ALTERNATIVE D

### Analysis

#### *Park Character*

The parks would retain their basic rustic character, offering most visitors opportunities to see the many natural and cultural resources for which the parks are significant. Development areas would total 2,133 acres (0.25% of the total park area), an increase of 388 acres over the no-action alternative. Within the development zone, park operations would occupy around 50% of the area, residential uses around 10%, campgrounds around 24%, and villages about 11%. Frontcountry areas reached by roads would amount to 3.8% of the parks, the majority of which (2.8%) would be in the low-use frontcountry zone. Compared to the other alternatives, there would be slightly less backcountry and slightly less area compatible with management as wilderness under this alternative. Higher levels of use might be more common on major backcountry trails.

Compared to the no-action alternative, alternative D would also preserve the low-key, rustic character of the parks because of limited development, guidelines to preserve rustic character, and the vast backcountry. However improved circulation and transit would result in moderate, beneficial impacts on visitor experiences.

#### *Visitor Use*

Traditional use patterns would continue to be altered as the regional population grows and new user groups continue to discover the parks. Visitation would not be limited, and facilities would likely be developed to accommodate additional visitation and more day use. Short stays and weekend use, in addition to day use, would likely become more common. Private vehicles

would remain the primary means of arriving at the parks, and relocated entrance stations would make the experience more pleasant. Most visitor use would be in the high-use scenic driving, development, and high-use frontcountry zones.

While more visitors could come, they would be dispersed by means of a transit system and the development of additional areas to visit. Developed areas in the parks would be larger than they are today. High-use areas would remain crowded at times, especially on summer weekends, but all visitors should be able to see primary park resources because of transit systems. Caves, alpine areas, and many trails would remain largely inaccessible to people with disabilities, so way-side exhibits would provide an alternative way to see what the parks offer. Educational programs would include backcountry skills, so that more people would experience the backcountry. Most facilities would remain in the parks.

More visitation, combined with more areas to visit, transit improvements, and additional facilities, would result in moderate, beneficial, long-term impacts on visitor experiences.

### ***Visitor Information***

People would have additional opportunities to learn about the parks before their visits on the Internet. This would allow them to plan their visits to make the best use of their time, resulting in minor, beneficial, long-term impacts.

### ***Educational Opportunities***

**Educational Facilities.** New educational facilities / visitor centers would be provided at Cedar Grove, Grant Grove, and Ash Mountain / Foothills or Potwisha. The visitor contact station at Mineral King would continue to provide limited space for education. The Lodgepole visitor center would be assessed to determine if several educational facilities could be supported in the Giant Forest area. A nature facility, which would meet the needs of day users as well as overnight guests, would be provided at Lodgepole. New educational facilities at the Giant Forest museum and the Beetle Rock education center would be

completed, filling an important interpretive gap about giant sequoia ecology and providing additional group learning opportunities. The result of new facilities would be major, beneficial, long-term impacts on visitors' abilities to learn about park resources.

**Educational Programs.** *Education, Interpretation, and Orientation* — Educational programs would be substantially expanded by means of more outreach, popular ranger naturalist programs, and additional programs that would focus on instilling park stewardship values, leave-no-trace ethics, and backcountry skills. Park orientation and wayfinding would be expanded. The overall impacts would be major, beneficial, and long term because many more visitors would have access to educational programs.

*Outreach Programs* — Visitor outreach programs would be expanded to reach diverse publics, including classrooms throughout the region. A classroom-focused website would provide additional education, and numerous volunteer and partnership efforts would be developed. The overall impact would be minor, beneficial, and long term because a broad segment of the population would have chances to learn about the parks, their ecology, and their history.

### ***Recreational Activities***

**Opportunities to Experience Park Resources.** Under alternative D there would be slightly more opportunities to experience the range of resources for which the parks are significant, with increased access to some resources, such as alpine areas, caves, and features along Generals Highway. The frontcountry trails system would be improved and expanded, offering more variety of trails and directional information. The likelihood of encountering others would remain similar to today. There would be more opportunities to experience wilderness values and recreational opportunities. Varied party sizes, dispersion of uses, and separation of stock and hikers would result in backcountry experiences still likely to provide solitude. Larger sizes of stock parties would be allowed.

Because of the terrain, caves, alpine areas, and many trails would remain largely inaccessible to people with physical disabilities. However, there would be more accessible trails and facilities than today, and they would provide more diverse experiences for disabled visitors.

With continued opportunities to experience the range of park resources, there would be moderate, beneficial, long-term impacts because of improved circulation and facilities.

**Opportunities for Traditional Recreational Experiences.** *Trails and Hiking* — There would be numerous recreational opportunities to use trails in all park environments, similar to the preferred alternative. Conditions of frontcountry trails in both low- and high-use areas would be improved, and additional trail information would be provided.

The majority of the parks would remain backcountry. While most of the backcountry would remain trailless, more major backcountry trails would be provided to accommodate higher levels of use. Educational programs and enforcement efforts by park rangers would be enhanced to ensure that hikers and backpackers protected their food supplies from black bears.

This alternative would have major, beneficial, long-term impacts for hiking and trail use since most park visitors would use portions of the improved trail system, and many more would be educated about trails and backcountry hiking

*Camping* — Camping opportunities would generally offer more variety, as well as greater separation of differing camping preferences.

- At Cedar Grove campground sizes would be limited and types of camping designated, thus improving the camping experience, resulting in minor, beneficial, long-term impacts.
- The Dorst campground would be redesigned to separate uses and provide more types of campsites. The RV dump station would be retained, and a camper store would be added. Impacts would be moderate and beneficial for campers over the long term because different needs of user groups would be met.

erate and beneficial for campers over the long term because different needs of user groups would be met.

- At Lodgepole the campgrounds would be reduced in size but conditions would be improved, resulting in minor, beneficial, long-term impacts for the smaller number of campers who could get a campsite.
- In the foothills the Potwisha campground would be removed, resulting in a moderate, adverse, long-term impact on camping in the foothills since this is the main foothills campground.
- Camping would be added along the North Fork, and the South Fork campground would be converted to a trailhead campground, resulting generally in minor, beneficial, long-term impacts on foothills camping.
- Both the Cold Spring and the Atwell Mill campgrounds would be expanded at Mineral King, resulting in minor, beneficial, long-term impacts because of more camping opportunities. Expanding overnight camping at Atwell Mill would be inconsistent with actions in other sequoia groves to eliminate overnight use and thus provide a safer visitor experience, with less risk of human injuries from falling trees and limbs. Retaining the Mineral King dams will continue the potential adverse impact on human life and downstream development at the Cold Spring campground, as discussed on page 249.
- The high Sierra camp at Bearpaw Meadow would continue to offer low-key, backcountry facilities for visitors, and a new high Sierra camp would be built, doubling opportunities for visitors seeking this type of backcountry experience. The result on visitor experiences would be minor to moderate, beneficial, long-term impacts to a small number of visitors.

This alternative would generally result in minor to moderate, beneficial, long-term impacts on camping due to improved facilities. Removing

the Potwisha campground would result in moderate, adverse impacts over the long term.

*Water Play* — Seasonal summer water play in rivers at Cedar Grove, Lodgepole, and the foothills would continue. Similar to the preferred alternative, river access points, parking areas, trails, and trailheads would be defined in popular areas to reduce bank and vegetation damage, as well as use impacts such as littering. This would result in minor, beneficial, long-term impacts, similar to the preferred alternative, because of improved and controlled visitor access for a small number of visitors.

*Cave Tours* — Low-cost, guided tours of Crystal Cave, with advance ticket sales, would continue to be offered by the Sequoia Natural History Association. As now, the cave would not be accessible to those visitors in wheelchairs or those unable to negotiate the terrain. For these visitors, access could be provided through educational waysides and photographs. Restrooms would remain at the parking lot; they would only be provided at the cave if it became technologically and economically feasible to meet state wastewater standards with sustainable facilities.

To better protect park resources, access to other caves would be restricted to cave specialists with permits. Alternative D would have negligible, beneficial, long-term impacts on opportunities for the general public to experience cave resources, and minor, adverse, long-term impacts on opportunities for recreational cavers and spelunkers to explore park caves.

*Fishing* — Sportfishing would continue and would be regulated in order to restore native populations and to eliminate nonnative species. The resulting impact would be negligible, beneficial, and long term for the few anglers fishing in the parks.

*Winter Use* — Winter use would be expanded so visitors could enjoy park resources year-round. Snowplay areas would be provided at Grant Grove and Wolverton, with equipment rentals, limited food service, and restrooms being made available. Crowding would be common at snow-

play sites during weekends and holidays. Cross-country skiing and snowshoeing would continue to offer opportunities to have a quieter experience within superb front- and backcountry park settings. Winter camping would be provided in several campgrounds, in addition to backcountry opportunities. Similar to the preferred alternative, alternative D would result in minor, beneficial, long-term impacts by improving winter use opportunities and services that serve a small number of winter users.

**Opportunities for Nontraditional Recreational Experiences.** *New Activities* — New activities would be assessed against policy and resource concerns to determine potential impacts. Low-impact activities that did not impair park resources and were related to park settings would be allowed. The parks would encourage basic activities. Measures to separate some activities that would infringe on the experiences of other visitors would enhance the overall enjoyment of park resources for as many visitors as possible. This alternative would have minor, beneficial, long-term impacts for visitors to experience new activities deemed appropriate.

*Bicycle Use* — Under alternative D bicycle use would improve with designated bike routes at Cedar Grove, redesigned roads that would accommodate bicycles at Grant Grove, and bicycling opportunities on the road to Crescent Meadow, Colony Mill Road, and Shepherd Saddle Road. Impacts on bicycle-riding visitors would be moderate, beneficial, and long term because of safer conditions and additional opportunities in many popular areas of the parks.

*Snowmobiles / Snow Machines* — Like the no-action and preferred alternatives, the use of snowmobiles and other snow machines would only be allowed on roads by private inholders and permit holders to access their cabins (in Wilsonia and Mineral King). Because most of the parks are wilderness and motorized equipment is prohibited, snowmobiles are confined to frontcountry roads, where their use may pose safety concerns for other winter users. Because snowmobile use is limited to a few areas, and because opportunities are provided on adjacent

USFS lands, impacts on the majority of park users during the winter would be minor, beneficial, and long term.

*Nonmotorized Watercraft* — Like the preferred alternative, nonmotorized watercraft would be allowed with regulation, and access points would be designated. The result would be minor, beneficial, long-term impacts on the small but increasing number of visitors using nonmotorized watercraft.

*Air Tours* — Similar to the preferred alternative, potential impacts would be analyzed in an air tour management plan prepared jointly by the National Park Service and the Federal Aviation Administration.

**Opportunities for Stock Use.** Under alternative D use by horses and other stock would continue but with less limitation on party sizes than under the other alternatives, resulting in minor, beneficial, long-term impacts to stock users. There would be more separation between stock users and hikers than today, resulting in minor, beneficial, long-term impacts to hikers, who would be less exposed to impacts from stock use.

Continuing commercial horse and pack trips; retaining the corrals at Cedar Grove, Grant Grove, and Mineral King; relocating the Wolverton corral (the Dorst, Wuksachi, Lodgepole, and Wolverton areas would be considered); and expanding and improving riding trails would result in minor, beneficial, long-term impacts to visitors seeking stock experiences. Some day use trails would be removed from the Giant Forest area, resulting in a minor, adverse, long-term impact on those riders seeking the experience of riding in the sequoia grove.

Continuing stock use would have negligible, beneficial, long-term impacts for visitors with physical disabilities because this would provide another means for them to access various resources in the parks.

Additional stock camps would be provided at Shepherd Saddle and on the Hockett Plateau. Stock support facilities would be provided at

Dillonwood. These additional facilities would result in a moderate, beneficial, long-term impact on the small number of visitors who are stock users.

A “Preliminary Draft Franchise Fee / Feasibility Analysis of Current Saddle Horse Ride and Pack Stations” (NPS 2004) indicates new or existing commercial pack station / stock ride operations might become increasingly infeasible without government-provided infrastructure, such as roads, utilities, and buildings. This is primarily due to rising insurance costs and projected costs for additional resource protection requirements, such as weed-free feed, waste removal, and equipment costs for waste removal.

Impacts of horse use (feces, eroded trails, dust) could be reduced by education and regulation enforcement, but hikers would continue to be adversely affected to a minor degree.

In general the impact of improved stock facilities and more accessible and expanded stock opportunities for visitors would be moderate, beneficial, and long term despite adverse impacts on backcountry hikers.

### *Visitor Facilities and Services*

Slightly more overnight facilities would be provided. When economically feasible, some non-visitor facilities would be moved outside the parks where they would be more efficient to operate. As previously described, campgrounds would be designed to offer more variety, as well as separation of differing camping preferences.

- Operating Cedar Grove year-round or for an extended season would increase use and change the character of this developed area. A visitor center would be added, diverse types of public lodging would be expanded, and camping preferences designated. Opportunities for visitors at Cedar Grove would expand substantially, resulting in moderate to major, beneficial, long-term impacts. The change in character would be mitigated by design guidelines already in place.

- At Grant Grove a bypass road could be constructed to divert Hume Lake traffic around the park, thus reducing traffic congestion in the village. (A determination would have to be made whether the bypass would be compatible with the presidential proclamation creating Giant Sequoia National Monument.) A transit system and related facilities would be constructed, the visitor center would be relocated near the transit staging area, and a gas station would be provided. Lodging would be expanded, with more cabins and other lodging types available. The changes in visitor experiences from expanded facilities under alternative D would be major, beneficial, and long term. Changes in park character resulting from this alternative would be mitigated by design guidelines already in place.
- Providing a camper store at Dorst would make obtaining supplies more convenient for overnight campers. However, supplies can be purchased at nearby Stony Creek Lodge in Giant Sequoia National Monument, so the beneficial overall impact of a store at Dorst would be negligible to minor.
- At Wuksachi a mix of cabins and lodges, to the extent allowed by contract, as well as a gas station, would be provided, resulting in moderate, beneficial, long-term impacts to visitors seeking overnight accommodations close to Giant Forest.
- At Lodgepole the nature center and post office would be removed and the need for a visitor center assessed. Fewer facilities would mean less convenience for some visitors, with minor to moderate, adverse impacts over the long term.
- At Wolverton the concession building for winter use and the picnic area would remain. The Boy Scout camp would be converted to a camp for volunteers. In addition to a new visitor parking lot / shuttle system, a 1,700-car parking garage would be developed to allow expanded day use at Giant Forest. While more day visitors would be able to visit Giant Forest, greatly increased parking and improved vehicular circulation

would result in more crowding and degraded visitor pedestrian experiences. The removal of the corral has reduced recreational opportunities at Wolverton, adversely affecting a relatively small number of visitors wanting to ride in Giant Forest until a new location has been identified, a minor, adverse impact. Visitor services at Wolverton would be vastly expanded compared to today, but as a result of crowding, the general impact would be major and adverse over the long term since most visitors spend time in the Giant Forest. While parking would be more convenient, the low-key character of the area would be changed over the long term.

- New visitor service facilities in the Giant Forest (the museum, the Beetle Rock education facility, and transit shuttle facilities) would result in major, beneficial impacts for visitors over the long term, the same as the other alternatives.
- The Potwisha campground would be converted to day uses or a new visitor center. The resulting impacts to day use would be major, beneficial, and long term.

This alternative would generally result in moderate to major, beneficial, long-term impacts on visitor experiences due to improved day use and educational facilities, as well as better visitor facility conditions.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable actions in the region would be the same as those described for the no-action alternative. Lodging, food service, and additional types of recreational opportunities are provided in surrounding communities, such as Three Rivers. It is likely that a similar type and number of services will be provided in the future.

Giant Sequoia National Monument is expected to have a negligible impact on existing types of visitor uses. Visitor services (such as lodging, camping, gas, and food) are provided in several locations in the monument, meeting the needs of

both monument and park visitors. National monument status is likely to attract additional visitors, which could add to congestion in the parks because visitors can only get to the northern unit by way of the Big Stump entrance station and visitors drive along Generals Highway through the monument between Sequoia and Kings Canyon National Parks. Some visitor confusion about how management regulations differ between the Forest Service and the Park Service and the types of recreational opportunities that can be offered (for example, hunting and snowmobiling are allowed in nonwilderness forest areas) could be mitigated with education.

Raising the level of Terminus Reservoir on Lake Kaweah resulted in some loss or relocation of recreation facilities, such as boat ramps and picnic areas. While these kinds of facilities are not provided in the parks, they primarily serve local and regional users, so this action would have a negligible, adverse, long-term impact on recreational opportunities for park visitors.

Past actions in the parks that have affected visitor experiences include the following:

- removing Giant Forest facilities, with replacement lodging at Wuksachi, and in the future relocating an underground electric power line running through the center of the sequoia grove to follow the Crescent Meadow road; these actions are intended to preserve and improve the condition of the Giant Forest sequoia grove
- rebuilding the Generals Highway to preserve its scenic historical character and slower mountain driving opportunities
- replacing utility systems to meet state standards, and in some locations replacing comfort stations with vault toilets
- updating exhibits at the Grant Grove and Ash Mountain visitor centers

Alternative D, in conjunction with past, present, and reasonably foreseeable regional actions, would generally expand visitor experience opportunities, resulting in moderate to major,

beneficial impacts on park visitors because of improved park facilities and opportunities and the attraction of Giant Sequoia National Monument.

## Conclusion

Alternative D would generally have moderate to major, beneficial, long-term impacts on visitor experiences. The expansion of facilities would offer choices and convenience, while improving access to park resources. There could be a minor adverse impact on basic activities as a result of accommodating new activities, but these activities would have to relate to park resources. The following actions would specifically contribute to the beneficial impact:

- a redesigned and more efficient circulation system
- a larger, improved trail system
- a maximized transit system
- more choices in lodging
- a new visitor center and bike routes at Cedar Grove
- a relocated visitor center and bypass at Grant Grove
- new facilities at Giant Forest
- a new foothills visitor center
- added bicycling, hiking, and camping opportunities
- improved and diversified educational programs (including more ranger naturalist programs, as well as a focus on park values and learning outdoor skills), and increased accessibility to park resources by visitors with disabilities .

Alternative D, in conjunction with past, present and reasonably foreseeable regional actions, would generally result in moderate to major, beneficial impacts on park visitors because of improved facilities and opportunities, plus the attraction of Giant Sequoia National Monument.

# Private Land and Special Use Permits on Park Land

## GUIDING REGULATIONS AND POLICY

The National Park Service was established to protect and preserve resources for this and future generations.

- *NPS Organic Act of 1916* — The Organic Act requires the National Park Service “to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”
- *National Parks and Recreation Act of November 10, 1978 (PL 95-625)* — This act transferred land in the Sequoia Game Refuge to Sequoia National Park and limited special use permits for cabins on what had been U.S. Forest Service land to the permittee of record in 1978.
- *Public Law 108-447* — This law amended Public Law 99-338 to authorize two additional renewals of the permit for hydroelectric facilities within the park, until September 8, 2026. The FERC license for the Kaweah complex facilities outside the park (Project 298-000-California) runs through December 31, 2021.  
  
Public Law 108-447 also amended Public Law 95-625 relating to the Mineral King special use permits. The legislation struck the permit limit of 25 years and the provisions that permits could not be transferred, giving permittees the right to transfer permits to their heirs, successors, and assigns (PL 108-447, Division E, Title 1, Sec. 139. (b)).
- *Director’s Order #53: Special Use Permits* — A special park use is a short-term activity that takes place in a park area and:
  - provides a benefit to an individual, group or organization, rather than the public at large;

- requires written authorization and some degree of management control from the National Park Service in order to protect park resources and the public interest;
- is not prohibited by law or regulation; and
- is neither initiated, sponsored, nor conducted by the NPS.”

According to section 3.3 of *Director’s Order #53*, a special use permit may be a right or a privilege. A right is based on property ownership, legislative or treaty entitlement, or constitutional guarantee. Where none of these factors is present, the use is a privilege over which the superintendent may exercise varying degrees of discretion and control.

## METHODOLOGY FOR ANALYZING IMPACTS

The impact analysis considers how the concept of public national parks, resource protection, and public recreational uses would be affected by

- privately owned land within park boundaries (inholdings)
  - Wilsonia
  - Oriole Lake
  - Silver City / Kaweah Han
  - portions of Mineral King Valley
- permitted special park uses (uses based on congressional legislation or park actions) — nonprofit campground permit (impacts related to special use permits for private cabins on public land in the Mineral King Valley are discussed under “Impacts Common to All Alternatives”)
- adjacent land / boundary adjustments

Beneficial impacts would increase public use and access, while adverse impacts would reduce public use and ownership. Some impacts could be beneficial to some users while adverse or neutral to others.

### *Impact Thresholds for Private Lands and Permitted Special Uses*

**Negligible** — Impacts from private and permitted land uses would not be detectable to visitors, private landowners, or permittees, and they would have no discernible effect on public use and ownership.

**Minor** — Impacts from private and permitted land uses would be slightly detectable to visitors, private landowners, and permittees, but they are not expected to have an overall effect on public use and ownership.

**Moderate** — Impacts from private and permitted land uses would be clearly detectable to visitors, private landowners, and permittees, and they could have an appreciable effect on public use and ownership.

**Major** — Impacts from private and permitted land uses would have a substantial and noticeable effect on visitors, private landowners, and permittees, and they could permanently alter various aspects of public use and ownership.

for the management and care of Sequoia National Park and the purposes for which it was established.

Hydroelectric facilities, which are readily apparent to many visitors and visually intrude on the natural scene, would continue to provide recreational opportunities, such as hiking along the channels, as discussed on page 249.

As a whole, impacts of special use permits for hydroelectric utilities on public land would be moderate, adverse, and long term, primarily as a result of visual intrusions on the natural setting.

**Mineral King Permit Cabins — Cabin Cove, West Mineral King, East Mineral King.** Permits to use private cabins at Cabin Cove, West Mineral King, and East Mineral King could be issued for terms not to exceed five years and could be renewed unless the National Park Service determined that use of a cabin was incompatible with the administration of the park or that the land was needed for park purposes. Permits would be administered in accordance with the provisions of *NPS Management Policies 2001* and *Director's Order #53: Special Use Permits* (see appendix G).

As a result of Public Law 108-447, the National Park Service is reviewing management of the cabin permit program. Permits will be issued to present permit holders, their heirs, or assigns in accordance with Public Law 108-447. These permits will include requirements that cabins meet applicable health and safety codes with provisions relating to unacceptable adverse impacts to park resources, cabin appearance, utilities, self-sustaining funding to maintain the historic community appearance, interpretation, and other issues to ensure that park resources will be protected and that public use of public land will be preserved.

Cabins may be acquired by the National Park Service through donation or purchase, however partial (percentage) acquisition of a cabin would be difficult for the agency to manage. Cabins acquired in sound condition would be managed according to the "Secretary's Standards."

## **IMPACTS COMMON TO ALL ALTERNATIVES**

As previously discussed, Public Law 108-447 authorized the continuation of the Kaweah no. 3 hydroelectric facilities and special use permit cabins in the Mineral King area. The following discussion therefore applies to all alternatives.

**Utility Use — Hydroelectric Facilities.** Continued hydroelectric power generation would allow the history and use of these facilities to be interpreted. Park managers would work with the operator through a regulated permitting process to ensure that the facilities are maintained and operated in a manner that does not impair park resources. In accordance with Public Law 108-447, a reauthorization permit requires that an independent safety assessment be conducted and that any identified deficiencies be corrected. The secretary of the interior may also impose any other reasonable terms and conditions necessary

A cultural resource preservation plan would be prepared for the Mineral King Road Cultural Landscape District in consultation with the state historic preservation officer and the Mineral King Preservation Society. The plan would identify a viable management / maintenance strategy, including an appropriate treatment method according to the "Secretary's Standards"; measures for resource protection (e.g., addressing cabins in wetland locations or within floodplains, or actions to make non-contributing cabins more compatible with the historical appearance of the landscape district; and a decision process for determining whether to repair, replace, or remove cabins in the event that they are damaged by natural disaster (such as a tree fall, flood, or avalanche). The cultural resource preservation plan and permit requirements would have moderate, long-term, beneficial impacts on the preservation and condition of privately owned facilities located on public land.

Over 60 permit holders and their families, heirs, or assigns could continue to have private cabins on 65 acres of public land. In terms of achieving national park purposes to provide for public enjoyment, as well as to preserve and conserve park resources, this action would have major, adverse, long-term impacts because 65 acres of publicly owned land would still be unavailable for public use.

As a whole, impacts due to the private use of public land would be major, adverse, and long term, despite the minor to moderate, beneficial impacts resulting from the preservation of the cabin community and requirements to meet permit conditions, because the general public would still not have access to public land.

## **IMPACTS OF THE NO-ACTION ALTERNATIVE**

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### **Analysis**

#### ***Private Land***

Privately owned land would be managed consistent with the parks' land protection plans, which would be updated as needed. Privately owned

recreational cabin areas would be considered as residential types of development.

**Wilsonia.** Private property would be acquired from willing sellers, in accordance with the 1986 *Land Protection Plan* and as funds were available (NPS 1986c). Structures would then be removed and the sites returned to natural conditions. Up to 190 private properties within the park boundary in Wilsonia could be affected. This alternative would continue piecemeal acquisition of approximately one property every 12 years, resulting in a patchwork of public and private ownership. Since the action would involve willing sellers, impacts on private landowners, their families, or heirs would not be considered adverse.

In terms of achieving national park purposes to preserve and conserve resources and to provide for public enjoyment, the purchase of private property and the restoration of purchased sites to natural conditions would be consistent with the current *Land Protection Plan*. If funds were not available to purchase inholdings offered for sale, the park would not be able to fully implement its current *Land Protection Plan*, and private uses within park boundaries would continue indefinitely.

Generally, the impacts of the no-action alternative on public use and ownership and private landowners would be negligible, beneficial, and long term because land inside park boundaries would be eventually acquired; however, the land is not easily seen by most visitors. There would be a negligible impact on potential public recreation since Wilsonia has limited recreational potential, the area is not readily apparent to visitors since it is not on main park roads, and there are no plans under this alternative to encourage recreational use of the area.

**Oriole Lake.** Purchasing private lands from up to four willing sellers, consistent with the 1986 *Land Protection Plan* (NPS 1986c) and as funds became available, and restoring sites and the access road to natural conditions would improve resource conditions. With the removal of all facilities, this area would be designated as

wilderness since it is surrounded by wilderness. Since the action would involve willing sellers, the impact on private landowners would not be considered adverse.

Acquisition would have only minor, beneficial, long-term impacts on public access since the area is remote and little used. If funds were not available to purchase inholdings offered for sale, the park would not be able to fully implement its current *Land Protection Plan*, and private uses within park boundaries would continue indefinitely.

The impact of acquiring private property for public use and ownership at Oriole Lake would generally be minor and beneficial over the long term because the area is remote and only limited public access would be facilitated under this alternative.

**Silver City.** Silver City Resort and private cabins would continue, in accordance with the 1984 *Land Protection Plan*, and remaining lots and/or property could be sold without restriction (NPS 1984). The National Park Service has already acquired approximately 60 acres. There would be no impact on approximately 30 private landowners.

In terms of achieving park purposes to protect resources and to provide for public enjoyment, private land within the park would continue to be a visual impact due to development and would continue to detract from public use, resulting in minor, adverse impacts over the long term. Some visual impacts have been mitigated through existing scenic conservation easements.

The small resort at Silver City provides public lodging and visitor services (restaurant, store, and public showers), which help meet visitor needs in the area. Public access to these services would continue, resulting in minor, beneficial, long-term impacts.

Generally, the no-action alternative would result in minor, beneficial, long-term impacts on visitor services, but minor, adverse, long-term impacts on public ownership and visual resources.

**Kaweah Han.** Private ownership of Kaweah Han, which is some distance from the Mineral King Road, would continue. Private residential use at this area does not impact existing patterns of visitor use or park access.

The impact on public ownership under the no-action alternative would be negligible and adverse over the long term.

**Mineral King.** As funds were available, the largest Mineral King trailhead parking area would be acquired if offered for sale by the owner, and the trailhead would be retained. Since this action would involve a willing private landholder, impacts would not be considered adverse. In terms of achieving park purposes, public ownership would have a moderate, beneficial, long-term impact on public use and access because continued trailhead access would be ensured.

Acquisition could affect two cabins that are adjacent to the trailhead parking area and that are under long-term leases issued by the landowner. Because the cabin leases would no longer apply, and long-standing users would not have access to the cabins, this action could be perceived as a major, adverse, long-term impact to the lessees. The historic cabins would be removed, resulting in changes that detract from the character of the cultural landscape or benefit the natural scenery. However, public acquisition would improve public access because the cabins imply limited access and public use in this area. Acquiring the backcountry trailhead would have a moderate, beneficial, long-term impact on public use and recreation since many Mineral King visitors use the trailhead parking area.

Taken as a whole and despite major, adverse, long-term impacts on the cabin leaseholders, the no-action alternative would generally have moderate, beneficial, long-term impacts on public use and ownership because improvements could be made to public access and use once the area became public land.

### ***Special Use Permits on Park Land***

The non-profit Boy Scout camp would continue to be permitted, and regional Boy Scout programs could remain in that location, resulting in no impact on this organization or other non-profit users and park volunteers who use the facilities. At the same time, the area would remain unavailable for public use. The impact on public use would be minor, adverse, and long term.

### ***Boundary Adjustments***

Acquiring the Alley property along the North Fork of the Kaweah River would allow a trail-head to be established and would improve access to the foothills environment. Since this is low-use area, impacts on public ownership, use, and access would be minor, beneficial, and long term.

### **Cumulative Impacts**

Around the time that General Grant National Park (now Kings Canyon National Park) was established in 1890 there was discussion about acquisition of the private land known as Wilsonia; however, acquisition did not occur. The private land was subsequently subdivided and sold for seasonal recreational use, making it more difficult to acquire all of the land. Over time the National Park Service has acquired private land from willing sellers.

Silver City was built in the late 1800s along the Mineral King Road, the first road into Sequoia National Park. A small recreation community remained after extractive uses like mining and logging stopped.

In conjunction with past, present, and reasonably foreseeable actions, the no-action alternative would have negligible, adverse, long-term impacts on public use and ownership of national park lands as a result of continuing a special use permit for a Boy Scout camp. At the same time, this alternative would have negligible impacts on private land and property rights within the parks.

### **Conclusion**

The no-action alternative would generally result in moderate, beneficial, long-term impacts on public use and ownership of national park lands. This impact would result from acquiring ownership of limited amounts of private land within and outside the parks from willing sellers to increase resource protection in some areas and public access in others.

In conjunction with past, present, and reasonably foreseeable actions, the no-action alternative would have a negligible impact on public use and ownership.

## **IMPACTS OF THE PREFERRED ALTERNATIVE**

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### **Analysis**

#### ***Private Land***

Privately owned land would be managed consistent with the parks' land protection plans, which would be updated as needed. Privately owned recreation cabin areas would be considered as residential types of development.

**Wilsonia.** Under the preferred alternative individual properties in the Wilsonia recreational community would continue to be acquired on a willing-seller / willing-buyer basis. Gradually increasing public ownership within park boundaries would have negligible, beneficial, long-term impacts, similar to the no-action alternative.

In terms of achieving national park purposes to preserve and conserve resources and to provide for public enjoyment, the purchase of private property and the restoration of purchased sites to natural conditions would be consistent with the *Land Protection Plan* (NPS 1986c). The *Land Protection Plan* would be updated to acknowledge the national register status of the Wilsonia Historic District (see discussion under "Cultural Resources"). Nonhistoric NPS sites would be returned to natural conditions. If funds were not available to purchase inholdings offered for sale, the park would not be able to fully implement its

current *Land Protection Plan* or any future plan calling for acquisition on a willing-seller, willing-buyer basis, and private uses within park boundaries would continue indefinitely.

Similar to the no-action alternative, the impact of the preferred alternative on public use and ownership and private landowners would be negligible, beneficial, and long term. There would be negligible, beneficial impacts on potential public recreation since *Wilsonia* is neither visually intrusive nor located near visitor destinations or facilities, and there are no plans to encourage recreational use of the area.

**Oriole Lake.** Under the preferred alternative, the Oriole Lake properties would be purchased if there were willing sellers, the structures removed, and the road converted to a backcountry trail for access to a unique foothills environment. This area would become federally designated wilderness with the removal of facilities.

Similar to the no-action alternative, this action would have a minor, beneficial, long-term impact in terms of achieving park purposes. Because properties would be acquired on a willing-seller / willing-buyer basis, impacts on landowners would not be considered adverse. Providing trail access to this remote area would allow use mostly by local and regional visitors, and use is expected to be quite low. Because the area is remote, impacts on public recreational use would be minor and beneficial over the long term. If funds were not available to purchase properties offered for sale, private uses within park boundaries would continue indefinitely.

Generally the impact of the preferred alternative at Oriole Lake would be minor and beneficial over the long term because private property would be acquired for public ownership and use.

**Silver City.** Under the preferred alternative the Silver City Resort would continue to provide visitor services and lodging; private land would only be acquired on a willing-seller / willing-buyer basis. Consequently, there would be no impacts on private landowners.

Silver City Resort and private cabins would continue in accordance with the 1984 *Land Protection Plan* (NPS 1984), and remaining lots and/or property could be sold without restriction. The National Park Service has already acquired approximately 60 acres. There would be no impact on approximately 30 private landowners. Some visual impacts are mitigated through existing scenic conservation easements.

The Silver City Resort provides public lodging and visitor services (restaurant, store and public showers) that help meet visitor needs in the area. Public access to these services could increase slightly with higher visitation, which could be accommodated.

Generally, the preferred alternative would result in minor, beneficial, long-term impacts on visitor services, but minor adverse impacts on public ownership and visual resources.

**Kaweah Han.** Private residential use at Kaweah Han, which is some distance from the Mineral King Road, would continue. Private use does not impact existing or future patterns of visitor use or park access. To preserve the visual values of the land under this alternative, the National Park Service would seek to acquire a scenic easement from the owner and would update the 1984 *Land Protection Plan*. If the property was to be subdivided, the National Park Service would seek to acquire properties on a willing-seller / willing-buyer basis.

Generally, the preferred alternative would result in negligible, adverse, long-term impacts on public ownership and use because the property is not visible or accessible to most visitors.

**Mineral King.** As funds were available, the largest Mineral King trailhead parking area would be acquired if offered for sale by the owner, and the trailhead would be retained, the same as the no-action alternative. Since this action would involve a willing seller, the impact on the private landholder would not be considered adverse.

As described for the no-action alternative, two cabins are located on this property. Acquisition could adversely affect the lessees who hold long-term leases issued by the private landowner. Because the cabin leases would no longer apply, and long-standing users would not have access to the cabins, this action could be perceived as a major, adverse, long-term impact by the lessees. In terms of achieving park purposes, public ownership would have a moderate, beneficial, long-term impact on public use and recreation since many Mineral King visitors use the trailhead and the cabins' presence implies limited access and public use in this area. This alternative would ensure trailhead access over the long term.

Despite major, adverse, long-term impacts on the cabin leaseholders, the preferred alternative would have moderate, beneficial, long-term impacts on public use and ownership because improvements could be made to public access and use of public land; historic cabins would be preserved; and trailhead access would be ensured over the long term.

### ***Special Use Permits on Park Land***

Under the preferred alternative the Boy Scout camp would be converted to a camp for NPS volunteers, with Boy Scout use allowed when possible. This action would result in minor, beneficial, long-term impacts related to park management and would therefore benefit the public. Although the Boy Scouts would no longer control scheduling for the camp, some continued Boy Scout use could be accommodated. The preferred alternative would have a minor to moderate, adverse impact on the Boy Scouts because annual use would likely be less convenient and not guaranteed. Using the area for park purposes would have a negligible, adverse, long-term impact on public recreation since the site is not currently used for public recreation.

Despite the adverse impact on the Boy Scouts, the preferred alternative would generally have a minor, beneficial impact because of improved park operations, which would benefit the public.

### ***Boundary Adjustments***

As described under the no-action alternative, the park would acquire the Alley property on the North Fork of the Kaweah River to create a trailhead and a small campground and to improve access to the foothills environment. Because this area is not highly used, the impact on public use and ownership would be minor, beneficial, and long term.

### **Cumulative Impacts**

As described for the no-action alternative, private land in Wilsonia predates the creation of the park in 1890. At that time the area was not acquired, and the private land was subsequently subdivided and sold for seasonal recreational use. Over time the National Park Service has acquired some private land in Wilsonia from willing sellers.

Silver City was built in the late 1800s along the Mineral King Road, the first road into Sequoia National Park. A small recreation community remained after extractive uses like mining and logging stopped.

In conjunction with past, present, and reasonably foreseeable actions, the preferred alternative would generally have a negligible, beneficial, long-term impact on public use and ownership. At the same time, this alternative would have a negligible impact on private land and property rights within the parks.

### **Conclusion**

The preferred alternative would result in moderate, beneficial, long-term impacts because public use of public land would be increased by acquiring a small amount of private land in and around the parks to increase public access, while generally allowing private use of private land to continue.

In conjunction with past, present, and reasonably foreseeable actions, the preferred alternative would generally have a negligible impact on public use and ownership.

## IMPACTS OF ALTERNATIVE A

### Analysis

#### *Private Land*

Privately owned land would be managed consistent with land protection plans, which would be updated as needed. Privately owned recreational cabin areas would be considered as residential types of development. Inholdings would be purchased on a willing-seller / willing-buyer basis. If funds were not available to purchase properties offered for sale, private uses within park boundaries would continue indefinitely, and goals under this alternative would not be fully achieved.

**Wilsonia.** As funds were available, private property would be acquired from willing sellers, the structures would be removed, and the sites would be returned to natural conditions. Approximately 190 properties could be acquired. Since the action would involve willing sellers, there would be no impact on private landowners. Similar to the no-action alternative, this alternative would continue piecemeal acquisition, leaving a patchwork of public and private properties within the park boundary.

In terms of achieving national park purposes, purchases of private property would have a moderate, beneficial, long-term impact on public ownership and full public use of land within park boundaries since the area is not within public view or along major roads. Because the Wilsonia area would be gradually returned to natural conditions and the area would not provide recreational opportunities, alternative A would have a negligible, beneficial impact on public recreational use of the area.

**Oriole Lake.** As funds were available, up to four private parcels would be purchased from willing sellers, structures and the road would be removed, the area would be restored, and only trail access would be provided. When nonconforming uses were removed the area would be designated as wilderness. Since the action would involve willing sellers, the impact on private landowners would not be considered adverse.

Because this is a remote area and would be accessed by a backcountry trail, use would probably be quite low and would be mostly by local and regional residents. With the presence of a trailhead and trail, the impact on the public recreational use would be minor, beneficial, and long term.

**Silver City.** As funds were available, land would be purchased from willing sellers, structures would be removed, and the sites would be returned to natural conditions. This alternative would result in piecemeal acquisition, leaving a patchwork of public and private ownership affecting approximately 30 cabins / lots within the park boundary. Since the action would involve willing sellers, there would be no adverse impact on them, the Silver City Resort, or the Silver City recreation community.

In terms of achieving park purposes, purchases of private property would have a moderate, beneficial, long-term impact on public ownership of park land since the area is visible along the Mineral King Road. But public use and recreation would not be improved, and public lodging would no longer be provided in the Mineral King area, resulting in a moderate, adverse, long-term impact on public use.

**Kaweah Han.** As funds were available, land would be purchased from willing sellers, and all structures would be removed, resulting in a negligible, beneficial, long-term impact on public use since the area is expected to have little use, is not visible, and is not along the Mineral King Road.

**Mineral King.** As funds were available, land on which the largest Mineral King trailhead parking area occurs would be acquired if the owner wished to sell; trailhead parking would then be removed, and the trailhead would be relocated in order to better preserve the Mineral King Valley. Since the action would involve a willing seller, impacts on the private landholder would not be considered adverse.

As described for the no-action alternative, two cabins are located on this property. Acquisition

could adversely affect the lessees who hold long-term leases issued by the private landowner. Because the cabin leases would no longer apply, and long-standing users would not have access to the cabins, this action could be perceived as a major, adverse, long-term impact by the lessees. In terms of achieving park purposes to provide for public enjoyment, as well as to preserve and conserve resources, this action would have moderate, beneficial, long-term impacts since private land would be acquired for public ownership, and the cabins, which imply limited access and public use in this area, would be removed. However, returning the land to more natural conditions and relocating the trailhead and parking area would have a moderate, adverse, long-term impact on public use and recreation since relocated facilities would result in added hiking distance for most hikers on popular trails leading out of the valley.

Despite major adverse impacts on the cabin leaseholders, alternative A would generally have a moderate, beneficial, long-term impact on public ownership as a result of improved resource conditions. Removing the parking area and relocating the trailhead would have moderate, adverse impacts on public recreational use.

### ***Special Use Permits on Park Land***

Under alternative A the Boy Scout Camp permit would not be extended. The camp would be removed and the area returned to natural conditions, resulting in a moderate, adverse, long-term impact on regional Boy Scouts and others who use the facility. At the same time there would be a negligible, beneficial, long-term impact on public use and recreation since the area would be restored and public use would be allowed.

### ***Boundary Adjustments***

As described under the no-action alternative, acquiring the Alley property on the North Fork of the Kaweah River to create a trailhead and improve access to the foothills environment would result in minor, beneficial, long-term impacts on public ownership, as well as public

access and use, since the area would likely experience lower levels of use.

## **Cumulative Impacts**

Cumulative impacts would be similar to those described for the no-action alternative. Private land at Wilsonia predates the creation of the park in 1890. At that time the area was not acquired, and the private land was subsequently subdivided and sold for seasonal recreational use. Over time the National Park Service has acquired some private land in Wilsonia from willing sellers.

Silver City was built in the late 1800s along the Mineral King Road. A small recreation community remained after extractive uses like mining and logging stopped.

In conjunction with past, present, and reasonably foreseeable actions, alternative A would have negligible impacts on public use and ownership.

## **Conclusion**

Reducing use and development under alternative A would substantially increase public ownership of private land in the parks. Under alternative A all private uses and private land inside the parks would eventually be acquired and the areas returned to natural conditions, resulting in moderate, beneficial, long-term impacts on public ownership and use of the parks. At the same time reduced opportunities for recreational use in the parks would result in moderate, adverse, long-term impacts.

In conjunction with past, present, and reasonably foreseeable actions, alternative A would have negligible impacts on public use and ownership.

## **IMPACTS OF ALTERNATIVE C**

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### **Analysis**

#### ***Private Land***

Privately owned land would be managed consistent with the parks' land protection plans, which would be updated as needed. Privately owned

recreational cabin areas would be considered as residential types of development.

**Wilsonia.** Wilsonia would continue as a private recreational community and NPS-owned property and buildings could be used for more residential and public uses, such as visitor lodging and concessioner / staff housing. This action would be a change from the 1986 *Land Protection Plan*, which would need to be updated. The action would have no adverse impact on private landowners.

In terms of achieving national park purposes of providing for public enjoyment, as well as preserving and conserving resources, this action would have only a negligible, beneficial, long-term impact on public ownership and full public use of park land since the area is not visible or along a main road. Since there would be little change to public recreation, alternative C would have a negligible adverse impact on public recreational use of the area.

**Oriole Lake.** Public access to Oriole Lake would be sought under alternative C without seeking to purchase private inholdings. The four landowners at Oriole Lake could experience minor noise and social impacts from small levels of public access that would be offered.

In terms of achieving national park purposes, continuing private property ownership inside national parks would have a minor, adverse, long-term impact on public ownership and full public use of park land. Because this area is remote and accessed by a backcountry road, public use is expected to be quite low and mostly by local and regional residents. However, the opportunity for public access to the lake, which provides an uncommon foothills experience, would result in a minor, long-term, and beneficial impact in terms of recreational use.

Continuing private ownership would result in a minor, adverse, long-term impact because the area would not be designated as wilderness.

**Silver City.** Slightly expanded facilities and services at Silver City Resort would be consis-

tent with alternative C. The resort would continue to provide public lodging and visitor services (restaurant, store, and public showers), helping meet visitor needs in the area. Since there would be no changes in land status, the action would have no adverse impact on private landowners, the Silver City Resort, or the Silver City recreational community.

In terms of achieving national park purposes, continuing private property inside the parks would have a moderate, adverse, long-term impact on public ownership and full public use of park land since Silver City is on the Mineral King Road. Some visual impacts are mitigated through existing scenic conservation easements. At the same time, because visitor services would continue to be provided and modestly expanded under this alternative, the impact on public use and recreation would be minor, beneficial, and long term.

**Kaweah Han.** Under alternative C the goal was to encourage the owners of Kaweah Han to use the facilities for commercial lodging. However, the property has been recently purchased, and there is no indication that commercial use is desired by the new owners, so the likelihood of public commercial use is very low. If the property was used for commercial purposes, resulting use would have a minor, adverse, long-term impact on Silver City residences from access road noise and safety concerns.

**Mineral King.** As funds were available, land on which the most trailhead parking occurs would be acquired if the owner wished to sell, and the trailhead would be redesigned to improve visitor trailhead parking. Since the action would involve a willing seller, the impacts on the landholder would not be considered adverse.

As described for the no-action alternative, two cabins are located on this property. Acquisition could adversely affect the lessees who hold long-term leases issued by the private landowner. Because the cabin leases would no longer apply, and long-standing users would not have access to the cabins, this action could be perceived as a major, adverse, long-term impact

by the lessees. The cabins would be retained for public use. In terms of achieving park purposes, public ownership would have a moderate, beneficial, long-term impact on public use and recreation since many Mineral King visitors use the trailhead and the cabins' presence implies limited access and public use in this area. This alternative would ensure trailhead access over the long term.

Redesigning the trailhead would improve resource conditions and recreational opportunities, resulting in moderate, beneficial, long-term impacts on recreational use. If funds were not available to purchase property offered for sale, private uses within park boundaries would continue indefinitely, and park purposes would not be fully achieved.

Despite major, adverse impacts on leaseholders, there would generally be moderate, beneficial, long-term impacts on public ownership and public recreational use.

### ***Special Use Permits on Park Land***

The Boy Scout Camp permit would be extended under alternative C. There would be no impact on the Boy Scouts. At the same time, since the area would not be used for wholly public purposes, there would be a minor, adverse, long-term impact on public use and recreation as a result of a special use permit benefiting a small group of users.

### ***Boundary Adjustments***

As described under the no-action alternative, acquiring the Alley property on the North Fork of the Kaweah River to create a trailhead and improve access to the foothills environment would result in a minor, beneficial, long-term impact on public ownership, as well as public access and use, since the area is expected to see low levels of use.

### **Cumulative Impacts**

Cumulative impacts would be similar to those described for the no-action alternative. Private

land at Wilsonia predates the creation of the park in 1890. At that time the area was not acquired, and the private land was subsequently subdivided and sold for seasonal recreational use. Over time the National Park Service has acquired some private land in Wilsonia from willing sellers.

Silver City was built in the late 1800s along the Mineral King Road. A small recreation community remained after extractive uses like mining and logging stopped.

In conjunction with past, present, and reasonably foreseeable actions, alternative C would have a negligible impact on public use and ownership.

### **Conclusion**

Alternative C would result in moderate, beneficial, long-term impacts because a small amount of private land in and around the parks would be acquired to increase public access. Private use of private land would be continued.

On a cumulative basis, alternative C would have negligible impacts on public use and ownership.

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## **IMPACTS OF ALTERNATIVE D**

### **Analysis**

#### ***Private Land***

Similar to the preferred alternative, privately owned land would be managed consistent with the parks' land protection plans, which would be updated as needed. Privately owned recreational cabin areas would be considered as residential types of development.

**Wilsonia.** Under alternative D either the recreational community of Wilsonia would continue and commercial use allowed (for example, public lodging), or all structures would be acquired and the area managed by the National Park Service to support park visitor needs. Under the first option the impact on private landowners would be minor, beneficial, and long term since their uses would continue and some new uses would be allowed. Under the second option the impact

on private landholders would be major, adverse, and long term since facilities would be acquired to support public recreation.

Continuing the private community would be at odds with public ownership of land within the boundaries of a national park. However, because this area is not readily apparent to most visitors and is not along a main park road, expansion would have only a minor, adverse, long-term impact on public ownership and public use of park land.

Alternatively, if all private land was acquired to provide public recreation support facilities (such as parking or transit support), alternative D would generally have a moderate, beneficial, long-term impact on of the area due to increased public use.

**Oriole Lake.** As funds were available, private lands would be purchased from the four owners on a willing-seller basis, and the structures would be removed, with the road and trail providing access to a primitive picnic area. Since this action would involve willing sellers, impacts on them would not be considered adverse.

Purchasing private property would have a minor, beneficial, long-term impact on public ownership and public use of land inside the national park. At the same time, the area's remoteness and access by a backcountry road would likely result in low visitor use, mostly by local and regional residents. Since the area is remote and would have only a small picnic area, trailhead, and a trail serving a few visitors, the impact on public recreational use would be minor, beneficial, and long term.

Continuing to provide road access and picnic facilities would result in minor, adverse, long-term impacts because it would not be designated as wilderness, and wilderness characteristics might not be protected over the long term.

**Silver City.** Under alternative D the National Park Service would partner with Silver City Resort to provide lodging and expand visitor

services (restaurant, store, and public showers). Public access to these services could increase slightly under this alternative as a result of greater partnership efforts with the National Park Service. Private land would only be acquired on a willing-seller / willing-buyer basis. Consequently, impacts on private landowners would not be considered adverse.

Silver City Resort and private cabins would continue in accordance with the 1984 *Land Protection Plan* (NPS 1984), and remaining lots and/or property could be sold without restriction. The National Park Service has already acquired approximately 60 acres. There would be no impact on approximately 30 private landowners. Visual impacts would be mitigated through scenic conservation easements.

Generally, alternative D would result in minor, beneficial, long-term impacts on public use and ownership since the National Park Service would partner with the resort to better meet visitor needs.

**Kaweah Han.** In alternative D the goal was for the National Park Service or a partnership group to acquire Kaweah Han and use it as an educational center. The lodge would be evaluated for its eligibility for listing on the National Register of Historic Places. Road access, which bisects the private community of Silver City, would result in moderate, adverse, long-term impacts on private landowners in Silver City because of additional traffic, safety concerns, and noise. This would be inconsistent with management prescriptions, which preclude mixing incompatible residential and public uses.

Kaweah Han was recently purchased, and acquisition by the National Park Service would result in a major, adverse, long-term impact on the new private owners. The Kaweah Han area is not readily apparent and is not located along the Mineral King Road, so continued private ownership would have a negligible impact on park visitors. Private ownership could provide the best way to preserve rustic structures at the site.

Generally, if Kaweah Han was acquired for public use, alternative D would result in moderate, adverse, long-term impacts on private landowners in Silver City because of additional traffic, safety concerns, and noise. Limited public use of Kaweah Han would not provide sufficient benefits of public ownership. Impacts on the private owner would be major, adverse, and long term.

**Mineral King.** As funds were available, the largest Mineral King trailhead parking area would be acquired if offered for sale by the owner, and the trailhead would be redesigned, as described for alternative C. Since this action would involve a willing seller, impacts on the private landholder would not be considered adverse.

As described for the no-action alternative, two cabins are located on this property. Acquisition could adversely affect the lessees who hold long-term leases issued by the private landowner. Because the cabin leases would no longer apply, and long-standing users would not have access to the cabins, this action could be perceived as a major, adverse, long-term impact by the lessees. In terms of achieving park purposes, public ownership would have a moderate, beneficial, long-term impact on public use and recreation since many Mineral King visitors use the trailhead and the cabins' presence implies limited access and public use in this area. This alternative would ensure trailhead access over the long term.

Redesigning the trailhead would improve resource conditions and recreational opportunities, resulting in moderate, beneficial, long-term impacts on recreational use. If funds were not available to purchase property offered for sale, private uses within park boundaries would continue indefinitely, and park purposes would not be fully achieved.

Despite major, adverse impacts on leaseholders, there would generally be moderate, beneficial, long-term impacts on public ownership and recreational use.

### ***Special Use Permits on Park Land***

Under alternative D the Boy Scout camp would be converted to a work center or a camp for volunteers. This action would result in minor, beneficial, long-term impacts for park management, which would therefore benefit the public. Using the area for park purposes would have negligible, long-term, adverse impacts on public use and recreation since the current use does not accommodate public recreational use.

There would be moderate, adverse, long-term impacts on regional Boy Scouts since they would no longer have use of a camp to which they have had long-standing access. The Boy Scouts constitute a more public use than other special use permittees since user groups change regularly. Boy Scouts would need to find other regional camping locations.

Despite the moderate, adverse, long-term impacts on the Boy Scouts, alternative D would generally have a minor, beneficial, long-term impact because the area would be used for park purposes.

### ***Boundary Adjustments***

Under alternative D the Alley property on the North Fork of the Kaweah River would be acquired to provide a primitive stock and bicycle campground and ranger residence, and cooperative management would be pursued with the Bureau of Land Management. The area is small, and it would probably attract mostly regional and local use, meeting some recreational needs. It would also provide improved park access and access to the Colony Mill Road area, resulting in a minor to moderate, beneficial, long-term impact on public ownership, as well as public access and use.

### ***Cumulative Impacts***

As described for the no-action alternative, private land in Wilsonia predates the creation of the park in 1890. At that time the area was not acquired, and the private land was subsequently subdivided and sold for seasonal recreational use. Over time the National Park Service has

acquired some private land in Wilsonia from willing sellers.

Silver City was built in the late 1800s along the Mineral King Road, the first road into Sequoia National Park. A small recreation community remained after extractive uses like mining and logging stopped.

In conjunction with past, present, and reasonably foreseeable actions, alternative D would have a negligible impact on public use and ownership. At the same time, this alternative would have some adverse impacts on private landowners within the parks, primarily as the result of acquiring Kaweah Han.

## **Conclusion**

Alternative D would result in moderate, beneficial, long-term impacts because public use of public land would be increased by acquiring a small amount of private land in and around the parks to increase public access. Private use of private land would be continued at Wilsonia and Silver City.

In conjunction with past, present, and reasonably foreseeable actions, alternative D would have a negligible impact on public use and ownership.

# Park Management, Operations, and Facilities

## METHODOLOGY FOR ANALYZING IMPACTS

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The impact analysis evaluated the effects of the alternatives on the following aspects of park operations:

- staffing, infrastructure, visitor facilities, and services
- operations of non-NPS entities, including the Sequoia Natural History Association, concessioners, commercial permittees, partners, and volunteers
- operations of other federal agencies (for example, the U.S. Forest Service and the Bureau of Land Management)

The analysis was conducted in terms of how park operations and facilities might vary under the different management alternatives. The analysis is qualitative rather than quantitative because of the conceptual nature of the alternatives. Consequently, professional judgment was used to reach reasonable conclusions as to the intensity, duration, and type of potential impact.

Beneficial impacts would improve park operations and/or facilities. Adverse impacts would negatively affect park operations and/or facilities and could hinder the staff's ability to provide adequate services and facilities to visitors as well as staff. Some impacts could be beneficial to some operations or facilities and adverse or neutral to others.

## IMPACTS COMMON TO ALL ALTERNATIVES

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As previously discussed, Public Law 108-447 authorized the continuation of the Kaweah no. 3 hydroelectric facilities and special use permit cabins in the Mineral King area. The following discussion therefore applies to all alternatives.

### *Impact Thresholds for Park Management, Operations, and Facilities*

*Negligible* — Impacts would have no discernible effect on park operations or facilities.

*Minor* — Impacts would be slightly detectable but are not expected to have an overall effect on park operations and facilities.

*Moderate* — Impacts would be clearly detectable and could have an appreciable effect on park operations and facilities.

*Major* — Impacts would have a substantial influence on park operations and facilities and could reduce the staff's ability to provide adequate services and facilities to visitors as well as staff.

There would be no additional impacts on park operations as a result of continuing the operation of hydroelectric facilities.

Owners of Mineral King permit cabins would be required to meet state and local standards for individual utility systems. There would be no additional impacts on park operations.

Currently representatives from the Mineral King special use permit community have worked with the park staff to develop maintenance standards for cabins / sites in the Mineral King Road Cultural Landscape District and to establish and maintain a water system in West Mineral King that provides water to the ranger station. The impact of this present partnership on park operations at Mineral King is moderate and beneficial.

## IMPACTS OF THE NO-ACTION ALTERNATIVE

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Park development, which includes the majority of park operational facilities, consists of around 1,745 acres, or 0.2% of the park. About 65% of

the developed area is used for administration and operations and 11% for residential purposes.

## Analysis

### *Impacts of Operational Needs*

**Utilities.** Aging utilities would be replaced as needed when funds were available, and more stringent water and wastewater standards would need to be met. Studies would be undertaken to assess when infrastructure replacements were needed. Each utility system would be assessed to determine what sustainable approach would best meet needs and legal requirements, as well as make use of improved technology. Eventually, more sustainable and efficient utility systems would replace existing aging systems, resulting in moderate, beneficial impacts over the long term.

Wastewater systems at Ash Mountain were designed to work at specific levels, but they would continue to operate inefficiently due to reduced volume, and it is possible that other wastewater systems could experience similar inefficiencies. These inefficiencies result in added staff time and funds to keep the systems functioning.

Water supply would continue to be inadequate in some drought years at Grant Grove, Lodgepole, Ash Mountain, and Mineral King, and drought plans might have to be implemented.

In Wilsonia private properties would be acquired from willing sellers at the rate of approximately one property every 12 years. Nonhistoric properties owned by the National Park Service would be removed and the areas returned to more natural conditions. Over time there would be a reduced number of private utility systems except for those serving historic structures.

Over time, some comfort stations would be replaced by vault toilets, necessitating long-term use of a pumping service, resulting in a permanent cost in the maintenance budget. RV dump stations would continue to place a burden on park wastewater systems since sludge is hauled to municipal facilities outside the parks.

The impact of this alternative on the utility infrastructure and park operations would generally be moderate, adverse, and short term as a result of the aging infrastructure, but long-term impacts would be moderate and beneficial as systems were replaced.

**Visitor Facilities and Services.** Visitor facilities would continue to be maintained as staff and funding were available; when facilities could no longer be cost-effectively maintained, they would be replaced by more sustainable facilities. However, many visitor facilities in historic structures that have been adaptively reused are expensive to maintain. Maintenance could continue to be inadequate or burdensome in some areas or due to unforeseen circumstances.

The impact on park operations of maintaining visitor facilities and services would continue to be minor, adverse, and short term due to the aging buildings and peak-season demands.

**Winter Operations.** Winter park operational needs and snow removal would continue to have a substantial impact on seasonal operations. The entire length of Generals Highway would be kept open during winter, with winter road closures generally of short duration. However, heavy snowfall could result in minor to major adverse impacts on park operations over the short term. However, since this is an ongoing situation, the impact of the no-action alternative on winter operations would generally be negligible and adverse over the long term.

**Administrative Helicopter Use.** Administrative helicopter use would continue to support both search-and-rescue operations as well as maintenance and backcountry deliveries. The park operational use of helicopters is valuable, and it would be considered a minimum tool in order to accomplish backcountry work in a timely fashion and to speed up backcountry seasonal openings. The impact of continued helicopter use on park operations would be negligible and beneficial over the long term.

**Administrative Stock Use.** Administrative stock use, which comprises over 40% of the

stock use in the parks, would continue to be vital for supporting backcountry operations. Stock are primarily used to improve resource conditions, facilitate public access, and deliver supplies. Impacts of administrative stock use are mitigated through such methods as monitoring, regulation, supplemental feed, and winter pasturing outside the parks.

The impact of continued administrative stock use would be negligible and beneficial over the long term.

**Administrative Snowmobile Use.** Snowmobiles are used by park staff to conduct research, snow surveys, and winter search and rescue. Continued use would result in negligible, beneficial, long-term impacts on operations.

#### *Impacts of Other Entities on Park Operations*

**Sequoia Natural History Association.** The cooperating association would continue to staff bookstores and to run visitor trips and activities such as cave tours to support the parks' purpose and mission. The focus of the visitor trips could change over time with public interest. Support from the association would continue to have moderate, beneficial, long-term impacts on park operations.

**Volunteers.** Over 1,000 people volunteer and support the parks in numerous ways; these efforts are critical to park operations because of insufficient full-time staffing. Stock user groups would continue to participate in backcountry trail building, resulting in moderate to major, beneficial impacts on park operations. Inadequate housing would continue as minor, adverse, long-term impacts on volunteers. Generally, impacts on park operations from a continued large volunteer program would be major and beneficial over the long term.

**Concessioners.** Concessioners who provide lodging, food service, and other visitor support services would continue to do so. In the case of Grant Grove and Wuksachi, lodging facilities would be expanded to the extent contractually allowed. Concessioners running stables and pack

trips for visitors would continue to supply their own facilities, which they would need to replace as necessary. Inadequate housing would remain a problem in some areas, as would staffing, resulting in minor to moderate, adverse, long-term impacts on concession operations. Impacts of concessioners on park operations would be moderate and beneficial over the long term.

**Commercial Permit Holders.** Business permits would be continued in order to provide special services to a relatively small number of visitors. The number and types of permits vary, depending largely on recreational trends. Because the permits address the needs of a small number of visitors and are renewed annually, their services would continue to have minor, beneficial, short-term impacts on park operations and the provision of visitor services.

**Partners.** There would be no additional impacts to partners.

#### *Impacts on Staffing*

Staffing priorities would not change under the no-action alternative, but staffing would expand slightly over time. Some park operations could be impacted over time. A special or intensive maintenance project, such as responding to a fallen tree across a road or heavy snowfall on the Generals Highway, could affect visitor experiences. Without staff increases, the education staff at the Lodgepole visitor center would be insufficient to also staff the Giant Forest museum, affecting visitor experiences. Staff housing would remain inadequate in some areas and could result in the inability to find and retain seasonal and permanent staff. For example, affordable housing in the gateway community of Three Rivers may not be available, resulting in long commutes.

Altogether, impacts of insufficient park staffing would be minor, adverse, and short and long term.

## **Cumulative Impacts**

**U.S. Forest Service.** NPS staff would continue to provide maintenance, fire, emergency and sequoia management consultation for Giant Sequoia National Monument. Continued park participation would have a moderate, long-term, adverse impact on park operations and budgets.

Gate receipts would continue to be shared with Sequoia National Forest, with no additional impacts in the short or long term.

Habitat shared between the national parks and Sierra National Forest would continue to be managed jointly in accordance with the recommendations of the Sierra Nevada Ecosystem Project. There would be no additional impacts.

Management purposes of the two agencies could continue to diverge, with the NPS mission geared more toward preservation and the USFS mission toward providing for multiple uses, including some not allowed in the parks, such as grazing, logging, hunting, and snowmobiling. Some visitors could be unaware of these different missions; however, there would be negligible, beneficial impacts on park operations over the long term as a result of increased interaction related to the management of Giant Sequoia National Monument.

**Bureau of Land Management.** NPS staff would continue to fulfill a cooperative agreement for maintenance and oversight, resulting in a negligible, beneficial, long-term impact on BLM operations.

**California Department of Transportation.** Caltrans plans and manages several roads in and around the parks, including opening and closing the Kings Canyon Highway (California 180) from Grant Grove to Cedar Grove. This affects the operating season at Cedar Grove and necessitates coordination, generally resulting in moderate, beneficial, long-term impacts on park operations. The state rebuilt about 9 miles of road following a flood several years ago. There are also plans to improve California 180 west of the parks and establish six- and four-lane expressway segments, which would provide easier access to

the parks. Short-term impacts on park operations as a result of natural events that could affect the opening or closing of Kings Canyon Highway could be moderate to major and adverse.

As described above, the no-action alternative would contribute negligible to moderate, adverse impacts over the short and long terms related to inadequate staffing and housing. At the same time it would contribute negligible to major, beneficial, long-term impacts because of more sustainable facilities and infrastructure, as well as the continued use of park volunteers. On a cumulative basis, continuing programs and work with the U.S. Forest Service, the Bureau of Land Management, and Caltrans, in conjunction with the no-action alternative, would generally result in minor, beneficial, long-term impacts.

## **Conclusion**

The gradual replacement of facilities with more sustainable and efficient ones would result in moderate, beneficial impacts on all aspects of park operations over the long term. There would be negligible, beneficial impacts from the continued use of stock, helicopters, and snowmobiles for park operations. Impacts of insufficient park staffing would be minor and adverse over the short and long terms, and inadequate housing would continue to be a problem. Generally the impacts of the no-action alternative on park operations would be minor to moderate and adverse over the long term, primarily due to an aging infrastructure, inadequate housing, and insufficient staffing. Impacts on park operations from the assistance of other groups — the natural history association, volunteers, concessioners, commercial permit holders, and partners — would be minor to major and beneficial.

On a cumulative basis, continuing programs and work with the U.S. Forest Service, the Bureau of Land Management, and Caltrans, in conjunction with continued park programs under the no-action alternative, would generally result in minor, beneficial, long-term impacts.

## IMPACTS OF THE PREFERRED ALTERNATIVE

Most park operational facilities would be located in the park development zone, with some facilities in high- and low-use frontcountry. Development would occupy around 1,887 acres or 0.22% of the parks. About 65% of the developed area would be used for administration / operations and 11% for residential purposes. Under the preferred alternative, administrative and maintenance functions would no longer be interspersed among residential areas or campgrounds. Administrative offices would be relocated outside the parks. Existing operational and educational facilities would be improved. A limited number of park operational facilities could be found in the backcountry, primarily in the major trails zone. Residential uses would be expanded from current levels only in the Wuksachi / Lodgepole area. Residential areas would be limited to Cedar Grove, Grant Grove, Ash Mountain, and Mineral King. Any unmet needs could be provided privately outside the parks.

### Analysis

#### *Impacts of Operational Needs*

**Utilities.** Utilities would be replaced as needed, and more stringent water and wastewater standards would need to be met. Studies would be undertaken to determine when infrastructure replacements were needed. Expanding development within the capacity of present utility systems would be the most cost-effective and sustainable approach, involving both reduced water demand and sufficient wastewater output to maintain efficient functions. The studies would determine whether the function was needed, whether it could be combined or consolidated with other functions, and whether government-built and maintained utilities would be the best way to meet needs. Also, the impact of new facilities on resource conditions would be assessed, and the best location for facilities would be identified (possibly outside the parks).

As described under the no-action alternative, water supply would continue to be inadequate in some drought years at Grant Grove, Lodgepole,

Ash Mountain, and Mineral King, resulting in the need to implement drought plans. Limited development in these areas would incorporate advanced technology to reduce water use. For example, water demand could be further reduced by installing very low-flow fixtures, such as waterless urinals, to replace present low-flow fixtures. In the Grant Grove area limited water supply could be mitigated by providing for more day use than overnight use (42–64 gallons per day [gpd] per overnight visitor compared to 10 gpd per day visitor).

Wastewater systems at Ash Mountain were designed to work at specific levels, but would continue to operate inefficiently due to reduced volume. It is possible that other wastewater systems could experience similar inefficiencies. These inefficiencies result in added staff time and funds to keep the systems functioning.

In Wilsonia private properties would be acquired from willing sellers at the rate of approximately one property every 12 years. Nonhistoric properties owned by the National Park Service would be removed, and the areas would be returned to more natural conditions. Over time there would be fewer private utility systems, except utility systems could be retained at historic structures.

Over time, some comfort stations would be replaced by vault toilets, necessitating long-term use of a pumping service, a permanent expense in the maintenance budget.

Removing RV dump stations that do not meet state standards would reduce the burden on park wastewater systems, thus improving the capacity of wastewater systems.

The impact of this alternative on the utility infrastructure and park operations would generally be moderate and adverse as a result of the aging infrastructure. Long-term impacts would be moderate and beneficial because systems would be replaced, reducing park staff responsibilities.

**Visitor Facilities and Services.** Visitor facilities would be redesigned to facilitate access and circulation and to better meet the needs of chang-

ing user groups. Services would be assessed to determine whether they were still needed and whether government-provided services would be the most efficient. Providing some new visitor facilities, replacing facilities as they reached the end of their useful lives with more efficient facilities, and designing new facilities to be efficient and sustainable would result in moderate, beneficial, long-term impacts to operations. Maintenance in congested or seasonal high-use areas would need to expand. Overall, the impact on visitor services would be moderate, beneficial, and long term.

**Winter Operations.** Expanded winter use would make demands on park operations, including visitor services (such as increased general road patrol coverage), emergency services (such as emergency medical treatment and search-and-rescue operations), accident investigation, and snow removal. Impacts would be negligible to minor, adverse, and long term since the park is already keeping the highway open year-round and avoiding winter closures would continue to be a goal.

**Administrative Helicopter Use.** Administrative helicopter use would continue to provide a vital service for both search-and-rescue operations as well as maintenance operations and backcountry deliveries, similar to the no-action alternative. It would be considered a minimum tool at times for accomplishing backcountry work in a timely fashion and speeding up backcountry seasonal openings. The impact of continued helicopter use on park operations would be negligible and beneficial over the long term.

**Administrative Stock Use.** About half of the stock use in the park is by staff; administrative stock use would continue to be critical to supporting backcountry park operations. Reducing administrative grazing in the Ash Mountain / foothills area would require additional feed to be brought in, resulting in a minor, adverse, long-term impact on park operations and budgets. Because stock use primarily supports trail and resource improvement programs, and it facilitates public access and supply delivery, the impact of continued administrative stock use on

operations would be minor and beneficial over the long term.

**Administrative Snowmobile Use.** Snowmobiles would continue to be used for winter search and rescue, resulting in negligible, beneficial impacts on operations.

### *Impacts of Other Entities on Park Operations*

**Sequoia Natural History Association.** The cooperating association would continue to staff bookstores and to run visitor trips and activities such as cave tours to support the parks' purpose and mission. Under the preferred alternative there would be moderate, beneficial, long-term impacts on park operations as additional and different types of programs were developed and provided by the association.

**Volunteers.** Under the preferred alternative volunteers would continue to support park operations, including educational, scientific, operational, and maintenance programs. Stock user groups would continue to participate in trail maintenance, resulting in moderate, beneficial, long-term impacts on backcountry trails. Additional volunteer housing facilities such as camps and dormitories would be provided. Overall, the impact of volunteers on park operations would be major and beneficial over the long term.

**Concessioners.** Concessioners under the preferred alternative would provide more services and facilities, with full buildout according to their contracts, resulting in more employees. Concessioners running stables and pack trips would continue to supply services in all locations except Wolverton, and their facilities would need to be maintained. Concessioners would supply services to more diverse visitors and groups, and staffing would have to be able to relate to these users. Housing for concession employees might not be able to be met in the parks, resulting in minor to moderate, adverse impacts over the long term. Overall impacts on park operations would be moderate, beneficial, and long term.

**Commercial Permit Holders.** Business permits would be continued in order to provide special services to visitors. Under the preferred alternative permit holders would be more likely to identify changing markets and adapt to their needs. Because these permit holders address the needs of visitors and permits are renewed annually, their services would continue to have minor, beneficial, short-term impacts on park operations and the provision of visitor services.

**Partners.** Partnerships would be pursued to provide education and other operations, including the management and operation of the Mineral King permit cabin area. This would result in a moderate, beneficial impact on park operations over the long term.

### *Impacts on Staffing*

Increased park and concession staffing would be required for additional educational programs, resource protection efforts, emergency services, park transit operations, and lodging, resulting in moderate, beneficial, long-term impacts since staffing would be more closely aligned with operational needs. Selecting staff who would be responsive to changing user groups, with foreign language skills as well as good communication skills, would result in moderate, beneficial, long-term impacts.

Additional housing would be required in the Wuksachi / Lodgepole area to meet staff needs, but other employees would need to find their own housing in surrounding communities. Additional volunteer camps and work camps could help meet short-term housing needs, resulting in moderate, beneficial impacts.

Taken together, the impacts of this alternative on existing staff levels and organization would likely be moderate, beneficial, and long term as a result of increased staffing and some related housing.

## **Cumulative Impacts**

**U.S. Forest Service.** As described for the no-action alternative, the following factors are

considered in the cumulative impact analysis for park operations:

- NPS staff would continue to provide maintenance, fire, emergency and sequoia management consultation for Giant Sequoia National Monument. Continued park participation would have a moderate, long-term, adverse impact on park operations and budgets.
- Gate receipts would continue to be shared with Sequoia National Forest, with no additional impacts in the short or long term.
- Habitat shared between the national parks and Sierra National Forest would continue to be managed jointly in accordance with the recommendations of the Sierra Nevada Ecosystem Project. There would be no additional impacts.
- Management purposes of the two agencies could continue to diverge, with the NPS mission geared more toward preservation and the USFS mission toward providing for multiple uses, including some not allowed in the parks, such as grazing, logging, hunting, and snowmobiling. Some visitors could be unaware of these different missions.

There would be negligible, beneficial impacts on park operations over the long term as a result of increased interaction with the U.S. Forest Service related to the management of Giant Sequoia National Monument.

**Bureau of Land Management.** NPS staff would continue to fulfill a cooperative agreement for maintenance and oversight, resulting in a negligible, beneficial, long-term impact on BLM operations.

**California Department of Transportation.** As described for the no-action alternative, Caltrans plans and manages several roads in and around the parks, including

- opening and closing the Kings Canyon Highway (California 180) from Grant Grove to Cedar Grove, which affects the operating season at Cedar Grove and necessitates coordination, generally result-

ing in moderate, beneficial, long-term impacts on park operations

- planning to improve California 180 west of the parks to create six- and four-lane expressway segments that would provide easier access to the parks

There could be moderate to major, adverse, short-term impacts on park operations as a result of natural events that could affect the opening or closing of Kings Canyon Highway.

The preferred alternative would generally contribute moderate, beneficial, long-term impacts in terms of improved infrastructure, more sustainable facilities, increased staffing, and continued use of volunteers. On a cumulative basis, continuing programs and work with the U.S. Forest Service, the Bureau of Land Management, and Caltrans, in conjunction with the preferred alternative, would generally contribute more beneficial impacts on park operations than the no-action alternative, resulting in minor to moderate, long-term impacts.

## Conclusion

The preferred alternative would generally have moderate, beneficial impacts on park operations because of improved infrastructure and more sustainable facilities over the long term. There would be negligible, beneficial impacts from the continued use of stock, helicopters, and snowmobiles for park operations. Assistance from other groups (the natural history association, volunteers, concessioners, commercial permit holders, and partners) would have minor to major, beneficial impacts. Adverse impacts of additional park and concession staffing on housing demand would be moderate and adverse over the long term.

On a cumulative basis, continuing programs and work with the U.S. Forest Service, the Bureau of Land Management, and Caltrans, in conjunction with actions under the preferred alternative, would generally result in minor to moderate, beneficial impacts over the long term. There would be more beneficial impacts on park

operations under the preferred alternative than under the no-action alternative.

## IMPACTS OF ALTERNATIVE A

Under this alternative the park development zone would consist of about 1,310 acres (about 0.15% of the park). About 60% of the developed area would be used for administration / operations and 10% for residential purposes. Most park operational facilities would be located in developed areas, with some facilities in high- and low-use frontcountry. Within the development zone, administrative and maintenance functions would no longer be interspersed among residential areas or campgrounds. Some administrative functions could occur in park villages or in museums or visitor centers in the high-use frontcountry zone. Very limited park operational facilities could be found in the backcountry, primarily in the major trails zone. Residential uses would be reduced from current levels, as would operations and villages.

## Analysis

### *Impacts of Operational Needs*

**Utilities.** Infrastructure would be reduced in size and facilities relocated outside the parks where possible. Existing utilities would be replaced as needed, and more stringent water and wastewater standards would need to be met. Similar to the other alternatives, value analysis studies would be undertaken to assess infrastructure when replacement was needed. These studies would assess the impact of infrastructure on resource conditions and would also determine whether the function was needed, whether it must be located inside the park, and whether government-built infrastructure would be the best way to supply it. Reduced demands on water systems would be important for areas where water supplies are limited, especially during droughts (Grant Grove, Lodgepole, Ash Mountain, and Mineral King).

Private lands inside the parks would be acquired, resulting in a reduction of individual water and wastewater systems inside the parks.

Wastewater systems at Ash Mountain were designed to work at specific levels, but they would continue to operate inefficiently due to reduced volume, and it is possible that other wastewater systems could experience similar inefficiencies. These inefficiencies result in added staff time and funds to keep the systems functioning. RV dump stations not meeting state standards would be removed, reducing the burden on park wastewater systems.

Over time some comfort stations would be replaced by vault toilets, necessitating long-term use of a pumping service, which would be a permanent expense in the maintenance budget.

Like the no-action alternative, the impact of this alternative on the utility infrastructure and park operations would generally be moderate, adverse, and short term as a result of aging infrastructure. Over the long term impacts would be moderate and beneficial as systems were replaced.

**Visitor Facilities and Services.** Fewer visitor facilities would be provided, and as some facilities reached the ends of their useful lives, they would be removed. Each facility would be assessed as to its function, its impact on natural ecosystems, the value added to the park, and whether it could be combined or consolidated with other facilities or moved. The impact of more efficient visitor facilities on park operations would be moderate, long term, and beneficial since maintenance in frontcountry areas could be done more efficiently.

**Winter Operations.** Keeping roads open during winter would not be a priority, resulting in reduced winter operations, but spring operations to reopen the roads would increase the work load during an already busy time. The overall result would be moderate, adverse, short- and long-term impacts on park operations.

**Administrative Helicopter Use.** Administrative helicopter use would continue only for search-and-rescue operations. Helicopters would not be seen as minimum tools, and they would not support backcountry maintenance, deliveries, or waste collection from Mount Whitney. This

could reduce the ability of park staff to efficiently perform backcountry maintenance, potentially delaying seasonal openings. The impacts of alternative A on park operations would be major, adverse, and long term.

**Administrative Stock Use.** No longer allowing administrative stock use for any front- or backcountry operations would adversely affect the ability of park staff to perform backcountry maintenance, slowing down and reducing the amount of work that could be accomplished and delay seasonal openings. The impact on park operations would be major, adverse, and long term.

**Administrative Snowmobile Use.** Allowing administrative snowmobile use only for winter search and rescue would affect staff ability to conduct snow surveys and research, would make operations less efficient, and would reduce the amount of work that could be accomplished. The impact on park operations would be major, adverse, and long term.

#### *Impacts of Other Entities on Park Operations*

**Sequoia Natural History Association.** Under alternative A fewer visitors to bookstores, Crystal Cave, and educational programs would result in moderate, adverse, long-term impacts on the cooperating association, which would still require people to staff bookstores and run trips and activities. Impacts on park operations from assistance provided by the association would continue to be moderate and beneficial over the long term.

**Volunteers.** Under alternative A the focus of volunteer activities would shift from education and maintenance to science, and an unknown number of volunteers would continue. Stock user groups could no longer participate in trail building, resulting in major, adverse, long-term impacts on backcountry trails. Inadequate volunteer housing would continue. Long-term impacts on volunteers could be major and adverse. Impacts on park operations would be moderate and adverse because the level of assistance provided by volunteer groups, such as stock user groups, could decline.

**Concessioners.** Reduced visitation would not necessarily result in reduced staffing levels for concessioners, adversely affecting cost-effective operations.

Prohibiting stock use would mean that concessioners would no longer be operating stables and pack trips, and their facilities would need to be removed.

While overall impacts on concession operations would be major and adverse over the long term, the impacts of concession operations on park operations would continue to be minor to moderate and beneficial over the long term.

**Commercial Permit Holders.** Any stock-related commercial permits would cease, and since they constitute many commercial permits, the impacts of reduced commercial operations in the parks would be a moderate, adverse, and long term since some help maintain backcountry areas.

**Partners.** Current partnerships with private landowners would likely dissolve with the acquisition of their properties, but the impact on essential park operations would be minor and adverse over the long term. Any new partnership groups would likely focus on improving the condition of natural resources, possibly resulting in negligible to minor benefits over the long term. Taken as a whole, the impacts on park operations would be minor, adverse, and long term.

### *Impacts on Staffing*

**Staffing.** Staffing priorities would change under alternative A, with a greater focus on science and research and possibly resulting in more summer season staffing. Keeping the entire length of the Generals Highway open in winter would no longer be a goal, and winter closures would be more common, which could result in additional work to reopen the highway in spring. Maintenance staff would support resource management as well as visitor services. Eliminating stock use in the parks would adversely affect backcountry access and park operations since additional staff would be required to accomplish work done with the help of stock animals. Addi-

tionally, less housing would be available in the parks to meet staff needs. Taken together, the impact of this alternative on existing staff levels and organization would likely be major, adverse, and long term.

### **Cumulative Impacts**

**U.S. Forest Service.** As described for the no-action alternative, the following factors are considered in the cumulative impact analysis for park operations:

- NPS staff would continue to provide maintenance, fire, emergency and sequoia management consultation for Giant Sequoia National Monument. Continued park participation would have a moderate, long-term, adverse impact on park operations and budgets.
- Gate receipts would continue to be shared with Sequoia National Forest, with no additional impacts in the short or long term.
- Habitat shared between the national parks and Sierra National Forest would continue to be managed jointly in accordance with the recommendations of the Sierra Nevada Ecosystem Project. There would be no additional impacts.
- Management purposes of the two agencies could continue to diverge, with the NPS mission geared more toward preservation and the USFS mission toward providing for multiple uses, including some not allowed in the parks, such as grazing, logging, hunting, and snowmobiling. Some visitors could be unaware of these different missions.

There would be negligible, beneficial impacts on park operations over the long term as a result of increased interaction with the U.S. Forest Service related to the management of Giant Sequoia National Monument.

**Bureau of Land Management.** NPS staff would continue to fulfill a cooperative agreement for maintenance and oversight, resulting in a negligible, beneficial, long-term impact on BLM operations.

**California Department of Transportation.** As described for the no-action alternative, Caltrans plans and manages several roads in and around the parks, including

- opening and closing the Kings Canyon Highway (California 180) from Grant Grove to Cedar Grove, which affects the operating season at Cedar Grove and necessitates coordination, generally resulting in moderate, beneficial, long-term impacts on park operations
- planning to improve California 180 west of the parks to create six- and four-lane expressway segments that would provide easier access to the parks

There could be moderate to major, adverse, short-term impacts on park operations as a result of natural events that could affect the opening or closing of Kings Canyon Highway.

Alternative A would contribute minor to major, adverse impacts over the short and long terms, primarily because of lack of winter maintenance on the Generals Highway. On a cumulative basis, continuing programs and work with the U.S. Forest Service, the Bureau of Land Management, and Caltrans, in conjunction with alternative A, would generally contribute less beneficial and more adverse impacts on park operations than would the no-action alternative or the preferred alternative.

## Conclusion

Alternative A would have major, adverse, long-term impacts on park operations as a result of reduced staff and eliminating the use of stock, helicopters, and snowmobiles for administrative purposes. Impacts on park operations from the assistance of other groups — the natural history association, volunteers, concessioners, commercial permit holders, and partners — would be minor to major and beneficial. Generally there would be moderate to major, adverse, long-term impacts on other entities from either reduced use or the acquisition and removal of privately owned land or structures.

On a cumulative basis, continuing programs and work with the U.S. Forest Service, the Bureau of Land Management, and Caltrans, in conjunction with alternative A, would generally contribute less beneficial and more adverse impacts on park operations than would the no-action alternative or the preferred alternative.

## IMPACTS OF ALTERNATIVE C

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Under alternative C most park operational facilities would be located in the park development zone, with some facilities in the high- and low-use frontcountry zones. The development zone would include about 1,986 acres (0.23% of the park). About 55% of the developed area would be used for administration / operations and 19% for residential purposes. Within the development zone, administrative and maintenance functions would not be interspersed in residential areas or campgrounds. Some administrative functions could occur in park villages or in museums or visitor centers. Very limited park operational facilities would be found in the backcountry, primarily in the major trails zone. Residential uses would be expanded from current levels, as would operations and villages.

## Analysis

### *Impacts of Park Operational Needs*

**Utilities.** Existing utilities would be replaced as needed, and more stringent water and wastewater standards would need to be met. Similar to the other alternatives, value analysis studies would be undertaken to assess infrastructure when replacement was needed. Each utility system would be assessed to determine which approach would best meet needs, legal requirements, and improved technology. Expanding utilities within their design capacity would be the most cost-effective for meeting additional demand, along with sustainable technologies to reduce both water demand and wastewater treatment needs.

Water supply could continue to be inadequate in some years at Grant Grove, Lodgepole, Ash Mountain, and Mineral King, and drought plans might need to be implemented, including mea-

tures such as replacing low-flow fixtures with even lower-flow fixtures (such as waterless urinals). In the Grant Grove area, this situation could be further exacerbated by more year-round use in Wilsonia.

Wastewater systems at Ash Mountain were designed to work at specific levels, but would continue to operate inefficiently due to reduced volume. It is possible that other wastewater systems could experience similar inefficiencies. These inefficiencies result in added staff time and funds to keep the systems functioning.

In Wilsonia private properties would be acquired from willing sellers at the rate of approximately one property every 12 years. Nonhistoric properties owned by the National Park Service would be removed, and the areas would be returned to more natural conditions. Over time there would be fewer private utility systems; however, utility systems could be retained at historic structures.

Over time some comfort stations would be replaced by vault toilets, necessitating long-term use of a pumping service, the cost of which would be included in the maintenance budget.

Removing RV dump stations that do not meet state standards would reduce the burden on park wastewater systems, thus improving the capacity of wastewater systems.

The impact of this alternative on the utility infrastructure and park operations would generally be moderate, adverse, and short term as a result of aging infrastructure, similar to the preferred alternative. Long-term impacts would be moderate and beneficial as systems were replaced with more sustainable ones.

**Visitor Facilities and Services.** Replacing visitor facilities as they reached the end of their useful lives would result in moderate, beneficial, long-term impacts in terms of park operations. Providing additional facilities would result in adverse impacts.

Maintaining existing services and expanding maintenance in congested or seasonal high-use areas would result in additional operational

needs, although backcountry stock use would include smaller party sizes, potentially reducing routine maintenance along backcountry trails. Overall, the impact of increased visitor services on park operations would be moderate, long term, and beneficial as a result of gradually improved facilities.

**Winter Operations.** Continuing present winter snow removal policies would have negligible additional impacts on park operations compared to the no-action alternative.

**Administrative Helicopter Use.** Continuing administrative helicopter use for search-and-rescue operations, as well as for maintenance and backcountry deliveries, would continue to have negligible, beneficial, long-term impacts on park operations. Helicopter use would be considered a minimum tool in order to accomplish backcountry work in a timely fashion and to speed up backcountry seasonal openings.

**Administrative Stock Use.** Continuing administrative stock use to support backcountry park operations (primarily improvement of resource conditions, facilitating public access, and delivering supplies) would continue to have negligible, beneficial, long-term impacts on operations.

**Administrative Snowmobile Use.** Snowmobiles would continue to be used for research, snow surveys, and winter search and rescue, resulting in negligible, beneficial, long-term impacts on operations.

#### *Impacts of Other Entities on Park Operations*

**Sequoia Natural History Association.** Alternative C would have no impact on the cooperating association compared to the no-action alternative. The association would still require people to staff bookstores and run trips and activities, so impacts on park operations would be moderate, beneficial, and long term.

**Volunteers.** Volunteers would continue to support park operations, including educational, scientific, operational, and maintenance programs. Stock user groups would continue to participate in trail building, resulting in moderate to major,

beneficial impacts on backcountry operations. Volunteer housing would be built, resulting in major, beneficial impacts on volunteers. Overall, the impacts of volunteers on park operations would be major, long term, and beneficial.

**Concessioners.** Concessioners under alternative C would provide more services and facilities in accordance with the full buildout scenarios in their contracts, resulting in additional services and employees. Concessioners running stables and pack trips would continue to supply services in all locations except Wolverton, and their facilities would need to be maintained. The overall impacts of concession services on park operations would be moderate, beneficial, and long term, but costs and added work to provide housing for additional employees, if supplied in the parks, could result in minor to moderate, adverse impacts over the long term.

**Commercial Permit Holders.** Commercial permit holders would retain their permits, but smaller stock party sizes could affect backcountry trips. Some commercial groups would continue to provide backcountry maintenance. Because most permits are annual and relatively few people are involved, impacts on park operations would be minor, beneficial, and short term.

**Partners.** Partnerships would be pursued to provide educational and other operations, including management of the Mineral King area, resulting in moderate, beneficial, long-term impacts on park operations.

### ***Impacts on Staffing***

Increased staffing would be needed for more seasonal interpretive programs, transit operations, and other visitor services, resulting in moderate, beneficial, long-term impacts on park operations. Maintaining buildings and utilities in aging recreational communities would remain challenging. At the same time housing needs that could not be met in the parks would need to be found individually outside the parks. Since more housing would be provided, the impact of housing availability on park operations would generally be minor to moderate, adverse, and long term.

Taken together, the impacts of this alternative with increased park staffing would likely be moderate, long term, and beneficial despite increased operational and housing needs.

## **Cumulative Impacts**

**U.S. Forest Service.** As described for the no-action alternative, the following factors are considered in the cumulative impact analysis for park operations:

- NPS staff would continue to provide maintenance, fire, emergency, and sequoia management consultation for Giant Sequoia National Monument. Continued park participation would have moderate, long-term, adverse impacts on park operations and budgets.
- Gate receipts would continue to be shared with Sequoia National Forest, with no additional impacts in the short or long term.
- Habitat shared between the national parks and Sierra National Forest would continue to be managed jointly in accordance with the recommendations of the Sierra Nevada Ecosystem Project. There would be no additional impacts.
- Management purposes of the two agencies could continue to diverge, with the NPS mission geared more toward preservation and the USFS mission toward providing for multiple uses, including some not allowed in the parks, such as grazing, logging, hunting, and snowmobiling. Some visitors could be unaware of these different missions.

There would be negligible, beneficial impacts on park operations over the long term as a result of increased interaction with the U.S. Forest Service related to the management of Giant Sequoia National Monument.

**Bureau of Land Management.** NPS staff would continue to fulfill a cooperative agreement for maintenance and oversight, resulting in negligible, beneficial, long-term impacts on BLM operations.

**California Department of Transportation.** As described for the no-action alternative, Caltrans

plans and manages several roads in and around the parks, including

- opening and closing the Kings Canyon Highway (California 180) from Grant Grove to Cedar Grove, which affects the operating season at Cedar Grove and necessitates coordination, generally resulting in moderate, beneficial, long-term impacts on park operations
- planning to improve California 180 west of the parks to create six- and four-lane expressway segments that would provide easier access to the parks

There could be moderate to major, adverse, short-term impacts on park operations as a result of natural events that could affect the opening or closing of Kings Canyon Highway.

Alternative C would contribute negligible to major, beneficial, long-term impacts as the result of more sustainable facilities and infrastructure, as well as continued use of park volunteers. However, impacts related to inadequate staffing and housing would contribute negligible to moderate, adverse impacts over the short and long terms. On a cumulative basis, continuing programs and work with the U.S. Forest Service, the Bureau of Land Management, and Caltrans, in conjunction with actions under alternative C, would generally result in minor, beneficial, long-term impacts.

## Conclusion

Overall, alternative C would generally have moderate, beneficial, long-term impacts on park operations as a result of expanded staffing and improved facilities. There would be negligible, beneficial impacts from the continued use of stock, helicopters, and snowmobiles for park operations. Impacts on park operations from the assistance of other groups — the natural history association, volunteers, concessioners, commercial permit holders, and partners — would be minor to major and beneficial.

On a cumulative basis, continuing programs and work with the U.S. Forest Service, the Bureau of

Land Management, and Caltrans, in conjunction with actions under alternative C, would generally result in minor, beneficial, long-term impacts.

## IMPACTS OF ALTERNATIVE D

Like the other action alternatives, most park operational facilities would be located in the park development zone, with some facilities in the high- and low-use frontcountry zones. Development would consist of about 2,133 acres (0.25% of the park). About 50% of the developed area would be for administration and operations, and 10% for residential purposes. In developed areas administrative and maintenance functions would not be interspersed with residential needs or campgrounds. Some administrative functions could occur in park villages or in museums or visitor centers in the high-use frontcountry. A limited number of park operational facilities could be found in the backcountry, primarily in the major trails zone. Residential uses would be expanded from current levels, as would operations and villages.

## Analysis

### *Impacts of Park Operational Needs*

**Utilities.** Existing utilities would be replaced as needed, and more stringent water and wastewater standards would need to be met. As described for the other action alternatives, value analysis studies would be undertaken to assess infrastructure when replacement was needed.

With year-round use in areas like Cedar Grove, utilities might need to be expanded or upgraded. Expanding development only to the design capacity of existing utility systems would be the most cost-effective method to meet needs. Value analysis studies would also assess the best locations for new facilities, resource impacts, whether the function should be located inside or outside the parks, and whether government-built and maintained infrastructure would be the best way to meet needs.

As described for the no-action alternative, water supply would continue to be inadequate in some

years at Grant Grove, Lodgepole, Ash Mountain, and Mineral King, and drought plans would need to be implemented periodically. Water demand could be further reduced by replacing fixtures with very low-flow fixtures, such as waterless urinals. In the Grant Grove area, inadequate water supplies could be further exacerbated by more year-round use or commercial use in Wilsonia. Since Wilsonia is on private utility systems, the impact of acquiring inholdings in Wilsonia to provide additional public uses is unknown, but could be beneficial.

Wastewater systems at Ash Mountain are likely to operate inefficiently due to reduced volume from facilities moved outside the parks. Other wastewater systems could experience similar inefficiencies. Removing RV dump stations that do not meet state standards would increase the capacity of wastewater systems.

In Wilsonia private properties would be acquired from willing sellers at the rate of approximately one property every 12 years. Nonhistoric properties owned by the National Park Service would be removed, and the areas would be returned to more natural conditions. Over time there would be fewer private utility systems, except utility systems could be retained at historic structures.

Over time some comfort stations would be replaced by vault toilets, necessitating long-term use of a pumping service, the cost of which would be included in the maintenance budget.

Removing RV dump stations that do not meet state standards would reduce the burden on park wastewater systems, thus improving the capacity of wastewater systems.

Like the preferred alternative, the impact of alternative D on the utility infrastructure and park operations would be moderate and beneficial over the long term as systems were replaced, and a partnership group would run the system in Mineral King. Impacts would generally be moderate, adverse, and short term as a result of aging infrastructure.

**Visitor Facilities and Services.** More visitor facilities would be provided, and facilities at the end of their useful lives would be replaced with more sustainable facilities. Before approval, each facility would be assessed as to its function, its impact on park resources, what value it adds to the park, and whether it could be combined or consolidated with other functions. New facilities would be designed to be efficient and improve park operations. The impact of expanding visitor facilities on park operations would be major and largely beneficial over the long term because increased staffing would be available and facilities would be more sustainable.

Visitor services would be expanded to adapt to the needs of changing user groups. Services would be assessed to determine whether a particular service was still needed and whether government-provided services were the most efficient. Additional educational and outdoor skills training would be provided. Overall, the impact of visitor services on park operations would be moderate, beneficial, and long term.

**Winter Operations.** Expanded winter use would make more demands on park operations and snow removal. Impacts would be minor and adverse over the long term.

**Administrative Helicopter Use.** Administrative helicopter use would be continued for search and rescue, as well as for maintenance and backcountry deliveries. It would be considered a minimum tool in order to accomplish backcountry work in a timely fashion and speed up backcountry seasonal openings. The impact on park operations would be negligible, beneficial, and long term.

**Administrative Stock Use.** Administrative stock use would continue to support backcountry park operations, facilitating public access and delivering supplies, with negligible, beneficial, long-term impacts on resource conditions. Continuing administrative stock use in the parks would be cost-effective for backcountry maintenance operations.

Relocating corrals and grazing areas in the foothills area outside the parks would require additional feed to be brought in, a minor, adverse, long-term impact on park operations and budgets.

**Administrative Snowmobile Use.** Continuing administrative snowmobile use for research, snow surveys, and winter search and rescue would result in negligible, beneficial, long-term impacts on operations.

### *Impacts of Other Entities on Park Operations*

**Sequoia Natural History Association.** Under alternative D there would be moderate, beneficial, long-term impacts on park operations from assistance provided by the cooperating association as additional and different types of programs were developed and offered to the public. The natural history association would be involved with more activities under this alternative than the other alternatives, with a greater impact on operations.

**Volunteers.** The focus of other volunteer activities would be diverse, ranging from education to science to maintenance. Stock user groups would participate in trail maintenance, resulting in moderate to major, beneficial, long-term impacts on backcountry trails. Volunteer housing would be constructed, resulting in major, beneficial impacts on volunteers. Overall, the impact of volunteer assistance on park operations would be major and beneficial over the long term.

**Concessioners.** Like the preferred alternative, concessioners would provide more services and facilities in accordance with the full buildout scenarios in their contracts, resulting in additional employees. Concessioners running stables and pack trips would continue to supply services in all locations except Wolverton, and their facilities would need to be maintained. Concessioners would be supplying services to more diverse visitors and groups. Overall impacts of concession services on park operations would be moderate, beneficial, and long term, but costs and added work to provide housing for additional employees, if supplied in the parks, could

result in minor to moderate, adverse impacts over the long term.

**Commercial Permit Holders.** There would be negligible, adverse, short-term impacts on commercial permit holder as they adapted to the needs of changing user groups.

**Partners.** Partnerships would be pursued to provide educational and other operations, including management of the Mineral King area, resulting in moderate, beneficial, long-term impacts on park operations.

Native American partnerships would be sought to support park interpretation and services, resulting in moderate, beneficial, long-term impacts for these groups.

### *Impacts on Staffing*

Park staffing needs would increase the most as a result of transit operations, expanded interpretive programs, and year-round use of the parks. Staff members would need to be responsive to changing user groups, and foreign language skills, as well as good communication skills, could be important. Keeping the entire length of the Generals Highway open in winter and avoiding all winter closures would be a goal that would require more staff. Additional housing would be required in the parks to meet staff needs or it would need to be individually acquired outside the parks. Affordable housing would continue to be a problem exacerbated by increased staffing.

Taken together, the impacts of this alternative on park staff would likely be moderate, beneficial, and long term, despite affordable housing problems.

### **Cumulative Impacts**

**U.S. Forest Service.** As described for the no-action alternative, the following factors are considered in the cumulative impact analysis for park operations:

- NPS staff would continue to provide maintenance, fire, emergency and sequoia

management consultation for Giant Sequoia National Monument. Continued park participation would have moderate, long-term, adverse impacts on park operations and budgets.

- Gate receipts would continue to be shared with Sequoia National Forest, with no additional impacts in the short or long term.
- Habitat shared between the national parks and Sierra National Forest would continue to be managed jointly in accordance with the recommendations of the Sierra Nevada Ecosystem Project. There would be no additional impacts.
- Management purposes of the two agencies could continue to diverge, with the NPS mission geared more toward preservation and the USFS mission toward providing for multiple uses, including some not allowed in the parks, such as grazing, logging, hunting, and snowmobiling. Some visitors could be unaware of these different missions.

There would be negligible, beneficial impacts on park operations over the long term as a result of increased interaction with the U.S. Forest Service related to the management of Giant Sequoia National Monument.

**Bureau of Land Management.** NPS staff would continue to fulfill a cooperative agreement for maintenance and oversight, resulting in negligible, beneficial, long-term impacts on BLM operations.

**California Department of Transportation.** As described for the no-action alternative, Caltrans plans and manages several roads in and around the parks, including

- opening and closing the Kings Canyon Highway (California 180) from Grant Grove to Cedar Grove, which affects the operating season at Cedar Grove and necessitates coordination, generally resulting in moderate, beneficial, long-term impacts on park operations

- planning to improve California 180 west of the parks to create six- and four-lane expressway segments that would provide easier access to the parks

There could be moderate to major, adverse, short-term impacts on park operations as a result of natural events that could affect the opening or closing of Kings Canyon Highway.

Alternative D would generally contribute moderate, beneficial impacts over the long term because of improved infrastructure, more sustainable facilities, increased staffing, and continued use of volunteers. Like the preferred alternative, on a cumulative basis, continuing programs and work with the U.S. Forest Service, the Bureau of Land Management, and Caltrans, in conjunction with the actions of alternative D, would generally result in minor to moderate, beneficial, long-term impacts. Impacts on park operations would be more beneficial than under the no-action alternative.

## Conclusion

Alternative D would generally have moderate to major, beneficial impacts on park operations over the long term as a result of improved facilities and increased park staffing. There would be negligible, beneficial impacts from the continued use of stock, helicopters, and snowmobiles for park operations. Impacts on park operations from the assistance of other groups — the natural history association, volunteers, concessioners, commercial permit holders, and partners — would be minor to major and beneficial. Impacts as a result of housing shortages would be moderate, adverse, and long term.

Like the preferred alternative, on a cumulative basis, continuing programs and work with the U.S. Forest Service, the Bureau of Land Management, and Caltrans, in conjunction with the actions of alternative D, would generally result in minor to moderate, beneficial, long-term impacts. Impacts on park operations would be more beneficial than under the no-action alternative.

# Socioeconomic Environment

## METHODOLOGY FOR ANALYZING IMPACTS

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Sequoia and Kings Canyon National Parks are an important part of the local socioeconomic environment of Fresno and Tulare counties, as well as Inyo County. However, there is no road access within the parks from the east, and Inyo County stands as a separate social and economic unit because it is isolated from Fresno and Tulare counties by the Sierra Nevada. Visitor access through Inyo County is limited to wilderness visitors. Therefore, Inyo County is not included in the analysis because none of the action alternatives would make any changes in the management and visitor use of the parks that would have any significant socioeconomic impacts on Inyo County.

Socioeconomic impacts for Fresno and Tulare counties were determined on the basis of applied logic and professional expertise and judgment. Economic data, historic visitor use data, expected future visitor use, and future developments within the park were all considered in identifying and discussing potential impacts. A qualitative analysis is sufficient to compare the effects of alternatives for decision-making purposes.

Impacts on socioeconomic conditions are expected to fall into four categories:

- *Local and Regional Economies* — Changes in the two-county regional economy, including local gateway communities, would include impacts on the regional and local socioeconomic base due to changes in park operations and other management or development actions. The socioeconomic base includes such factors as population, income, employment, and earnings. More staff seeking housing outside the parks could be expected to benefit the local tax base. Park development and removal projects during the life of the general management plan could be expected to benefit the

local construction industry. The cost estimates developed for the alternatives include many projects common to every alternative, some of which have already been funded. Projects could be funded in a variety of ways. About \$107 million in projects have already been funded or committed through the NPS line-item construction program (\$23 million), the Federal Lands Highway Program (over \$26.6 million), and the fee demonstration program (\$0.7 million), plus there are nearly \$57 million in projects reflecting concessioner commitments.

- *Private Land* — Some inholdings could be acquired by the National Park Service on a willing-seller / willing-buyer basis. If the park acquired an inholding, then some private land would no longer be subject to local taxes. This action could affect a county's property tax receipts.
- *Park Concessioners* — New concessioner contracts could call for changes in the availability of goods and services provided by concessioners, which could affect the visiting public and the regional economy.
- *Park Staffing and Budget* — Each alternative would have different staffing and budget needs, which could affect adjacent communities.

Context, intensity, and duration of impacts were used to compare the action alternatives to the no-action alternative. Context refers to the relative area within which impacts would occur; for the most part impacts would affect a regional area (Fresno and Tulare counties) or a local area (e.g., the Three Rivers gateway community).

Impact intensity is the degree to which a topic is beneficially or adversely affected (see accompanying text box). For this analysis, impacts on recreational visitation were qualitatively evaluated and described.

### *Socioeconomic Impact Thresholds*

**Negligible** — No effects would occur, or the effects on socioeconomic conditions would be below or at the level of detection.

**Minor** — The effects on socioeconomic conditions would be small but detectable, and only a small number of firms and/or a small portion of the population would be affected. The impact would be slight and would not be detectable outside the affected area.

**Moderate** — The effects on socioeconomic conditions would be readily apparent. Any effects would result in changes to socioeconomic conditions on a local scale (e.g., in a gateway community) within the affected area.

**Major** — The effects on socioeconomic conditions would be readily apparent. Measurable changes in social or economic conditions at the county or two-county regional level would occur. The impact would be severely adverse or exceptionally beneficial within the affected area.

A short-term impact would last less than three years, and a long-term impact longer than three years (and could be considered a permanent change in conditions).

## **IMPACTS COMMON TO ALL ALTERNATIVES**

As previously discussed, Public Law 108-447 authorized the continuation of the Kaweah no. 3 hydroelectric facilities and special use permit cabins in the Mineral King area. The following discussion therefore applies to all alternatives.

**Utility Use — Hydroelectric Facilities.** The operation of hydroelectric generating facilities in Sequoia National Park by Southern California Edison may continue as it has in the past. These hydroelectric facilities provide a limited amount of electricity seasonally to the local power grid. Benefits to the parks include being able to use some water from the impoundments to fight local wildland fires. Also, Southern California

Edison will compensate the park, as required by Public Law 108-447. Impacts are expected to be minor to moderate, beneficial, and long term as a result of compensation to the parks.

**Mineral King Permit Cabins — Cabin Cove, West Mineral King, East Mineral King.** Permits to use private cabins at Cabin Cove, West Mineral King, and East Mineral King will be issued in accordance with the provisions of Public Law 108-447 and administered in accordance with NPS *Management Policies 2001* and *Director's Order #53: Special Use Permits* (see appendix G). Continuing approximately 60 permits for private cabins in the Mineral King area will result in ongoing annual fee income to Sequoia National Park, plus property taxes to Tulare County. Impacts would be negligible to minor, beneficial, and long term.

## **IMPACTS OF THE NO-ACTION ALTERNATIVE**

### **Analysis**

Facilities and services within the parks would remain essentially the same as now. Without a long-term, comprehensive management plan, park managers would accommodate changing visitor use patterns, uses, and volumes, along with changes in resource conditions, as they occurred or in response to pressure from various interest groups. While visitation could fluctuate, an overall growth of 23% for 1997–2010 is assumed.

### **Local and Regional Economies**

Additional funds for specific projects that have already been identified would amount to \$125 million in direct expenditures. Because these projects would be phased over a number of years, impacts on individual firms and employees in terms of increased income and more jobs could be moderate to major, beneficial, and short term. Impacts on the regional economy in terms of economic indicators such as a major decrease in income levels, unemployment, or poverty would be negligible because the economy had

more than \$17 billion in earnings and over 591,000 jobs in 2000.

Sequoia and Kings Canyon National Parks would continue to be important contributors to the local economy as a result of jobs provided, and wages and operational expenditures by the National Park Service. In addition, the parks serve as primary attractions for local and regional tourism. The visiting public would continue to generate tourist-related spending within the local economy, which benefits local businesses by generating income and providing employment opportunities.

Present trends in park use would continue to provide the impetus for increased development in adjacent communities, especially along corridors leading to the parks. However, the two-county region would not be affected due to the size and diversity of the regional economy.

#### ***Private Land within the Parks***

Inholdings at Wilsonia in Kings Canyon National Park and at Oriole Lake in the Mineral King area of Sequoia National Park would be acquired on a willing-seller basis. There are approximately 275 private property landowners within the two parks. Inholders who sold to the federal government would benefit from selling their property rights for fair market value, and the public would benefit from having additional property and resources protected within the parks. Because title for the affected properties would be transferred from private individuals to the federal government, these parcels would be removed from the local real estate tax bases. The amount of property tax revenue subsequently lost to the two counties would be relatively small compared to the total tax revenues collected by Fresno and Tulare counties. In FY 2000 real estate property taxes in Tulare County amounted to \$155.7 million (for 228,984 parcels), and in Fresno County, \$373.7 million (241,200 parcels).

#### ***Park Concessioners***

Concession facilities and services would continue as they are now, except that limited expansion of lodging facilities at Grant Grove and Wuksachi would be allowed in accordance with the concession contracts.

#### ***Park Staffing and Budget***

Implementing this alternative would require staff levels of 275.2 permanent employees (full-time equivalents or FTEs)\* and 305.3 seasonal employees, plus unpaid volunteers. In 2001 there were 261.8 permanent and 290.4 seasonal employees. The parks' base budget was \$11.4 million in 2000.

#### **Cumulative Impacts**

Improvements in road and transportation access outside the parks include Caltrans improvements of California 180 and 65 and the potential development of a high-speed rail system connecting central California with southern California and the San Francisco Bay area. Transportation and circulation improvements within the parks include improvements to Generals Highway and a transit system for Giant Forest. Together these actions could generate increased visitation, resulting in additional tourist-related spending within the region and gateway towns, thereby increasing business opportunities, income, and employment.

In conjunction with other past, present, and reasonably foreseeable actions, the no-action alternative would continue to have a moderate to major, beneficial impact on the socioeconomic climate of the area over the short term, primarily because of ongoing construction projects. Improvements in transportation and access both outside and within the parks could generate additional visitation and tourist-related expenditures, benefiting the two-county regional and gateway economies. Over the long term these

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\* A full-time equivalent is equal to one person working full time for one year. So, four people working full time for three months each would equal one FTE.

impacts would be moderate for gateway communities but negligible at the regional level.

## **Conclusion**

Approved projects that would be funded under the no-action alternative would amount to about \$125 million. These projects would be phased over a number of years, so impacts on individual firms and employees could be moderate to major and beneficial over the short term, but impacts on the regional economy would be negligible. The current range and level of impacts on adjacent communities due to tourist spending would continue to be beneficial, providing income, employment, and business opportunities to the affected area's economy.

The acquisition of private lands within the parks on a willing-seller / willing-buyer basis would benefit the general public because additional resources within the parks would be protected and available for public access.

Current impacts relating to concessioners would continue, with negligible changes in short- or long-term effects on their business operations.

The parks' staff levels and base budget would not change under the no-action alternative other than as a result of adjustments for inflation and rising labor and materials costs.

Cumulative improvements in transportation and access both outside and within the parks would generate additional visitation and tourist-related expenditures in the two-county regional and gateway economies. Over the long term these effects would be moderate and beneficial for gateway communities but negligible for the regional economy.

## **IMPACTS OF THE PREFERRED ALTERNATIVE**

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### **Analysis**

Developing additional facilities (e.g., redesigning and refurbishing campgrounds, enhancing educational facilities, and providing new work

centers) at various locations throughout the parks would increase visitor access and accommodate sustainable growth in visitor use of 30%.

### ***Local and Regional Economies***

An estimated \$144 million in direct expenditures would be spent for various projects, or \$19 million more than under the no-action alternative. These projects would be accomplished in phases over the life of the plan. The resulting impacts to individual firms and workers due to increased income and more jobs would be moderate to major and beneficial over the short term. Impacts to the regional economy in terms of a substantial decrease in unemployment or poverty would be negligible because of the relative size of the regional economy (approximately \$17 billion in earnings and over 591,000 jobs in 2000).

Providing additional facilities and improved access would encourage more visitor use at the parks. The amount of additional use is indeterminate at this time. However, this increased use could result in some additional spending within the gateway communities, which would benefit some retail establishments, restaurants, or motels in nearby travel corridors.

Moving administrative functions and park employee housing to areas outside the parks would result in the purchase or long-term lease of land and the construction of buildings in gateway areas. New facility construction would result in beneficial, short-term impacts on the local economy, mostly affecting the construction sector. The purchase of land (on a willing-buyer / willing-seller basis) by the federal government would result in some long-term loss of local real-estate tax revenue. However, the amount of property tax revenue lost to the two counties would be negligible compared to the total tax revenues collected by Fresno County (\$373.7 million in FY 2000) and Tulare County (\$155.7 million in FY 2000).

### ***Private Land within the Parks***

Private land at Oriole Lake and in the Mineral King Valley (e.g., the Disney properties) would

be acquired on a willing-seller / willing-buyer basis. Private land at Silver City and Kaweah Han in the Mineral King area of Sequoia National Park, and at Wilsonia in Kings Canyon National Park would remain. Inholders who chose to sell to the federal government would benefit from receiving fair market value for their properties, and the public would receive long-term benefits because additional property and resources would be protected within the parks. Properties acquired by the federal government would be removed from Fresno and Tulare counties' real estate tax base; however, the amount of property tax revenue lost to the two counties would be negligible compared to their total tax revenues.

### ***Park Concessioners***

Under the preferred alternative some concessioner-provided facilities and services would be expanded, as well as incidental business permits and or other commercial permits. Like the no-action alternative, lodging at Wuksachi and Grant Grove village would be expanded in accordance with the present concession contract. This expansion of concession services and facilities would provide additional business and employment opportunities for a few firms and a small number of additional workers.

### ***Park Staffing and Budget***

Implementing the preferred alternative would require a park staff of 312.8 permanent employees (an increase of 37.6 FTEs compared to the no-action alternative) and 347 seasonal employees (an increase of 41.7). The parks' base budget would need to be increased substantially. The parks would make additional expenditures for labor and materials to support the staffing increases. The resulting impacts on the local economy (e.g., Three Rivers), compared to the no-action alternative, would be minor to moderate because of a relatively small increase in population. Additional park employees could increase the demand for housing outside the parks, and they would probably spend money for goods and services in the gateway communities. While the impacts would be moderate at the

gateway community level, the impact on the regional economy would be negligible because of the size of the two-county economy.

### **Cumulative Impacts**

As discussed for the no-action alternative, improvements in road and transportation access outside the parks include Caltrans improvements of California 180 and 65 and the potential development of a high-speed rail system connecting central California with southern California and the San Francisco Bay area. Transportation and circulation improvements within the parks include improvements to Generals Highway and a transit system for Giant Forest. Together these actions could generate increased park visitation.

More visitors could result in additional tourist-related spending within the region and gateway towns, increasing business opportunities, income, and employment. Improving facilities within the parks would further generate economic benefits to the growing regional economy in the form of direct spending. The need for additional park staff housing, combined with the increasing desirability of living in the gateway communities, would add to the demand for local housing and other locally provided goods. Hiring additional staff could result in a small increase in the local population, which contributes to the overall growth in gateway communities.

The preferred alternative, in conjunction with other past, present, and reasonably foreseeable actions, would have negligible to moderate, beneficial impacts over the long term on the socioeconomic climate of the local gateway communities. However, impacts at the regional level would be negligible.

### **Conclusion**

Approximately \$144 million would be spent over the life of the plan on various projects, an increase of only \$19 million compared to the no-action alternative. These expenditures could result in moderate to major, short-term, beneficial impacts on individual firms and employees because of increased business and profits, more

employment opportunities, and higher income. Overall impacts on the regional economy, however, in terms of economic indicators (income, unemployment, poverty) would be negligible because of the economy's size and the fact that projects would be phased over the next 15 to 20 years. These projects would encourage more visitation to the parks, with beneficial effects on adjacent communities in terms of increased visitor expenditures for locally provided goods and services. Moving administrative functions and park employee housing outside the parks would result in the purchase or long-term lease of land and the construction of buildings in local gateway areas, with short-term, beneficial impacts on the local economy, mostly affecting the construction sector.

The acquisition of private land within the parks on a willing-selling / willing-buyer basis, as well as the expiration of special use permits, would have negligible, long-term impacts on the property tax bases and revenue of both Fresno and Tulare counties.

There would be some additional moderate, beneficial impacts over the long term for concessioners and other businesses within the parks due to the expansion of facilities and increased visitor use.

An increase in park staffing levels by 37.6 full-time employees and 41.7 seasonal employees, along with a substantial budget increase, would have a moderate impact on the local gateway communities' economies because staff would likely purchase many goods and services locally. The impact on the regional economy, however, would be negligible.

Cumulative improvements in transportation and access both outside and within the parks and improved park facilities would generate additional visitation and tourist-related expenditures in the gateway communities and the two-county region. Additional staff would result in a small increase in the local population, contributing to the overall economic growth of the gateway communities. These would be moderate, beneficial impacts over the long term.

## **IMPACTS OF ALTERNATIVE A**

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### **Analysis**

Some facilities throughout the developed areas of the park (e.g., the Atwell Mill campground, the Lodgepole campground, and Cedar Grove) would be removed or redesigned to provide fewer sites, and sites would be restored to more natural conditions. Visitor use would be restricted to protect resources and ease congestion, and visitation could decrease by up to 10%.

### ***Local and Regional Economies***

An estimated \$126.6 million in direct expenditures would be spent over the life of the plan on various projects, an increase of only \$1.6 million compared to the no-action alternative. This work would provide short-term business and employment opportunities for some firms and individuals, primarily in the construction and landscaping industries. Benefits for the affected firms and workers in terms of increased income and more jobs could be moderate to major, but there would be negligible impacts on regional economic indicators such as unemployment, income, or poverty because work would be phased over the next 15 to 20 years, and the spending increase compared to the no-action alternative would be negligible.

Park operations and the visiting public would continue to generate spending within the local economy, a beneficial impact. However, fewer visitor facilities and restrictions on visitor uses, such as no stock use and reduced parking at various sites, would likely lead to reductions in visitor use. Fewer people visiting the parks during the peak summer season could reduce park-related economic activity in the gateway communities. Some retail establishments, restaurants, or motels in nearby travel corridors could experience a minor to moderate decline in business (e.g., lower sales, decline in income, fewer jobs). However, a reduction in some facilities and services in the parks (such as smaller campgrounds and administrative facilities located outside the parks) could increase business opportunities in gateway communities. Thus, it is not possible at this time to determine if

alternative A would have a net beneficial or adverse effect on the economies of gateway communities.

### ***Private Land within the Parks***

Inholdings at Wilsonia in Kings Canyon National Park, and at Oriole Lake and Silver City in Sequoia National Park, would be acquired on a willing-seller / willing-buyer basis. The impacts would be similar to the no-action alternative except inholdings at Silver City would also be acquired. Some real estate property tax revenue would be lost to Fresno and Tulare counties, with negligible impacts when compared to total tax revenues.

### ***Concessioners***

Concessioners, incidental business permit holders, or other commercial permit holders would be affected by actions such as eliminating lodging at Cedar Grove, reducing lodging at Grant Grove, and eliminating stock use within the parks. Two concessioner contracts would have to be terminated or renegotiated to allow for a reduction in services, with the National Park Service compensating the concessioners, as specified in the contracts.

Eliminating stock use in the parks would affect approximately 22 firms that provide horse or llama pack services. Permits for these services could be terminated upon their normal expiration dates.

These long-term actions would reduce the presence of concessioners and other commercial activity within the park. Some firms and employees would be adversely affected as a result of less income and fewer employment opportunities. Such reductions could be moderate to major for individual firms and employees. Over the long term the affected firms and individuals would adjust and find new opportunities within the region. The long-term impact on the regional economy would be negligible.

### ***Park Staffing and Budget***

Alternative A would require a park staff of 280.9 permanent employees, an increase of 5.7 FTEs compared to the no-action alternative, and 311.6 seasonal employees, an increase of 6.3 FTEs. The parks' base budget would increase slightly. The subsequent impact on the local and regional economies would be negligible and beneficial over the long term because of the small increase in jobs.

### ***Cumulative Effects***

As discussed for the no-action alternative, improvements in road and transportation access outside the parks include Caltrans improvements of California 180 and 65 and the potential development of a high-speed rail system connecting central California with southern California and the San Francisco Bay area. Transportation and circulation improvements within the parks include improvements to Generals Highway and a transit system for the Giant Forest. Together these actions could generate increased visitation to the two parks, contrary to the limited visitation goal of alternative A.

Restricting visitor use and removing or reducing lodging and camping facilities within the parks would reduce visitation to the parks, and some potential visitors would go to other nearby recreation areas. This displacement effect could increase visitation to Giant Sequoia National Monument and Sequoia National Forest to the extent that comparable or acceptable substitute facilities and recreational experiences were available, or if comparable facilities and experiences were not offered, the number of regional recreational visitors passing through the gateway communities (e.g., Three Rivers) could be reduced. Decreases in facilities within the parks could encourage the private sector to develop more lodging and camping facilities outside the parks, as long as there was sufficient demand. However, if visitation to the parks was substantially reduced, the gateway economies could suffer from reduced patronage, leading to decreased incomes, decreased profits, less business, and fewer employment opportunities. It is possible that the opposite effects could occur —

changes in expenditure patterns could happen because fewer visitors might be more relaxed and more likely to spend more per person. The exact effects cannot be accurately predicted.

On a cumulative basis, restricting visitation and removing or reducing lodging and camping facilities within the parks would reduce visitation to the parks, which could increase visitation to Giant Sequoia National Monument and Sequoia National Forest to the extent that comparable facilities were offered. This could produce either a negligible to minor, beneficial or negative impact over the long term.

## **Conclusion**

Based on expenditures of \$126.6 million for restoration and other projects (an increase of only \$1.6 million over the no-action alternative), impacts on individual firms and individuals would be moderate to major, beneficial, and short term. The projects would be accomplished in phases over the next 15 to 20 years. Impacts on the economies of gateway communities would most likely be minor to moderate and beneficial over the long term, but benefits to the regional economy would be negligible. Whether these effects were beneficial or adverse would depend on whether the public's demand for facilities and services removed from the parks were supplied by the private sector in adjacent areas.

The impacts of private land within the parks being acquired on a willing-seller / willing-buyer basis would be the same as the no-action alternative except that more properties and owners could be affected. Both Fresno and Tulare counties would experience negligible, long-term decreases in their respective property tax bases and revenue.

Some concessioners and their employees, and commercial stock users and their employees would experience long-term, moderate to major, adverse impacts with the loss of business and jobs. Over the long term these firms and individuals would find other commercial and employment opportunities within the regional

economy, resulting in negligible impacts. The public could look to the private sector within the gateway communities to provide services no longer offered in the parks.

Park staffing increases of 5.7 permanent employees and 6.3 seasonal employees, and a small increase in the parks' budget, would have long-term, negligible, beneficial impacts on the local and regional economies because of the small increase in jobs.

On a cumulative basis, restricting visitation and removing or reducing lodging and camping facilities within the parks would reduce visitation to the parks, which could increase visitation to Giant Sequoia National Monument and Sequoia National Forest to the extent that comparable facilities were offered. Decreases in park facilities could encourage private sector development of more lodging and camping facilities outside the parks to meet demand. Decreased visitor spending is expected; however, the opposite could occur because of changes in visitor expenditure patterns. Either way, the effects are expected to be long term and of minor intensity at the local and regional levels.

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## **IMPACTS OF ALTERNATIVE C**

### **Analysis**

Various projects relating to park facility expansion and service improvements (such as expanding park housing and maintenance areas at Cedar Grove, and improving roads and parking at Lodgepole) would be undertaken. Visitor use is estimated to increase by 30% over the life of the plan, the same as the preferred alternative.

### ***Local and Regional Economies***

Projects under alternative C would provide business and employment opportunities for some firms and individuals, primarily in the construction industry. An estimated \$159.5 million would be spent for various projects, an increase of \$34.5 million compared to the no-action alternative. These projects would not be accomplished all at the same time but rather would

occur in phases over the next 15 to 20 years. Over the short term impacts on individual firms and workers could be moderate to major and beneficial; however, impacts on the regional economy would be negligible because the total value would be about 0.9% of the region's \$17 billion in earnings in 2000. The number of jobs created would be only a small fraction of the 591,000 jobs that existed in 2000.

Providing additional facilities and improved access would encourage more visitor use at the parks. The amount of additional use is projected at 30% over the life of the plan, the same as the preferred alternative. This increased use could result in some additional spending within the gateway communities, which would benefit retail establishments, restaurants, or motels in the nearby travel corridors.

Sequoia and Kings Canyon National Parks would continue to be important contributors to the local economy as a result of wages and operational expenditures, as well as visitor expenditures. Any improvement in visitor facilities in the parks could enhance visitation and subsequent expenditures in the local area.

#### ***Private Land within the Parks***

Inholdings in the Mineral King Valley (e.g., the Disney properties) would be acquired on a willing-seller / willing-buyer basis. Inholdings at Oriole Lake, Silver City, and Kaweah Han in Sequoia National Park and at Wilsonia in Kings Canyon National Park would remain. Inholders who chose to sell to the federal government would benefit from receiving fair market value for their properties, and the public would receive long-term benefits because additional property and resources would be protected within the parks. Properties acquired by the federal government would be removed from the Fresno and Tulare counties' real estate tax base; however, the amount of property tax revenue lost to the two counties would be negligible compared to their total tax revenues. There would be no loss of property tax revenues for inholdings that remained in the parks (i.e., Wilsonia, Oriole Lake, Kaweah Han, and Silver City).

#### ***Park Concessioners***

Concession facilities and services would continue to provide goods and services within the parks to the extent allowed by existing contracts. Some expansion of concession activities (for example, at Cedar Grove and Wuksachi) would provide additional business and employment opportunities for a few firms and a small number of additional workers.

#### ***Park Staffing and Budget***

Implementing alternative C would require a park staff of 312.8 permanent employees (an increase of 37.6 FTEs) and 347 seasonal employees (an increase of 41.7 FTEs), requiring a substantial increase in the parks' base budget. Long-term impacts on the local economy would be minor and beneficial, and on the regional economy, negligible and beneficial because of the modest increase in park jobs.

#### ***Cumulative Effects***

As discussed for the no-action alternative, improvements in road and transportation access outside the parks include Caltrans improvements of California 180 and 65 and the potential development of a high-speed rail system connecting central California with southern California and the San Francisco Bay area. Transportation and circulation improvements within the parks include improvements to Generals Highway and a transit system for Giant Forest. Together these actions could generate increased visitation to the two parks.

In conjunction with other past, present, and reasonably foreseeable actions, alternative C would result in additional tourist-related spending within the region and gateway towns, increasing business opportunities, income, and employment. For the local economy these would be long-term effects of moderate intensity, but for the regional economy they would be negligible. Improving facilities within the parks would contribute beneficial economic impacts to the regional economy in the form of direct spending. The need for housing additional park staff, combined with the increasing desirability

of living in the gateway communities, would add to the demand for local housing and other locally provided goods. Hiring additional staff would result in a small increase in the local population, which would contribute to the overall growth in the gateway communities.

## **Conclusion**

An estimated \$159.5 million would be spent over the life of the plan to construct various projects, an increase of \$34.5 million compared to the no-action alternative. Benefits for individual firms and employees in the construction industry would be moderate to major, short term, and beneficial. Impacts on the regional economy would be negligible because of the size of the projects, which would be phased over the next 15 to 20 years.

The acquisition of private lands within the parks on a willing-selling / willing-buyer basis would have negligible, long-term impacts on the property tax bases and revenue of both Fresno and Tulare counties.

Park concessioners would benefit over the long term as a result of a growth in visitor services. Effects would be negligible.

An increase in park staffing levels by 37.6 permanent employees and 41.7 seasonal employees, along with a substantial rise in the parks' budget, would have a minor, beneficial, long-term impact on the local economy but a negligible impact on the regional economy.

Cumulative improvements in transportation and access both outside and within the parks and improved park facilities would generate additional visitation and tourist-related expenditures in the gateway communities and the two-county region. The long-term results would be beneficial and moderate. Additional staff would result in a small increase in the local population, which contributes to the overall economic growth of the gateway communities. Over the long term these would be moderate, beneficial impacts locally, but negligible impacts regionally.

## **IMPACTS OF ALTERNATIVE D**

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### **Analysis**

Developing additional facilities (e.g., a 1,700-car parking lot at Wolverton, and a new visitor center at Cedar Grove) throughout the parks would accommodate additional visitors and increase public access. Increases in visitor use of up to 48% are expected by 2010.

### ***Local and Regional Economies***

An estimated \$250.6 million would be spent over the life of the plan, an increase of \$125.6 million compared to the no-action alternative. These projects would be accomplished in phases over the next 15 to 20 years. Benefits (e.g., increased income, more jobs) for individual firms and workers would be moderate to major and short term. There would be minor impacts on economic indicators (e.g., unemployment and poverty) because of the size of the projects and their phasing. Total project-related expenditures would amount to less than 1% of the counties' \$17 billion in earnings in 2000, and the number of jobs created would be only a small fraction of the 591,000 jobs that existed in 2000.

Providing additional facilities and improved access would encourage more visitor use at the parks. The amount of additional use is indeterminate at this time. However, this increased use could result in some additional spending within the gateway communities, which would benefit some retail establishments, restaurants, or motels in nearby travel corridors. Such long-term positive impacts would be noticeable at the local level.

Sequoia and Kings Canyon National Parks would continue to be important contributors to the local economy as a result of wages and operational expenditures, as well as visitor expenditures. Any improvement in visitor facilities in the parks could enhance visitation and subsequent expenditures in the local area.

### ***Private Land within the Parks***

Private lands at Wilsonia in Kings Canyon National Park, and at Oriole Lake and Silver City in Sequoia National Park, would be acquired on a willing-seller / will-buyer basis. The impacts would be the same as under the no-action alternative except that private lands at Silver City would also be acquired. The amount of property tax revenue lost to the two counties would be negligible compared to total tax revenues.

### ***Park Concessioners***

Concession facilities and services would continue to provide goods and services that would otherwise be unavailable within the parks. Alternative D calls for some expansion of facilities and services that would be provided or managed by concessioners or holders of incidental business permits or other commercial permits. Expanding concession services and facilities would provide additional business and employment opportunities for a few firms and a small number of additional workers.

### ***Park Staffing and Budget***

Under alternative D park staffing would increase to 340.8 permanent employees (an increase of 65.6 FTEs compared to the no-action alternative) and 378.1 seasonal employees (an additional 72.8 FTEs), the largest increase of any alternative. The parks' base budget would have to increase substantially, resulting in moderate, beneficial impacts on the local economy because of a modest increase in jobs, but only a negligible, beneficial impact on the much larger regional economy.

### **Cumulative Effects**

As discussed for the no-action alternative, improvements in road and transportation access outside the parks include Caltrans improvements of California 180 and 65 and the potential development of a high-speed rail system connecting central California with southern California and the San Francisco Bay area. Transportation and circulation improvements within the parks include improvements to Generals Highway and a

transit system for Giant Forest. Together these actions could generate increased visitation to the two parks.

In conjunction with past, present, and reasonably foreseeable actions, alternative D would provide moderate, long-term benefits at the local level (gateway community) and minor impacts at the regional level. More visitors could result in additional tourist-related spending within the region and gateway towns, resulting in increased business opportunities, income, and employment. Improved facilities within the parks would further contribute economic benefits to the growing regional economy in the form of direct spending. Housing needs for additional park staff, combined with the increasing desirability of living in the gateway communities, would add to the demand for local housing and other locally provided goods. Hiring additional staff would result in a small increase in the local population, which contributes to the overall growth in the gateway communities.

### **Conclusion**

Approximately \$250.6 million would be spent over the life of the plan on various projects, an increase of \$125.6 million compared to the no-action alternative. While impacts on individual firms and employees in the construction industry could be moderate to major, beneficial, and short term, impacts on the regional economy would be negligible and beneficial because of the size projects, which would be phased over the next 15 to 20 years. These projects would encourage greater visitation to the parks, with beneficial effects on adjacent communities, particularly for firms along the access corridors; impacts would be minor to moderate and beneficial over the long term.

Local property taxes from the acquisition of private lands within the parks on a willing-seller / willing-buyer basis would result in negligible, adverse, long-term impacts on property tax bases of both Fresno and Tulare counties.

Impacts on park concessioners and other businesses would be beneficial over the long term as a result of providing additional visitor services.

Park staffing levels would increase by 65.6 permanent employees and 72.8 seasonal employees, the most of any alternative. The parks' budget would have to increase the most of any alternative, but with minor, beneficial impacts on the local economy and negligible, beneficial impacts on the regional economy.

Cumulative improvements in transportation and access both outside and within the parks, along with improved park facilities, would generate additional visitation and tourist-related expenditures in the gateway economies and the two-county regional. Additional staff would result in a small increase in the local population, which contributes to the overall economic growth of the gateway communities. For the local economy these would be moderate, beneficial impacts over the long term, but for the regional economy they would be negligible impacts.

# Unavoidable Adverse Effects

This section summarizes the adverse impacts that could not be avoided once an alternative was implemented. These are the impacts that would remain after mitigation was implemented.

## **THE NO-ACTION ALTERNATIVE**

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### **Natural Resources**

There would be continued unavoidable impacts on vegetation and soils, primarily in existing areas of concentrated use and development. The maximum size of the development zone would be 1,745 acres, but not all of this area would be subject to development.

There would also be unavoidable, adverse impacts on meadows, riparian, and wetland communities in developed areas, around popular lakes and streams, at stream crossings, and below water withdrawal diversions.

### **Cultural Resources**

The inevitable loss of cultural landscape values in the Big Stump Basin, which would be managed as a recovering sequoia grove, would be unavoidable.

## **THE PREFERRED ALTERNATIVE**

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### **Natural Resources**

There would be continued unavoidable impacts on vegetation and soils, primarily in existing areas of concentrated use and development. The maximum size of the development zone would be 1,887 acres, but not all of this area would be subject to development.

### **Cultural Resources**

The inevitable loss of cultural landscape values in part of the Big Stump Basin managed as a recovering sequoia grove would be unavoidable.

Removing historic structures at Wolverton that could not be adaptively used, and providing infill housing at Lodgepole would have unavoidable adverse effects on the historic structures, as well as the potential historic district.

## **ALTERNATIVE A**

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### **Natural Resources**

There would be continued unavoidable impacts on vegetation and soils, primarily in existing areas of concentrated use and development. The maximum size of the development zone would be 1,310 acres (the least of any alternative), but not all of this area would be subject to development.

### **Cultural Resources**

The inevitable loss of cultural landscape values in the Big Stump Basin, which would be managed as a recovering sequoia grove, would be an unavoidable adverse impact.

The loss of structures that could not be adaptively reused at the Redwood Mountain resident, the potential General Grant National Park historic district, the Wilsonia Historic District, the Cabin Creek ranger resident and dormitory, the upper Ash Mountain housing area, the Sycamore CCC camp, and the CCC recreation hall at Ash Mountain would be unavoidable adverse impacts. Removing backcountry structures that could not be adaptively used or allowing them to molder would result in unavoidable adverse impacts.

### **Visitor Experience**

No longer providing public lodging in the Silver City area would be an unavoidable adverse effect on visitor experiences.

This alternative would result in unavoidable adverse impacts on most visitors as the result of reducing facilities, such as Potwisha campground, Wolverton winter use facilities, and Cedar Grove

lodging. Prohibiting horses and other stock throughout the parks would result in adverse impacts to those visitors seeking to use stock.

**Special Use Permits**

Removing the Boy Scout camp would result in an unavoidable adverse impact on regional Boy Scouts and others who use the facility annually.

**ALTERNATIVE C**

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**Natural Resources**

There would be continued unavoidable impacts on vegetation and soils, primarily in existing areas of concentrated use and development. The maximum size of the development zone would be 1,986 acres, but not all of this area would be subject to development.

**Cultural Resources**

The inevitable loss of cultural landscape values in part of the Big Stump Basin managed as a recovering sequoia grove would be unavoidable.

Removing historic structures at Wolverton that could not be adaptively used would have unavoidable adverse impacts on the potential historic district.

Removing backcountry structures that could not be adaptively used or allowing them to molder would result in unavoidable adverse impacts.

**ALTERNATIVE D**

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**Natural Resources**

There would be continued unavoidable impacts on vegetation and soils, primarily in existing areas of concentrated use and development. The

maximum size of the development zone would be 2,133 acres, but not all of this area would be subject to development.

Constructing a Grant Grove bypass road would have unavoidable adverse impacts on soils, vegetation, and wildlife. The extent of impacts would depend on site-specific conditions and project design.

**Wilderness**

More concentrated use by larger groups in the park’s backcountry would result in unavoidable adverse impacts on wilderness values.

Continuing road access and providing picnic facilities at Oriole Lake could adversely affect wilderness values.

**Cultural Resources**

The inevitable loss of cultural landscape values in part of the Big Stump Basin managed as a recovering sequoia grove would be unavoidable.

Removing structures from Wolverton that could not be adaptively used would adversely affect this potential historic district.

**Visitor Experience**

Converting the Potwisha campground to a day use area or a new visitor center would unavoidably change camping in the foothills since this is the major foothills campground.

**Special Use Permits**

Removing the Boy Scout camp would unavoidably affect the regional Boy Scouts and others who use the facility annually.

# Relationship of Short-term Uses of the Environment and Maintenance and Enhancement of Long-term Productivity

This section discusses the effects of short-term use of resources resulting under any of the alternatives on the long-term productivity of vegetation and wildlife.

Human uses throughout the parks could have negligible to minor impacts on wildlife productivity. Visitor impacts would be confined and controlled to reduce impacts on vegetative productivity in the high-use frontcountry and development zones. Backcountry access to some areas would be limited periodically to protect wildlife habitat, particularly for special status species. The potential effects of water withdrawals on short- and long-term productivity of sequoia groves would be monitored and studied under all alternatives.

## **THE NO-ACTION ALTERNATIVE**

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Approximately 1,745 acres or 2% of the parks would be included in the development zone. Vegetation and habitat productivity would continue to be affected by these areas. Since the developed areas are so small compared to the size of the parks, there would be no overall effect on long-term productivity.

## **THE PREFERRED ALTERNATIVE**

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The development zone could increase by approximately 142 acres or 8% under the preferred alternative. If feasible, an additional high Sierra camp could have a minor impact on approximately 40 acres of vegetation and local wildlife. Peak-season water withdrawals would be limited, and additional conservation measures would be taken, thus reducing any potential effects on productivity in sequoia groves. Even with increased development, the developed areas are so small compared to the size of the parks that there would be no overall effect on long-term productivity.

## **ALTERNATIVE A**

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The development zone would decrease by approximately 435 acres or 25% compared to the no-action alternative. Reduced water withdrawals in alternative A could benefit sequoia grove productivity. Even with reduced development, the developed areas are so small compared to the size of the parks that there would be no overall effect on long-term productivity.

## **ALTERNATIVE C**

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The development zone could increase by approximately 241 acres or 14% compared to the no-action alternative. Under alternative C dispersed backcountry use could affect wildlife productivity throughout a broader area. Peak-season water withdrawals would be limited, and additional conservation measures would be taken, thus reducing any potential effects on productivity in sequoia groves. While developed areas would increase slightly, when compared to the size of the parks there would be no overall effect on long-term productivity.

## **ALTERNATIVE D**

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The development zone could increase by approximately 388 acres or 22% compared to the no-action alternative. If feasible, an additional high Sierra camp could have a minor impact on approximately 40 acres of vegetation and local wildlife, similar to the preferred alternative. Peak-season water withdrawals would be limited, and additional conservation measures would be taken, thus reducing any potential effects on productivity in sequoia groves. Even with a 20% or more increase in development, all developed areas would be so small compared to the size of the parks that there would be no overall effect on long-term productivity.

# Irreversible and Irretrievable Commitments of Resources

An irreversible commitment of resources cannot be changed once it occurs except possibly in the extreme long term; an irretrievable commitment means the resource is lost for a period of time and is unlikely to be recovered or reused. Under all alternatives, management actions would contribute to resource protection and preservation and would be expected to minimize the occurrence of irreversible or irretrievable impacts.

## **THE NO-ACTION ALTERNATIVE**

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The loss of soils and wildlife habitat would continue, primarily in areas of concentrated use and development. Limited amounts of non-renewable resources, such as rock, from local, previously impacted areas would be reused in park operations and construction projects.

Cultural resources that were removed or allowed to molder would result in irreversible and irretrievable impacts. Decisions related to the method of removal or treatment would be determined in consultation with the state historic preservation officer, and all resources would be fully documented as a mitigation strategy.

## **THE PREFERRED ALTERNATIVE**

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The loss of soils and wildlife habitat would continue, primarily in areas of concentrated use and development. Limited amounts of non-renewable resources from local, previously impacted areas, such as rock, would be reused in park operations and construction projects.

As described for the no-action alternative, cultural resources that were removed or allowed to molder would result in irreversible and irretrievable impacts. Decisions related to the method of removal or treatment would be determined in consultation with the state historic preservation

officer, and all resources would be fully documented as a mitigation strategy.

## **ALTERNATIVE A**

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The loss of soils and wildlife habitat would continue, primarily in areas of concentrated use and development. Limited amounts of non-renewable resources from local, previously impacted areas, such as rock, would be reused in park operations and construction projects.

As described for the no-action alternative, cultural resources that were removed or allowed to molder would result in irreversible and irretrievable impacts. Decisions related to the method of removal or treatment would be determined in consultation with the state historic preservation officer, and all resources would be fully documented as a mitigation strategy.

## **ALTERNATIVES C AND D**

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The loss of soils and wildlife habitat would continue, primarily in areas of concentrated use and development. Limited amounts of non-renewable resources from local, previously impacted areas, such as rock and downed timber, would be reused in park operations and construction projects.

As described for the no-action alternative, removing cultural resources or allowing them to molder would result in irreversible and irretrievable impacts. Decisions related to the method of removal or treatment would be determined in consultation with the state historic preservation officer, and all resources would be fully documented as a mitigation strategy.

# *Consultation and Coordination*



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# Public Involvement History

## **PUBLIC SCOPING**

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Scoping for the general management plan began in July 1997 with newsletter 1, which briefed the public on the planning process, issues, and general information. The newsletter had a response form for people to comment about what issues they felt the plan needed to address, and it announced a series of open house type meetings at the parks. At the open houses, which were supplemented by evening campfire programs, visitors were encouraged to share views and to identify the most critical issues they felt were facing the parks. Additionally, the planning team talked with park visitors along trails and waiting in traffic queues to encourage their involvement.

During the summer of 1997 meetings were held specifically to reach park visitors. They were held July 31 at Giant Forest / Dorst; August 1 at Ash Mountain / Potwisha; August 2 at Mineral King (which had an additional meeting at the Mineral King District Association picnic); August 3 at Grant Grove; August 4 at Cedar Grove; and August 5 at Lodgepole.

Newsletter 1 was reprinted in a winter version and announced informal public scoping meetings in Three Rivers, Visalia, and Clovis from February 25, 1998, to February 27, 1998.

Newsletter 1 was posted on the NPS planning web page and was made available at visitor centers throughout the parks.

As a result of the scoping process, a mailing list with around 3,700 names was developed. All newsletters and plans are posted on either the parks' Website or the NPS planning website.

## **Public Information Newsletters 2 and 3**

Following the scoping phase, public scoping comments were summarized in newsletter 2, which was sent out in summer 1998. This newsletter also presented visions for the park,

issues, types of decisions that would have to be made, and background information about the Mineral King area. The newsletter further updated recipients about changes and plans that were underway.

Newsletter 3, published in March 1999, described a transportation study conducted in 1997–98 and a 1998 visitor satisfaction survey. It also summarized the finding of a 1998 study to determine the eligibility of Mineral King Road corridor for the National Register of Historic Places as a cultural landscape. This newsletter announced public planning workshops that would be held in April 1999 throughout California to help generate a range of management alternatives for the general management plan.

## **Planning Workbook / Newsletter 4**

To prepare the public for the public workshops, a large format, 24-page workbook was distributed. This workbook described the planning process; introduced management zoning; reiterated the mission, purpose, and significance of the parks; touched on other factors affecting management (such as laws, policies, and special designations); and presented a brief timeline for the parks. The main part of the workbook consisted of discussions of the issues and tradeoffs, along with GIS maps illustrating conditions. The workbook contained a response form, and 745 responses were received and were put into a database, along with transcripts of written comments.

## **Workshops to Generate a Range of Alternatives**

During 1999 public workshops were held in San Francisco and Sacramento on April 17; in Bishop on April 18; in Los Angeles on April 19, in Three Rivers on April 20; in Visalia on April 21, and in Fresno / Clovis on April 22. Attendees worked in groups to develop a parkwide

vision, and then a vision for a developed area of their choice. Over 300 people attended the meetings. While each meeting had its own character, several workshops had sufficient time for groups to present their ideas and every workshop displayed what all groups or individuals had produced. All ideas from maps and sheets were recorded.

### **Newsletter 5 — The Range of Alternatives**

In the winter of 2000 an informational newsletter was sent out to describe the range of four alternatives that would be assessed in the draft environmental impact statement. The alternatives were based on the range of ideas proposed by the public at the alternatives workshops. The newsletter did not include a preferred alternative, which was to be developed during the course of the environmental analysis.

The newsletter also presented parkwide zoning prescriptions that told what could happen in each type of zone. Visions for both parks and for specific areas were described, followed by related actions that would take place. An accompanying foldout with alternative zoning maps allowed readers to compare the alternatives.

Newsletter 5 was also sent to people on mailing lists for the wilderness stewardship / stock use plan and those with commercial permits.

### **Newsletter 6 — Status**

In late fall 2000 a status newsletter was sent out that included a number of announcements as well as a discussion about designated wilderness. The newsletter announced that summary newsletters would be sent to everyone on the mailing list, but that the draft environmental impact statement would be sent only to those who requested it. The draft statement would be available on the Internet, at local libraries and organizations, at the park library, and at visitor centers. Also, copies would be sent to organizations and agencies.

### **Newsletter 7 — Status**

In spring 2002 a status newsletter was sent out with information about the new superintendent and an explanation of the delay in the draft general management plan. The newsletter described additional work on management zones, the development of a preferred alternative, and mapping for the plan. The newsletter also asked recipients to let the planning team know if they wanted a paper copy of the document rather than a CD ROM version,

## **NATIVE AMERICAN CONSULTATIONS**

During July 1999 Native American consultations were held on both sides of the Sierra Nevada (see appendix D for a report). Government-to-government communication has continued throughout the plan's progress, and detailed records have been kept of all consultations with Native American groups. Discussion topics have included:

- Why the park needs to have a new general management plan in light of the outdated status of the plan that is now in place.
- The way the NPS planning process works.
- The need and desire to share information, such as where traditional plant-gathering areas might be in the parks as ethnographic resources, and what NPS research on resources might be relevant to American Indian perspectives.
- How to provide convenient access for tribal members to enter the parks without paying the visitor-use fee when coming in for traditional cultural purposes.
- The need for effective procedures to keep communicating on a government-to-government basis at various stages in the planning process, and to ensure tribal representation in the process, including on-site park visits of tribal officials and elders.

Park staff recognize the need for the tribes and the park to share background information about each other's cultural perspectives. It is recognized that traditional plant-gathering areas are

important for such purposes as basket-making. With sharing in mind, follow-up telephone calls have regularly been made to invite the tribes to comment and share concerns at pertinent stages in the planning process, such as upon the range of draft management alternatives. Tribal relationships with traditional lands within the parks will continue to be the subject of regular government-to-government communication between the parks and interested tribes.

### **AGENCIES CONSULTED**

Park staff consulted with the Bureau of Land Management. Consultations with the staff from the U. S. Forest Service and Giant Sequoia National Monument have included meeting with the planning team and participating as advisors for the monument plan.

Under the 1995 “Programmatic Agreement Among the National Park Service, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers,” park superintendents have been delegated responsibility to consult directly with the state historic preservation office and the advisory council regarding compliance with section 106 of the National Historic Preservation Act. Official letters of notification about the start of the general management planning process were sent by the superintendent to both the state historic preservation office and the advisory council on May 18, 1999. Beginning in 1998, the park staff worked with the state office on the determination of eligibility and nomination of the Mineral King Road Cultural Landscape District to the National Register of Historic Places.

In December 1999 the planning team initiated informal consultation with the U.S. Fish and Wildlife Service with a request for a list of threatened and endangered species that may occur in the parks. A response dated February 2000 was received, and this information was used in conducting the environmental analysis.

### **INFORMATIONAL BRIEFINGS**

During the scoping and development of the general management plan, the team or park staff briefed or met with representatives of the following stakeholders and interested parties.

#### Regular Briefings:

Sequoia Natural History Association  
Park Concessioners  
Delaware North Park Services  
Kings Canyon Park Services  
Cedar Grove Pack Station  
Mineral King Pack Station

#### Special Use Permittees:

Southern California Edison  
Mineral King District Association —  
August 1, 1997  
Boy Scouts of America

#### Private Landowners:

Wilsonia District Association — August 3,  
1997  
Silver City landowners  
Oriole Lake landowners

Other stakeholders briefed on the general management plan included the following:

Backcountry Horsemen of California  
California Department of Transportation  
Clean Air groups  
Educational institutions  
Fresno County  
Friends of the River  
High Sierra Hikers  
Local or regional business groups  
Mineral King Advocates — August 1, 1997  
Mineral King Preservation Society —  
August 1, 1997  
National Parks Conservation Association  
Save the Redwoods League  
Sequoia federal managers group  
Sierra Club  
The National Park Foundation  
Three Rivers community planner  
Tulare Country Historical Society  
Tulare County

# List of Recipients of the Environmental Impact Statement

## California Congressional Delegation

Senator Barbara Boxer  
Senator Dianne Feinstein

Representative Devin Nunes  
Representative George Radanovich  
Representative William Thomas  
Representative Calvin Dooley  
Representative Buck McKeon

## Federal Agencies

Advisory Council on Historic Preservation  
Department of Agriculture  
Forest Service  
Region 5 Office  
Inyo National Forest  
Sequoia National Forest and Giant  
Sequoia National Monument  
Sierra National Forest

Department of the Interior  
Assistant Secretary for Fish, Wildlife and  
Parks  
United States Fish and Wildlife Service,  
Sacramento  
United States Geological Survey  
Regional Office, Seattle  
Office of the Regional Solicitor  
Pacific West Regional Office  
Office of the Solicitor  
Washington, DC  
Bureau of Land Management  
Bakersfield District Office  
California State Office  
National Park Service  
Pacific West Regional Office  
Washington Office  
Channel Islands National Park  
Death Valley National Park  
Devils Postpile National Monument  
Joshua Tree National Park  
Manzanar National Historic Site  
Mojave National Preserve  
Pinnacles National Park

Santa Monica Mountains National  
Recreation Area  
Yosemite National Park  
Department of Transportation  
Federal Aviation Administration  
Western Pacific Region  
Western Region  
Department of Defense  
Army Corps of Engineers, Lake Kaweah  
Lemoore Naval Air Station  
Edwards Air Force Base  
China Lake Naval Weapons Center  
Environmental Protection Agency  
Region IX  
Federal Energy Regulatory Commission

## Indian Tribal Government

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

## State of California

Governor Arnold Schwarzenegger  
State Senator Roy Ashburn  
State Senator Charles Poochigian  
State Assemblyman Bill Maze  
State Assemblywoman Sarah Reyes  
State Assemblyman Steve Samuelian  
  
Air Resources Board

California Environmental Protection Agency  
Department of Transportation  
District 6  
Office of Historic Preservation  
Resources Agency  
Department of Fish and Game  
Department of Parks and Recreation  
Department of Forestry and Fire Protection  
Department of Water Resources  
State Water Resources Control Board

### **Regional, County, and Local Governments**

San Joaquin Valley Air Pollution Control  
District  
Central Valley Regional Water Quality Control  
Board

Fresno County Board of Supervisors  
Inyo County Board of Supervisors  
Kern County Board of Supervisors  
Kings County Board of Supervisors  
Tulare County Board of Supervisors

Bakersfield, Mayor of  
Bishop, Mayor of  
Fresno, Mayor of  
Visalia, Mayor of  
Fresno County Library  
Inyo County Library  
Kern County Library  
Tulare County Free Library

### **Organizations and Businesses**

Backcountry Horsemen of California  
Bishop Chamber of Commerce  
California Native Plant Society  
California Nature Conservancy  
Fresno Chamber of Commerce  
Fresno County Audubon Society  
Friends of the River  
Friends of the South Fork Kings  
High Sierra Hikers Association  
Hume Lake Christian Camp  
Mineral King District Association  
Mineral King Preservation Society  
Montecito-Sequoia Resort  
National Parks Conservation Association  
National Trust for Historic Preservation

Natural Resources Defense Council  
Save-the-Redwoods League  
Sequoia Forest Alliance  
Sequoia Regional Visitors Council  
Sequoia Riverlands Trust  
Sierra Club  
Sierra Los Tulares Land Trust  
Three Rivers Lemon Cove Business Association  
Tulare County Audubon Society  
Visalia Chamber of Commerce  
Wilderness Society  
Wilderness Watch  
Wilsonia Historic District Trust  
Wilsonia Village Incorporated

### **Within-Parks Partners and Businesses**

Boy Scouts of America, Western Los Angeles  
County Council, Inc.  
Cedar Grove Pack Station  
Delaware North Companies Parks and Resorts  
Kings Canyon Park Services  
Mineral King Pack Station  
Pacific Gas and Electric Company  
SBC Incorporated  
Sequoia and Kings Canyon National Parks  
Foundation  
Sequoia Natural History Association  
Silver City Resort  
Southern California Edison Company, Limited  
Verizon California, Incorporated

### **Media**

Associated Press — Fresno  
Bakersfield Californian  
Fresno Bee  
Inyo Register  
Kaweah Commonwealth  
Los Angeles Times  
Sacramento Bee  
San Francisco Chronicle  
Visalia Times—Delta

Comments and responses on the *Draft Environmental Impact Statement* are included in volume 3.

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