

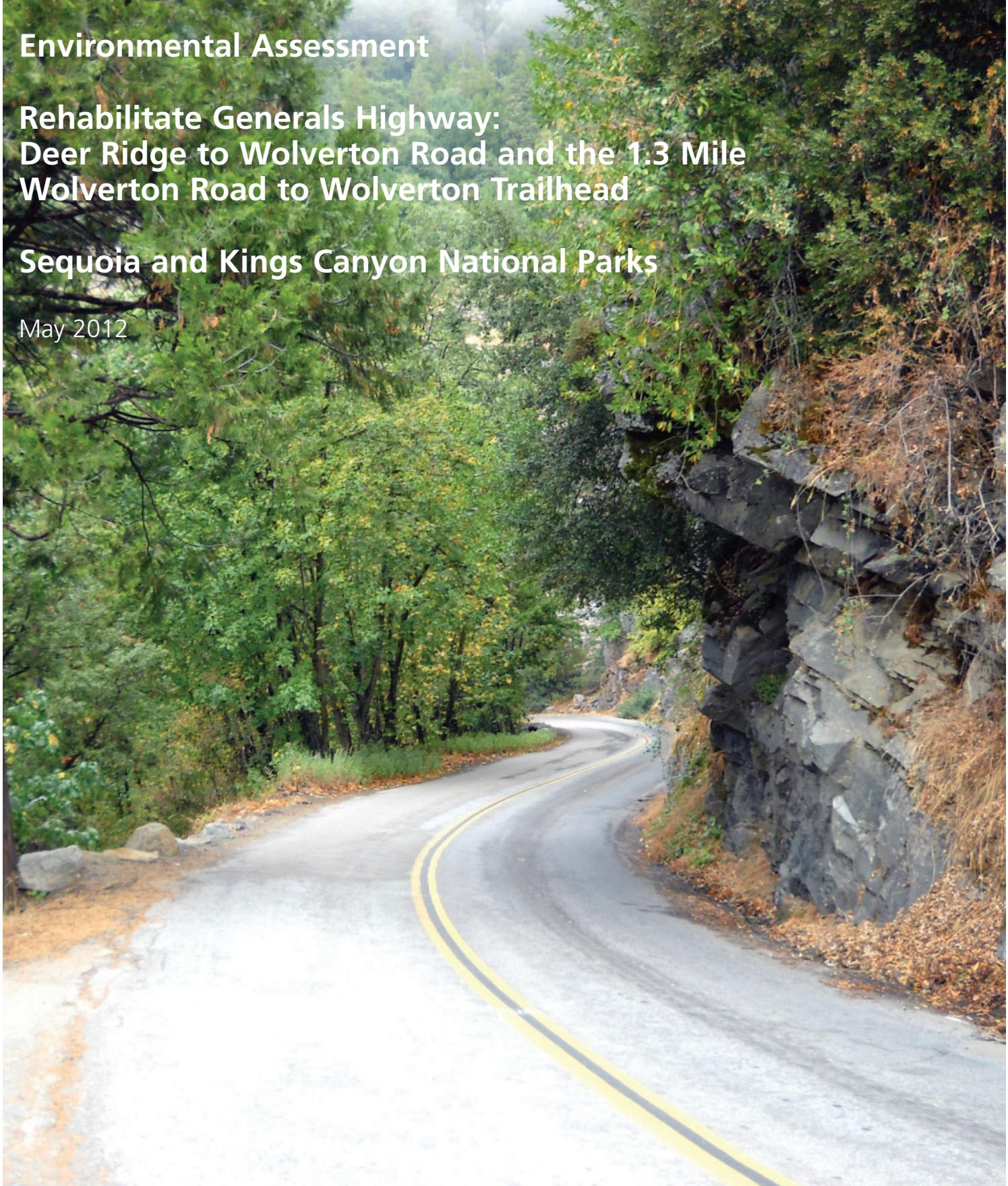


## Environmental Assessment

### Rehabilitate Generals Highway: Deer Ridge to Wolverton Road and the 1.3 Mile Wolverton Road to Wolverton Trailhead

Sequoia and Kings Canyon National Parks

May 2012



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# **Environmental Assessment**

## **Rehabilitate Generals Highway:**

### **Deer Ridge to Wolverton Road and the 1.3-Mile Wolverton Road to Wolverton Trailhead**

#### **SEQUOIA AND KINGS CANYON NATIONAL PARKS**

#### **SUMMARY**

The National Park Service (NPS), in cooperation with Central Federal Lands Highway Division of the Federal Highway Administration (FHWA), is considering resurfacing, restoring, and rehabilitating 7 miles of Generals Highway between Deer Ridge and Wolverton Road and the 1.3-mile Wolverton Road to the trailhead parking lot. Generals Highway (highway) was originally completed in 1935 and has periodically needed repairs to address structural deficiencies and normal wear that have led to deterioration of the highway. Currently a number of repairs and improvements are needed to address inadequate drainage, subgrade slumping, pavement cracking, potholes, and other structural problems. The 1-mile segment of the highway from Deer Ridge to Eleven Range requires more extensive reconstruction to address structural and retaining wall issues, a narrow road width, and drainage needs. New pullouts and improvements at intersections and parking areas along the highway also are components of the project. The proposed rehabilitation work would improve the efficiency of park operations by correcting structural deficiencies and reducing maintenance requirements, as well as providing for improved visitor enjoyment and safety while protecting park scenic, natural, and cultural resources.

This environmental assessment (EA) evaluates two alternatives: a no action alternative and a preferred action alternative. Under the no action alternative, the road would not be rehabilitated or improved. The road pavement and structural integrity would continue to deteriorate and drainage problems would persist. Park staff would continue routine road maintenance and repairs as it has in the past. The preferred alternative includes a number of measures to rehabilitate and improve the condition of the road.

This EA has been prepared in compliance with the National Environmental Policy Act (NEPA) to provide the decision-making framework that 1) analyzes a reasonable range of alternatives to meet objectives of the proposal, 2) evaluates potential issues and impacts on the park's resources and values, and 3) identifies mitigation measures to lessen the degree or extent of these impacts. Resource topics evaluated in detail in this document are vegetation and special status plant species, water resources, historic structures, cultural landscape, visitor use and experience, socioeconomics, public health and safety, and park operations. All other resource topics were dismissed because the project would result in less than minor effects. No major effects were identified as a result of this project. The proposed project would not adversely affect the road's nomination for the National Register of Historic Places. Public scoping was conducted to assist with the development of this EA and comments were received and considered in the evaluation of effects.

## **PUBLIC COMMENT**

If you wish to comment on this EA, you may post comments online using the National Park Service Planning, Environment and Public Comment (PEPC) website at: <http://parkplanning.nps.gov> or mail comments to: Superintendent; Sequoia and Kings Canyon National Parks, 47050 Generals Highway, Three Rivers, California 93271. Emailed comments will not be accepted.

This EA will be on public review for 30 days. It is the practice of the NPS to make all comments, including the names and addresses of those who comment, available for public review in their entirety after the close of the NEPA process. However, individuals not representing businesses or organizations may request that the NPS withhold their names and/or addresses from the record. The NPS will honor this request to the extent allowable by law, but you should be aware that your comment—including your personal identifying information—may be made publicly available at any time.

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## **Acronyms and Abbreviations**

ACHP	Advisory Council on Historic Preservation
BMP	best management practice
CCC	Civilian Conservation Corps
CEQ	Council on Environmental Quality
Corps	U.S. Army Corps of Engineers
CDFG	California Department of Fish and Game
DO	Director's Order
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
GHG	greenhouse gases
GMP	General Management Plan
MP	milepost
national register	National Register of Historic Places
NEPA	National Environmental Policy Act
NHLD	National Historic Landmark District
NHPA	National Historic Preservation Act
NPS	National Park Service
PA	Programmatic Agreement
Parks	Sequoia and Kings Canyon National Parks
PEPC	Planning, Environment and Public Comment
Highway	Generals Highway
SHPO	State Historic Preservation Officer

# **Environmental Assessment**

## **Rehabilitate Generals Highway:**

### **Deer Ridge to Wolverton Road and the 1.3-Mile Wolverton Road to Wolverton Trailhead**

#### **SEQUOIA AND KINGS CANYON NATIONAL PARKS**

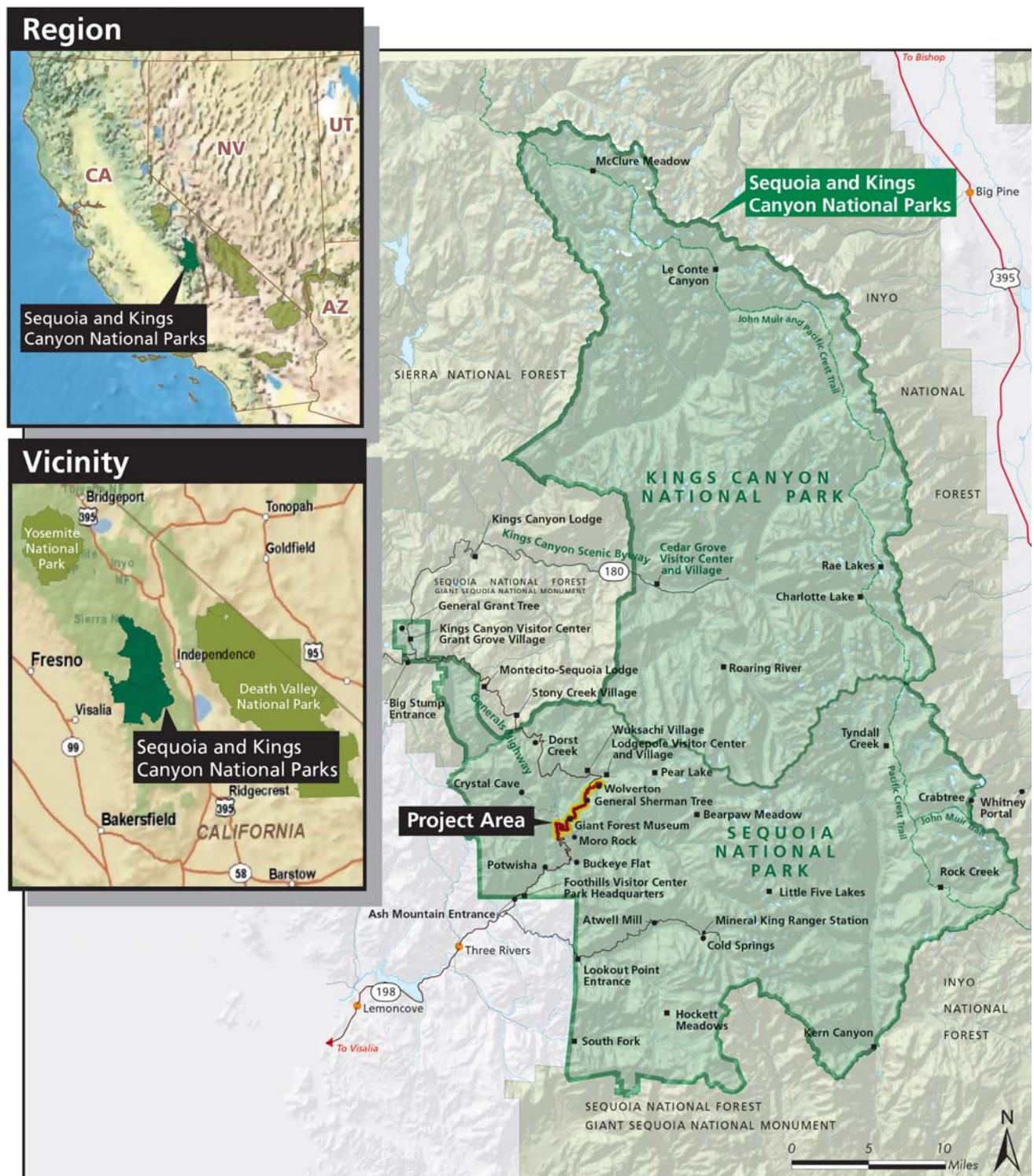
## **INTRODUCTION**

The National Park Service (NPS), in cooperation with Central Federal Lands Highway Division of the Federal Highway Administration (FHWA), is considering resurfacing, restoring, and rehabilitating 7 miles of Generals Highway between Deer Ridge and Wolverton Road and the 1.3-mile Wolverton Road to the trailhead parking lot. Generals Highway (highway) was originally completed in 1935 and has periodically needed repairs to address structural deficiencies and normal wear that have led to deterioration of the highway. Currently a number of repairs and improvements are needed to address inadequate drainage, subgrade slumping, pavement cracking, potholes, and other structural problems. Phase 1 includes the 1-mile segment of the highway from Deer Ridge to Eleven Range, which requires more extensive reconstruction to address structural and retaining wall issues, a narrow road width, and drainage needs. Phase 2 extends 6 miles from Eleven Range to Wolverton Road and includes minor curve widening, repaving, and drainage work. This phase also includes repaving Wolverton Road and parking lot. If approved, the work is expected to begin in 2014, depending on available funding, and would require about three to four years to complete. The project area is northeast of Three Rivers, California in the western portion of Sequoia National Park beginning about 12.5 miles from the park's Ash Mountain entrance station off Highway 198 and ending about milepost 19.5 (Figure 1). The Wolverton Road section of the project begins at milepost 19.5 and ends about 1.3 miles to the east at the Wolverton Trailhead parking lot.

Generals Highway is one of only two main access roads into Sequoia and Kings Canyon National Parks (parks) and the only year-round access for visitors to Sequoia National Park. Sequoia National Park hosted almost 1 million visitors and Kings Canyon National Park about 600,000 visitors in 2010 (NPS 2011a). The highway provides the most direct year-round access to some of the park's most popular features including the Giant Forest, Crystal Cave, Lodgepole visitor center and village, Wuksachi Village, Giant Forest Museum, several campgrounds, and numerous day use areas and trailheads. The highway is vital to park operations and local economies, and contributes greatly to visitor use and enjoyment. In addition, Generals Highway is eligible for listing in the National Register of Historic Places (national register).

This Environmental Assessment (EA) was prepared to evaluate potential environmental, socioeconomic, and cultural resource effects from the preferred alternative to rehabilitate the highway; and a no action alternative that does not rehabilitate or improve the highway. The

**FIGURE 1. PROJECT LOCATION**



EA was prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 and implementing regulations, 40 CFR Parts 1500-1508, and NPS Director's Order (DO) – 12 and Handbook, *Conservation Planning, Environmental Impact Analysis, and Decision-making*. The EA would determine whether significant impacts would occur as a result of the proposed project and if an environmental impact statement (EIS) or finding of no significant impact (FONSI) would be required. The documents related to the National Historic Preservation Act (NHPA), in accordance with the Advisory Council on Historic Preservation's (AChP) regulations implementing section 106 (36 CFR Part 800), have been completed as a separate submittal to the California State Historic Preservation Officer (SHPO). The NPS has found that the preferred alternative would have an adverse effect on a contributing element to the historic character of Generals Highway. The park would comply with applicable stipulations in the existing Programmatic Agreement (PA) between the SHPO and the parks (NPS 2008) to address identified adverse effects of the preferred alternative. This includes 1) identifying and evaluating historic properties (nonarcheological) (stipulation 3.a); 2) preparing an Assessment of Effects (stipulation 4); and 3) applying a treatment of adverse effects for a historic, nonarcheological property (stipulation 5.a).

## **BACKGROUND**

Generals Highway is the main artery for traffic between Sequoia National Park and Kings Canyon National Park and is the only highway connecting Ash Mountain (park headquarters) to the Lodgepole / Wuksachi area. The section of highway proposed for rehabilitation work has been in continuous use since 1935 and, with few exceptions, is in service today as originally constructed. California Highway 198 provides access from Visalia to the Foothills visitor center at Ash Mountain in Sequoia National Park. At Ash Mountain, California Highway 198 becomes Generals Highway, which provides most of the year-round road access to Sequoia's main visitor interest areas. Generals Highway terminates at Kings Canyon Highway about 1 mile south of Grant Grove and east of the Big Stump entrance station. Generals Highway provides access to the Giant Forest Museum, Crystal Cave, the Giant Forest, Wuksachi Village, and the Lodgepole visitor center and village, and numerous trailheads. The highway is a vital component of park operations that provides a destination for visitors and an important link with other portions of the park.

Reconstruction of Generals Highway began in fall 1993 at the south park boundary and to date has been completed to Deer Ridge. Phase 1 of the Generals Highway reconstruction project began at the south entrance and continued 1.49 miles to Alder Creek. Phase 2 began where the first phase ended and continued for approximately 4.10 miles to Potwisha campground. Phase 3 covered 2.39 miles from Potwisha campground to Hospital Rock. Phase 4 covered the section of highway from Hospital Rock to Big Fern Springs, approximately 3.29 miles. Phase 5 extended approximately 1.6 miles from Big Fern Springs to Amphitheater Point. Construction on phase 5 began in summer 2006 and was completed in late 2007. Rehabilitation of 8.5 miles of Generals Highway from Wolverton Road to Little Baldy Pullout was completed in 2009. In 2010 rehabilitation of 1.5 miles of Generals Highway from Amphitheater Point to Deer Ridge began and is expected to be completed in 2012.

## PROJECT PURPOSE AND NEED

### Project Purpose

The proposed project is being considered because of the need to address deficiencies in the condition of 7 miles of Generals Highway from Deer Ridge to Wolverton Road and the 1.3-mile Wolverton Road (Figure 1). The intent of the proposed project is to correct structural and drainage deficiencies that could lead to road failure and that jeopardize the integrity of the road and safety of the traveler. In addition, the proposed improvements are intended to provide a pleasant driving experience, improve traffic flow, facilitate maintenance operations, and reduce maintenance costs. The objectives of the proposed project are to:

#### Improve the Efficiency of Park Operations

- Repair damaged and deteriorating road pavement; widen narrow sections of the road; address drainage concerns, slope instabilities, and other structural features that require rehabilitation and restoration
- Reduce maintenance requirements and costs due to deficiencies in the condition of the road and prevent catastrophic failure that could lead to road closure

#### Provide for Visitor Enjoyment and Safety

- Improve the condition and width of the highway to more safely accommodate traffic
- Reduce the incidence and risk of traffic accidents
- Efficiently implement rehabilitation work while minimizing visitor impacts

#### Protect Park Resources

- Maintain the scenic quality of the highway
- Protect park natural resources and values
- Protect park cultural resources, including the highway's status for eligibility in the national register

### Project Need

Generals Highway is a narrow road constructed in the 1930s and was not designed for travel by the larger vehicles in use today. The proposed project is being considered because of the need to address deficiencies in the condition of the highway and safety concerns. Currently about 90% of the section of the highway proposed for improvements is either in fair or poor condition and Wolverton Road also is in poor condition (NPS 2009). Deteriorating road conditions are due to a number of factors including road damage from heavy construction traffic from the Giant Forest restoration project, development of Wuksachi Village, daily visitor and administrative traffic, and normal wear of an aging road.

This highway is in mountainous terrain between 5,000 feet and 7,200 feet in elevation where snow and ice conditions are constant during the winter. The road surface, shoulders, retaining walls, and culverts are deteriorating at a rate the park is unable to keep up with

through routine maintenance. In several areas the base and subgrade material is in poor condition and requires excavation and replacement. The curb and drain structures throughout this section need repairs to allow for proper drainage to protect the road surface and subgrade. Potholes, collapsing historic walls, and failing road shoulders may go undetected for long periods because of major snow events. Further deterioration of the highway could lead to failure of the road shoulder or retaining walls or other structural damage. Accidents have occurred when travelers try and avoid deteriorating sections of road. Multiple serious accidents involving both visitors and employees have occurred in addition to numerous minor accidents. Several of the existing pullouts are poorly designed and located, and are unable to handle current traffic flow. Traffic accidents that have occurred at or near roadside pullouts could be attributed to the pullout design and use. Continued deterioration of the highway has the potential to damage the adjacent natural and cultural environment, increase maintenance costs, and create hazardous driving conditions.

## **PURPOSE AND SIGNIFICANCE OF SEQUOIA AND KINGS CANYON NATIONAL PARKS**

An essential part of the planning process is to understand the purpose, significance, and mission of the parks for which this EA is being prepared.

### **Park Purpose**

Sequoia National Park was established as the nation's second national park on September 25, 1890, with the purpose of preserving the giant sequoias (*Sequoiadendron giganteum*). General Grant National Park was established a week later, also with the purpose of preserving the giant sequoias. Kings Canyon National Park was established by Congress in 1940 and includes the area that was formerly General Grant National Park. The purposes of the parks are the reasons Congress established the area as part of the national park system. The purpose statements are basic to all other assumptions about the parks and the ways in which the parks should be used and managed. As defined by park managers, the following are the purposes of Sequoia and Kings Canyon National Parks, which incorporate the mission statement:

- Protect forever the greater Sierran ecosystem — including the sequoia groves and high Sierra regions of the park — and its natural evolution.
- Provide appropriate opportunities to present and future generations to experience and understand park resources and values.
- Protect and preserve significant cultural resources.
- Champion the values of national parks and wilderness.

### **Park Significance**

Park significance statements capture the essence of the national park's importance to the natural and cultural heritage of the United States of America. Significance statements do not inventory park resources; rather, they describe the park's distinctiveness and help place the park within the regional, national, and international context. Defining park significance helps

park managers make decisions that preserve the resources and values necessary to accomplish the purpose of the national park. Sequoia and Kings Canyon National Parks are special and unique places because they have:

- the largest giant sequoia trees and groves in the world, including the world's largest tree, the General Sherman Tree
- an extraordinary continuum of ecosystems arrayed along the greatest vertical relief (1,370 to 14,495 feet elevation) of any protected area in the lower 48 states
- the highest, most rugged portion of the high Sierra, which is part of the largest contiguous alpine environment in the lower 48 states
- magnificent, deep, glacially carved canyons, including Kings Canyon, Tehipite Valley, and Kern Canyon
- the core of the largest area of contiguous designated wilderness in California, the second largest in the lower 48 states
- the largest preserved southern Sierran foothills ecosystem
- almost 250 known marble caverns, many inhabited by cave wildlife that is found nowhere else
- a wide spectrum of prehistoric and historic sites documenting human adaptations in their historic settings throughout the Sierran environments

Sequoia and Kings Canyon National Parks have been designated as an international biosphere reserve, a program under the United Nations Educational, Scientific, and Cultural Organization that recognizes resources with worldwide importance. While this designation does not grant any form of control or ownership to the international body, it underscores the exceptional and singular qualities of the parks.

## Park Mission

Park purpose describes the specific reason the park was established. Park significance is the distinctive features that make the park different from any other. Together, purpose and significance lead to a concise statement—the mission of the park. Park mission statements describe conditions that exist when the legislative intent for the park is being met.

The mission of Sequoia and Kings Canyon National Parks is based on the mission of the NPS, as defined by Congress in the 1916 Organic Act: to “conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.” The following mission statement for Sequoia and Kings Canyon National Parks articulates the broad ideals and vision that the NPS is striving to achieve: The mission of Sequoia and Kings Canyon National Parks is to protect forever the greater Sierran ecosystem, including the sequoia groves and high Sierra regions of the parks and their natural evolution, and to provide appropriate opportunities to present and future generations to experience and understand park resources and values.

## RELATED PLANNING DOCUMENTS

### **Sequoia and Kings Canyon National Parks General Management Plan**

The Sequoia and Kings Canyon National Parks General Management Plan (GMP) provides the overall guidance for management of the park (NPS 2007). Generals Highway is an integral part of park operations and a component of the GMP is to continue to rebuild Generals Highway to sustain existing traffic and preserve its character. Management prescriptions for a high use scenic driving corridor in the park, such as General Highway, seek to provide sightseeing opportunities in areas of natural beauty, offer scenic views, and connect heavily visited park features and visitor service areas. Key features of the management prescriptions for Generals Highway include:

- **Natural Resources.** Natural resources in the road corridor are managed to accommodate facilities and the aesthetic experience. Construction-related impacts are confined to the corridor; impacted resources may be actively restored or left to regenerate naturally.
- **Cultural Resources.** Original cultural resources related to historic road corridors are retained and reused, or they are removed or relocated. However, for safety reasons and because of changes in technology, construction methods, and current road standards, the original elements contributing to historic character may need to be replaced or relocated.
- **Desired Visitor Experience.** The goal is a safe and pleasant driving experience on a park road with rustic character and many opportunities to enjoy diverse scenery. Road character guidelines that were developed in 1990 for Generals Highway are followed. Natural materials such as stone and wood are used to complement the rustic character, scale, texture, and colors of the original roadwork. Park roads are well maintained, with moderate speed limits. Vehicle sizes may be limited for safety, to facilitate traffic flow, or to improve the driving experience for other visitors.
- **Appropriate Activities.** Activities include pleasure driving, sightseeing (with opportunities to stop at viewpoints and features), bus touring, picnicking, and photography. Activities related to using transit shuttles, such as parking and queuing, may occur. Bicycling is only allowed on roads or designated bike routes.
- **Appropriate Facilities.** Highways are paved, with two lanes, shoulders, turn lanes, roadside pullouts for passing, and guardrails/walls as necessary. Visitor facilities include entrance stations, viewpoints, interpretive waysides, picnic areas, ranger stations, trailheads, spur roads, parking areas, shuttle stops and related facilities, and site furnishings; restrooms may be provided at picnic areas and trailheads. Curbs and gutters are used along high-use road segments.
- **Carrying Capacity.** Carrying capacity for the high-use scenic driving zone is based on the physical capacity of facilities such as roads and parking since resource conditions would be maintained to meet desired experiences.

## **Management Policies 2006**

NPS *Management Policies 2006* provides guidance for management of all national park units. Road systems are addressed in section 9.2.1, which states “park roads will be well constructed, sensitive to natural and cultural resources, reflect the highest principles of park design, and enhance the visitor experience.”

The purpose of park roads is to enhance visitor experience by providing access to park facilities, resources, and recreational opportunities. Park roads are not intended to provide fast and convenient transportation, but rather to access areas of recreation while being sensitive to the natural and cultural resources in the area (section 9.2.1.1 *Management Policies 2006*). Park roads provide access for the protection, use, and enjoyment of the resources that constitute the park. Generals Highway provides important entry into the park and access connections to Sequoia National Forest, Kings Canyon National Park, and other roads in the park, as well as regional connections to other state highways and communities.

## **1984 NPS Park Roads Standards**

The 1984 NPS Park Roads Standards state that roads in national parks serve a distinctly different purpose from most other road and highway systems. Among all public resources, those of the national park system are distinguished by their unique natural, cultural, scenic, and recreational qualities. Park roads are to be designed with extreme care and sensitivity to provide access for the protection, use, and enjoyment of the resources that constitute the national park system.

## **Director's Order – 87A: Park Roads and Parkways**

DO – 87A states that park roads are constructed only where necessary to provide access for the protection, use, and enjoyment of the natural, historical, cultural, and recreation resources that constitute our national park system. Park roads should enhance the visitor experience while providing safe and efficient accommodation of park visitors and to serve essential management action needs. Park roads are designed with extreme care and sensitivity with respect to the terrain and environment through which they pass—they are laid lightly onto the land.

## **SCOPING**

Scoping is an early and open process to determine the breadth of issues and alternatives to be addressed in an EA. Park staff, resource professionals of the NPS Denver Service Center, and the FHWA conducted internal scoping. This interdisciplinary process defined the purpose and need, identified potential actions to address the need, determined likely issues and impact topics, and identified the relationship of the preferred alternative to other planning efforts at the park.

On January 20, 2011, the park initiated public scoping with a press release to provide the public and interested parties an opportunity to comment on the proposed project (Appendix A). The park also sent letters to more than 240 interested individuals; organizations; state,

county, and local governments; federal agencies; local businesses; and media outlets describing the preferred alternative and asking for comments. In addition, the scoping letter was sent to the California State Historic Preservation Office and American Indian tribes traditionally associated with the parks. More information regarding external scoping and American Indian consultation can be found in the “Consultation and Coordination” section.

During the 30-day scoping period, which ended February 22, 2011, the park received two public comments—one from an individual and one from the California Department of Fish and Game (CDFG). Concern was expressed on whether access to the park by large recreational vehicles would be restricted during roadwork and whether deer that are commonly seen in the area would be affected. The CDFG indicated the project has the potential to affect several federal and state endangered, rare, or threatened species, as well as state sensitive species, migratory birds, and listed plant species. The public has supported improvements to the road during previous phases of Generals Highway rehabilitation.

Internal and external scoping comments were considered in the choice of impact topics and the development and evaluation of alternatives discussed in this EA. Scoping issues or impact topics that were considered, but not evaluated further, are discussed below in “Impact Topics Dismissed from Further Analysis.”

The public, agencies, and American Indian tribes traditionally associated with park lands also will have an opportunity to review and comment on this EA.

## **IMPACT TOPICS RETAINED FOR FURTHER ANALYSIS**

Issues and impact topics for this project have been identified on the basis of federal laws, regulations, and orders; NPS *Management Policies 2006*; and NPS knowledge of resources at Sequoia and Kings Canyon National Parks, as well as the questions and comments brought forth during internal and external scoping. Impact topics that are carried forward for further analysis in this environmental assessment are listed below in Table 1 along with the reasons why the impact topic is further analyzed.

**TABLE 1. IMPACT TOPICS RETAINED FOR FURTHER EVALUATION AND RELEVANT LAWS, REGULATIONS, AND POLICIES**

Impact Topic	Reasons for Retaining Impact Topic	Relevant Laws, Regulations, and Policies
<b>Vegetation and Special Status Plant Species</b>	Small areas of tree and vegetation removal would be necessary to provide adequate sight distance, selective road widening, and to better define turnouts. This may include removal of several sequoias less than 22 inches in diameter and possible root damage. One sensitive plant species potentially occurs near the highway. Roadside vegetation disturbance and the introduction of invasive nonnative species are possible from ground-disturbing activities during road reconstruction work.	NPS Organic Act; NPS <i>Management Policies 2006</i> ; (4.4.2.3 Management of Threatened or Endangered Plants and Animals; including state-listed species 16 USC 1535 section 7(a)(2); Resource Management Guidelines (NPS-77); Federal Noxious Weed Control Act; Executive Order (EO) 13112; Invasive Species (1999); Endangered Species Act

Impact Topic	Reasons for Retaining Impact Topic	Relevant Laws, Regulations, and Policies
<b>Water Resources</b>	<p>The highway crosses several streams. Temporary effects on water quality are possible during construction from erosion and introduction of sediment to drainages. Proposed drainage improvements were designed to improve hydrologic conditions, prevent erosion, and protect water quality.</p>	<p>Clean Water Act; Fish and Wildlife Coordination Act of 1934 (PL 85-624), as amended; EO 12088; NPS <i>Management Policies 2006</i>; NPS-77</p>
<b>Historic Structures</b>	<p>Generals Highway and associated historic structures are eligible for listing in the national register. The NPS has an agreement with the SHPO to manage the highway as if it were listed in the national register. There is concern that construction activities such as adding pullouts, adding and replacing guardrails, work on stone walls, and other structural measures do not affect the highway's eligibility for listing in the national register.</p>	<p>NPS Organic Act (1916), the Antiquities Act of 1906, the NHPA of 1966 (1992, as amended), NEPA, the National Parks and Recreation Act of 1978, the Archaeological Resources Protection Act of 1979, NAGPRA (1990), and the Curation of Federally Owned and Administered Archaeological Collections (1991). Applicable agency policies relevant to cultural resources include Chapter 5 of NPS <i>Management Policies</i>, and DO – 28: <i>Cultural Resource Management</i>, as well as other related policy directives such as the NPS Museum Handbook (2005), Interpretation and Visitor Services Guidelines (1986), and <i>The Secretary of the Interior's Standards for the Treatment of Historic Properties</i> (1992a)</p>
<b>Cultural Landscapes</b>	<p>Because Generals Highway and associated historic structures are eligible for listing in the national register, there is concern that any new structural features or modifications to existing structures should maintain the historic character of the highway. The NPS has an agreement with the SHPO to manage the highway as if it were listed in the national register.</p>	<p>Section 106 of the NHPA, NPS <i>Management Policies 2006</i>, DO – 28</p>
<b>Visitor Use and Experience</b>	<p>The quality of the visitor experience would be temporarily affected during construction from traffic delays and short-term closures, closed parking areas and pullouts, increased noise, and a change in scenic quality from construction equipment and disturbances. The proposed improvements would provide long-term benefits to the visitor experience by ensuring access to the park.</p>	<p>NPS <i>Management Policies 2006</i></p>
<b>Socioeconomics</b>	<p>Construction-related spending and employment may benefit gateway communities. However, construction-related traffic delays also could affect tourism and concessioner operations in the park.</p>	<p>NPS <i>Management Policies 2006</i></p>
<b>Public Health and Safety</b>	<p>Deteriorating road conditions pose an increasing safety risk to vehicle travel and increase the potential for accidents. The proposed improvements are designed to improve road conditions and safety.</p>	<p>NPS <i>Management Policies 2006</i></p>

Impact Topic	Reasons for Retaining Impact Topic	Relevant Laws, Regulations, and Policies
Park Operations	Construction activities would require temporary changes in park operations to address traffic control and keep the public informed about road conditions. Road maintenance, repairs, and snow removal would benefit from road rehabilitation and associated improvements.	NPS Management Policies 2006; OMB Circular A-123; Federal Managers Financial Integrity Act of 1982 (31 USC 3512(d)); Government Performance and Results Act of 1993 (GPRA)

## **IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS**

In this section of the EA, the NPS provides a limited evaluation and explanation as to why some impact topics are not evaluated in more detail. Impact topics were dismissed from further analysis if it was determined that the project did not have the potential to cause substantial change to these resources and values. In addition, impact topics were dismissed from further evaluation in this EA if:

- they do not exist in the analysis area, or
- they would not be affected by the proposal, or the likelihood of impacts are not reasonably expected, or
- through the application of mitigation measures, there would be minor or less effects (i.e., no measurable effects) from the proposal, and there is little controversy on the subject or reasons to otherwise include the topic.

The NPS defines “measurable” impacts as moderate or greater effects. It equates “no measurable effects” to minor or less effects. “No measurable effect” is used by the NPS in determining if a categorical exclusion applies or if impact topics may be dismissed from further evaluation in an EA or EIS. The use of “no measurable effects” in this EA pertains to whether the NPS dismisses an impact topic from further detailed evaluation in the EA. The reason the NPS uses “no measurable effects” to determine whether impact topics are dismissed from further evaluation is to concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail in accordance with Council on Environmental Quality (CEQ) regulations at 1500.1(b).

The regulatory context and baseline conditions relevant to each impact topic were analyzed in the process of determining if a topic should be retained or dismissed from further analysis. Because there would be no effects or no measurable effects, there would either be no contribution toward cumulative effects or the contribution would be low. The following provides overview of impact topics that were considered, but ultimately dismissed along with the reasons for dismissing each topic from further analysis.

### **Air Quality and Climate Change**

The Clean Air Act of 1963 (42 USC 7401 et seq.) was established to promote the public health and welfare by protecting and enhancing the nation’s air quality. The act establishes specific programs that provide special protection for air resources- and air quality-related

values associated with national park system units. Section 118 of the Clean Air Act requires a park system unit to meet all federal, state, and local air pollution standards.

Sequoia and Kings Canyon National Parks were designated Class I under the 1970 Clean Air Act, as amended. A Class I area is subject to the most stringent regulations of any designation. The proposed project falls within the San Joaquin Valley Air Pollution Control District. This air district is susceptible to air pollution given its climate, topography, and human activities. Area (nonpoint) sources continue to be the major contributor of air pollutants in the district. Ozone, acidic and nitrogen deposition, pesticide drift, and regional haze are the most serious threats. Area sources include cars, trucks, farm equipment, and other agricultural activities. Most of the air pollution found in the parks originates outside park boundaries. The district is currently classified as severe nonattainment for ozone (1-hour) nonattainment for ozone (8-hour), and nonattainment for particulate matter (PM 10 and PM 2.5) under California Ambient Air Quality Standards (San Joaquin Valley Air Pollution Control District 2011).

Under the preferred alternative, earthwork and hauling material during construction would temporarily increase dust and vehicle emissions and would result in localized effects on air quality. Hydrocarbons, nitrogen oxide, and sulfur dioxide vehicle emissions would be rapidly dissipated and would not exceed air quality standards. Visibility, deposition, and other air quality-related values in the park are not expected to be appreciably affected. These effects would be short-term, negligible, and adverse. Road rehabilitation would not result in a long-term increase in traffic or vehicle emissions. Neither overall park air quality nor regional air quality would be more than negligibly affected by the short-term increase in emissions. The no action alternative would have no effect on existing air quality.

Climate change refers to any significant changes in average climatic conditions (such as mean temperature, precipitation, or wind) or variability (such as seasonality and storm frequency) lasting for an extended period (decades or longer). Recent reports by the U.S. Climate Change Science Program, the National Academy of Sciences, and the United Nations Intergovernmental Panel on Climate Change provide evidence that climate change is occurring as a result of rising greenhouse gas (GHG) emissions and could accelerate in the coming decades. While climate change is a global phenomenon, it manifests differently depending on regional and local factors. General changes that are expected to occur in the future as a result of climate change include hotter, drier summers; warmer winters; warmer water; higher ocean levels; more severe wildfires; degraded air quality; more heavy downpours and flooding; and increased drought. Climate change is a far-reaching, long-term issue that could affect the parks, their resources, visitors, and management. Although some effects of climate change are considered known or likely to occur, many potential impacts are unknown. Much depends on the rate at which the temperature would continue to rise and whether global emissions of GHGs can be reduced or mitigated. Climate change science is a rapidly advancing field and new information is being collected and released continually.

The parks strive to incorporate the principles of sustainable design and development into all facilities and park operations. Sustainability can be described as the result achieved by doing things in ways that do not compromise the environment or its capacity to provide for present and future generations. Sustainable practices minimize the short- and long-term environmental impacts of developments and other activities through resource conservation,

recycling, waste minimization, and the use of energy-efficient and ecologically responsible materials and techniques.

Construction activities associated with implementation of the preferred alternative would contribute to increased GHG emissions, but such emissions would be short-term, ending with the cessation of construction. Any effects of construction-related GHG emissions on climate change would not be discernible at a regional scale, as it is not possible to meaningfully link the GHG emissions of such individual project actions to quantitative effects on regional or global climatic patterns. The no action alternative would have no effect on air quality and GHG emissions. Because the preferred alternative would result in short-term negligible adverse effects on air quality during construction and it is not possible to meaningfully link the GHG emissions from the project to climate change, air quality and climate change were dismissed as impact topics in this EA.

## **Geology and Soils**

In accordance with NPS *Management Policies 2006*, the NPS strives to preserve and protect geologic resources and features from adverse effects of human activity, while allowing natural processes to continue (NPS 2006b). The geology of the parks is characterized by igneous rocks formed in the Cenozoic and Mesozoic eras. Metamorphic rocks from the Mesozoic, which often contain caves and beds of marble, are also common. The soils in the parks are derived from these igneous and metamorphic rocks as well as glacial debris and alluvium. Soils are generally shallow and young, with little development. Soils in the parks have high sand and rock content, resulting in high infiltration rates. Surface erosion is generally low because infiltration rates are greater than rainfall or snowmelt rates. Soils in the project area, on adjacent cut and fill slopes beyond the edge of the pavement, have been disturbed by past human activities such as original construction of the road and periodic maintenance.

Road rehabilitation activities under the preferred alternative would occur primarily within areas of existing disturbance, although about 4.8 acres of disturbance would occur outside of the existing paved area. Most of this disturbance would be revegetated or stabilized including 0.25 acre of new pavement. Only limited rock removal is planned under the preferred alternative for Phase 1, which would have local long-term negligible impacts on geology. Excavation for culvert replacement would result in temporary incidental impacts on soils. Proposed drainage improvements, culvert inlet and outlet protection, and correction of deteriorating road pavement would reduce the potential for erosion and soil loss. Exposed soil material during construction would be subject to erosion until stabilized or revegetated. Impacts on soils during construction would be local, short-term, minor, and adverse. The preferred alternative would result in a local long-term beneficial effect on soil resources by repairing road conditions that currently generate erosion. Planned use of temporary and permanent erosion control best management practices (BMPs) would reduce the potential for erosion and soil loss. The no action alternative would not affect geology and would have local long-term minor adverse effects on soils from deterioration of the road and poor drainage that lead to erosion. Because impacts on geology and soils would be minor or less under both alternatives, this impact topic was dismissed from further analysis in the EA.

## **Wetlands**

EO 11990, “Protection of Wetlands” requires federal agencies to avoid, where possible, adversely impacting wetlands. In accordance with NPS *Management Policies 2006* and DO – 77-1: *Wetlands Protection*, the NPS strives to prevent the loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In addition, section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers (Corps) to prohibit or regulate, through a permitting process, discharge of dredged or fill material or excavation within waters of the United States.

The majority of the project area is located in steep terrain with only a few wetlands present near drainages. Proposed rehabilitation activities including culvert replacement and drainage improvements generally avoid impacts on wetlands. Replacement of an existing culvert on Hazelwood Creek near Round Meadow would result in a temporary disturbance to waters of the U.S. with incidental impact on less than 0.1 acre of wetlands. Stream drainage would be diverted around the construction disturbance to minimize impacts on water quality. Wetland vegetation temporarily disturbed during culvert replacement would be revegetated with native species. Because adverse impacts on wetlands would be local, short-term, negligible, wetlands was dismissed as an impact topic.

## **Wildlife**

In accordance with NPS *Management Policies 2006*, the NPS strives to maintain all components and processes of naturally evolving park unit ecosystems, including the natural abundance, diversity, and ecological integrity of animals (NPS 2006b). Wildlife likely to occur in the project area include common raven (*Corvus corax*), Steller’s jay (*Cyanocitta stelleri*), white-breasted nuthatch (*Sitta carolinensis*), American robin (*Turdus migratorius*), sharp-shinned hawk (*Accipiter striatus*), black bear (*Ursus americanus*), western fence lizard (*Sceloporus occidentalis*), northern flying squirrel (*Glaucomys sabrinus*), spotted skunk (*Spilogale gracilis*), and deer mouse (*Peromyscus* sp.). Most work under the preferred alternative would occur within previously disturbed areas such as the existing highway and adjacent shoulders. Temporarily disturbed areas would be revegetated and rehabilitated following construction. Construction would result in an increase in noise, which may cause wildlife to avoid the area during construction. Larger animals, such as deer, would likely avoid the road corridor during construction and are not expected to be adversely affected by proposed rehabilitation work.

To accommodate road widening in Phase 1, approximately 30 trees would be removed along about 3,700 feet of the road shoulder. The removed trees would include big-leaf maples, incense cedars, black oaks, and canyon live oaks. Tree removal would slightly reduce available habitat for birds, some bat species, and tree-nesting mammals. To minimize wildlife and migratory bird impacts during the breeding season, tree removal would be conducted between August 15 and March 1 when feasible. If tree removal is necessary during the breeding season, all trees would be examined before removal to ensure they are not being used for nesting or denning. Additional mitigation measures would be implemented for bat species as described in the following “Special Status Wildlife Species” section.

Construction-related noise would be temporary, and existing sound conditions would resume following construction activities. Project activities would occur in developed frontcountry areas of the park where human presence and noise from human activities are common. Night work would introduce new short-term disturbance to the environment, displacing some animals away from the highway corridor. Black bears may be drawn to the area if food is not properly stored and removed. Mitigation measures, including education of construction workers to prevent feeding of wildlife and to properly store food in bear-proof containers, would be implemented, as is currently enforced with park visitors. Planned retention of 25 mph speed limit and 15 mph at sharp curves would benefit wildlife by limiting the risk of collisions with vehicles. Slower traffic speeds during construction would have a slight beneficial effect on wildlife by reducing the risk of road kill. Overall, impacts on wildlife under the preferred alternative would be local, short-term, minor, and adverse. Under the no action alternative, the existing highway would continue to have local long-term negligible adverse effects on wildlife from collisions with automobiles, as well as disturbances associated with human activities. Because impacts on wildlife would be minor or less under both alternatives, this impact topic was dismissed from further analysis in the EA.

### **Special Status Wildlife Species**

The Endangered Species Act of 1973 (ESA) requires examination of impacts on all federally listed threatened, endangered, and candidate species. Section 7 of the ESA requires all federal agencies to consult with the U.S. Fish and Wildlife Service to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitats. In addition, the NPS *Management Policies 2006* and DO – 77: *Natural Resources Management Guidelines* require the NPS to examine the impacts on federal candidate species as well as state-listed threatened, endangered, candidate, rare, declining, and sensitive species (NPS 2006b). Special status species are listed as threatened, endangered, or candidate under the ESA (CDFG 2011a); species listed as endangered, threatened, or sensitive by the state of California (CDFG 2011a); species listed as sensitive by the U.S. Forest Service or Bureau of Land Management (CDFG 2011b); and any other species considered sensitive by the park. NPS biologists identified 32 wildlife species with special status that are known to occur in or travel through the project area (Appendix B).

The California condor (*Gymnogyps californianus*), federally listed as endangered, has the potential to occur in the parks. California condors are highly mobile and do not congregate near the project area. Although condors were observed near the park in 2011, there are no breeding areas near the project area. Adverse effects on condors would be local, short-term, and negligible because their presence near the project area is rare and they could readily avoid construction activity.

Three candidate species for federal listing, the California wolverine (*Gulo gulo*), the Pacific fisher (*Martes pennanti*), and the Sierra Madre yellow-legged frog (*Rana mucosa*), have the potential to occur in the project area. Park records indicate the California wolverine and the Sierra Madre yellow-legged frog have been extirpated from the park; therefore, these two species will not be further evaluated. The Pacific fisher is known to occur in the project area and a road-killed fisher has been found on Generals Highway in the vicinity of Amphitheater Point. Removal of trees adjacent to the road could potentially reduce denning

and resting habitat for fishers; however, fisher use of trees close to the road is unlikely and the few trees removed would not substantially affect the availability of suitable habitat for fishers. Thus, adverse impacts on fishers from tree removal would be local, long-term, and minor. In addition, trees would be checked prior to removal to ensure that no denning fishers are present. Pacific fishers could be disturbed by increased noise and human activity; however, fishers tend to be shy and solitary and are likely to avoid areas where human disturbance is occurring during construction. Thus, adverse effects on fishers would be local, short-term, and negligible.

Three state-listed endangered species, bald eagle (*Haliaeetus leucocephalus*), great gray owl (*Strix nebulosa*), and willow flycatcher (*Empidonax traillii*), have the potential to occur in the project area. Two state-listed threatened species, Swainson's hawk (*Buteo swainsonii*) and Sierra Nevada red fox (*Vulpes vulpes necator*), also have the potential to occur in the project area. The bald eagle, great gray owl, and Swainson's hawk are rare visitors to the project area, and would only occur in the project area momentarily, as they fly over the road. The Sierra Nevada red fox is considered rare in the area, but could be present near the project area. These species would not be affected by the project because they generally avoid areas with human activity. Based on limited park records, the willow flycatcher is thought to be extirpated from the project area.

Other state-listed bird species of concern potentially occurring in the project area include northern goshawk (*Accipiter gentilis*), sharp-shinned hawk (*Accipiter striatus*), short-eared owl (*Asio flammeus*), long-eared owl (*Asio otus*), California spotted owl (*Strix occidentalis occidentalis*), black swift (*Cypseloides niger*), purple martin (*Progne subis*), yellow warbler (*Dendroica petechia brewsteri*), harlequin duck (*Histrionicus histrionicus*), Vaux's swift (*Chaetura vauxi*), northern harrier (*Circus cyaneus*), and great gray shrike (*Lanius excubitor*). Effects on these bird species are expected to be local, short-term, negligible, and adverse with measures to avoid impacts on nesting species and the minimal loss of suitable habitat from limited tree removal adjacent to the road in the Phase 1 segment of the project. Surveys of the project area for California spotted owls have detected several breeding pairs within 0.5 mile of Generals Highway (NPS 2011b). Only one breeding pair was found within 0.25 mile of the highway. Proposed road improvements are expected to have a short-term negligible adverse effect on the spotted owl population, although several individuals could be displaced from foraging areas as a result of construction noise. The park would continue annual monitoring of spotted owl activity near the project area and determine if additional protection measures are needed based on nesting locations at the time road work begins.

Mammal species of concern potentially occurring include American marten (*Martes americana*), American badger (*Taxidea taxus*), and several bat species (Appendix B).

Surveys of potential bat habitat in the Generals Highway segment of the proposed project were conducted from October 7 to October 10, 2010 (Central Coast Bat Research Group 2011). Features such as culverts, rock formations, and trees were inspected to determine if they provided roosting habitat for bat species. Several roost sites were found near the project area, including a hollow cedar tree with evidence of day roosting and a giant sequoia with evidence of night roosting by pallid bats (*Antrozous pallidus*). Foliage roosting bats such as western red bat (*Lasiurus blossevillii*) could potentially roost in foliage of the approximate 30 trees to be removed adjacent to the road at the southern end of the project area. These trees

would be removed from August 15 through March 1 if feasible to avoid impacting active roosting bats. If tree removal occurs at other times of the year, cut trees would be allowed to lie for 24 hours before being sectioned, chipped, or mulched. This measure would allow foliage roosting bats to arouse and leave. No large sequoia trees with hollows suitable for bat use would be removed. Construction activities and noise could potentially disturb roosting bats, although the effects are not well known and impacts are expected to be minor. Night work and associated lighting would attract insects that bats are likely to forage on. Thus, while local short-term minor adverse effects on bats are possible from tree removal and construction activity, the only long-term adverse effect is a minor loss in potential roosting habitat from tree removal adjacent to the highway.

Proposed work under the preferred alternative would occur within previously disturbed areas along the highway where human presence and noise from traffic and other human activity are prevalent. Most of the special status species would not likely occur in the project area during construction due to behavior and habitat preference. Noise and the presence of work crews are not expected to adversely affect special status species because the road currently experiences frequent traffic noise and is within a developed area where human presence is typical. Local short-term beneficial effects on wildlife are possible during construction from slowed traffic through construction zones, resulting in fewer road kills. Mitigation measures such as restoring and revegetating disturbed areas to preconstruction conditions would reduce the potential for long-term habitat loss. Based on mitigation and past project work, any beneficial or adverse effects would be discountable and insignificant, and the determination has been made that there would be no effect on listed or sensitive species as a result of the project. There would be no impacts on special status species under the no action alternative. Because the preferred alternative and no action alternative would have no effect on special status species, this topic was dismissed from further analysis in this EA.

## **Visual Resources**

NPS *Management Policies 2006* state that scenic views and visual resources are considered highly valued associated characteristics that the NPS should strive to protect. Visual impacts would occur during construction from the presence of construction equipment, materials, orange construction fencing around giant sequoia trees, and ground disturbances. Rehabilitation of damaged sections of the existing highway would improve visual quality. Any disturbances to existing structural features or new structural features, such as guard walls, would be constructed with material to match the color, texture, and character of existing facilities. Visual impacts from construction activities under the preferred alternative would be local, short-term, and negligible. The long-term visual impact of road rehabilitation and improvements would not adversely affect any viewsheds. Under the no action alternative, road conditions would continue to deteriorate, which would detract from the scenic quality of the highway corridor. The long-term effect on visual quality would be beneficial under the preferred alternative, with a long-term minor adverse effect under the no action alternative; therefore, visual resources were dismissed as an impact topic in this EA.

## Natural Soundscapes

An important part of the NPS mission is preservation of natural soundscapes associated with national park units, as indicated in *NPS Management Policies 2006* and DO – 47: *Sound Preservation and Noise Management*. Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all natural sounds within the park, together with the physical capacity for transmitting natural sound through air, water, or solid material. Acceptable frequencies, magnitudes, and durations of human-caused sound varies among national park units, as well as potentially throughout each park unit, but are generally greater in developed areas and less in undeveloped areas. The NPS strives to preserve the natural soundscape associated with the physical and biological resources of the parks. The natural soundscape in the project area is influenced primarily by vehicle traffic. More than 230,000 vehicles passed through the Ash Mountain entrance in 2010, including motorcycles and oversized vehicles such as buses, recreational vehicles, and trucks (NPS 2011a). Most of these vehicles likely drove along the highway within the project area. Park operations, maintenance, and administration activities also contribute to the traffic and noise generated along the highway.

Road rehabilitation work under the preferred alternative would result in temporarily elevated noise levels along the highway from equipment for pulverizing the asphalt surface, as well as graders, trucks, backhoes, and other equipment or machinery. Limited blasting is possible in Phase 1 of the project. While most of the noise would occur within the highway corridor, truck traffic from delivering supplies would increase traffic-related noise along roads leading to the construction area. There would be no adverse effects on the natural soundscape following construction activities and none of the road improvements would increase traffic capacity. The effects on the existing soundscape from work activities under the preferred alternative would be local, short-term, minor, and adverse. There would be no change to the existing soundscape under the no action alternative. Periodic road maintenance and repairs would continue to be conducted when necessary and the noise associated with these operations would likely involve trucks and heavy equipment. Because there would be no long-term adverse effects on the natural soundscape under either alternative and short-term effects under the preferred alternative would be minor, this topic was dismissed from further analysis in this EA.

## Lightscape

In accordance with *NPS Management Policies 2006*, the NPS strives to preserve natural ambient lightscape, which are natural resources and values that exist in the absence of human-caused light. The parks strive to limit the use of artificial outdoor lighting to that necessary for building security and human safety. The parks also strive to ensure that all outdoor lighting is shielded to the maximum extent possible to keep light on the intended subject and out of the night sky. No new permanent outdoor lighting is proposed as part of the preferred alternative. There are no campgrounds or other visitor facilities near the project area that would be affected by night construction and activities and lighting. Night construction and use of temporary lighting would result in a local short-term minor adverse impact on the night sky. There would be no impact on the lightscape or night sky from the no action alternative. Because impacts on the lightscape would be minor or less under both alternatives, this topic was dismissed from further analysis in this EA.

## **Archeological Resources**

Sequoia and Kings Canyon National Parks contain at least 5,000 years of history. Limited archeological work within the parks precludes a detailed cultural history specific to the project area. Ethnographically, however, the area was occupied by the Western Mono and Foothill Yokuts groups, many of whom remained in the area until the late 1800s or throughout the refugee period. A cultural resource inventory of primary and secondary roads within Sequoia National Park was undertaken, including about 28.3 miles of road (Mundy 1990). The survey included the current Generals Highway project area from Deer Ridge to Wolverton, but did not include the 1.3-mile section of Wolverton Road. The inventory identified 12 cultural resources adjacent to Generals Highway. Of these, only one prehistoric archeological site eligible for listing in the national register was located near the current project area. This site dates to the prehistoric period and includes milling basins, mortars, and bedrock basins in the Giant Forest area, but is well outside the area of potential effect for the current project.

All identified archeological sites would be avoided during construction activities. No activity that would have the potential to impact archeological sites would take place outside of the previously disturbed road corridor. Any archeological resources discovered during future surveys along Wolverton Road would be avoided or addressed under the existing signed Programmatic Agreement between the California SHPO and the NPS (NPS 2008). Monitoring may be necessary should the project design include disturbance near an archeological site identified during future inventory of Wolverton Road. No known archeological sites would be affected under the no action alternative because no new disturbances would be planned. Because no impacts on archeological resources are anticipated under either alternative, and measures are in place to address archeological resources should they be discovered during construction, this topic was dismissed from further analysis in this EA.

## **Indian Trust Resources**

Secretarial Order 3175 requires that any anticipated impacts on Indian trust resources from a proposed project or action by Department of the Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights. The order represents a duty to carry out the mandates of the federal law with respect to American Indian and Alaska Native tribes. There are no Indian trust resources in the park; therefore, Indian trust resources were dismissed as an impact topic in this EA.

## **Ethnographic Resources**

The NPS defines ethnographic resources as any “site, subsistence, or other significance in the cultural system of a group traditionally associated with it” (DO – 28). There are no known ethnographic resources in the project area or general vicinity. The American Indian tribes traditionally associated with the lands of the park were apprised of the proposed project by letter. No comments from the tribes were received during the scoping period.

Copies of the EA will be forwarded to each associated American Indian tribe for review and comment. If subsequent issues or concerns are identified, appropriate consultations would be undertaken. Because it is very unlikely that ethnographic resources would be affected under either alternative, and because appropriate steps would be taken to protect any human remains, funerary objects, sacred objects, or objects of cultural patrimony inadvertently discovered, ethnographic resources was dismissed as an impact topic in this EA.

### **Museum Collections**

According to DO – 24: *Museum Collections*, the NPS requires the consideration of impacts on museum collections. Museum collections include historic artifacts, natural specimens, and archival and manuscript material. These collections may be threatened by fire, vandalism, natural disasters, and careless acts. The preservation of museum collections is an ongoing process of preventive conservation, supplemented by conservation treatment, when necessary. The primary goal is preservation of artifacts in the most stable condition possible to prevent damage and minimize deterioration. The preferred and no action alternatives would not affect museum collections; therefore, museum collections were dismissed as an impact topic in this EA.

### **Prime or Unique Farmland**

In 1980, the Council on Environmental Quality directed federal agencies to assess the effects of their actions on farmland soils classified as prime or unique by the United States Department of Agriculture, Natural Resources Conservation Service. Prime or unique farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; and unique farmland produces specialty crops such as fruits, vegetables, and nuts. No prime or unique farmlands are associated with the project area; therefore, prime or unique farmland was dismissed as an impact topic in this EA.

### **Environmental Justice**

Presidential EO 12898, “General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing the disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. According to the U.S. Environmental Protection Agency, environmental justice is the

...fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

The goal of “fair treatment” is not to shift risks among populations, but to identify potentially disproportionately high and adverse effects, and identify alternatives that may mitigate these impacts.

Three Rivers and surrounding communities contain both minority and low-income populations; however, environmental justice was dismissed as an impact topic for the following reasons:

- The park staff and planning team actively solicited public participation as part of the planning process and gave equal consideration to all input from persons regardless of age, race, income status, or other socioeconomic or demographic factors.
- Implementation of the preferred alternative would not result in any identifiable adverse human health effects. Therefore, there would be no direct or indirect adverse effects on any minority or low-income population.
- The impacts associated with implementation of the preferred alternative would not disproportionately affect any minority or low-income population or community.
- Implementation of the preferred alternative would not result in any identified effects that would be specific to any minority or low-income community.

The impacts on the socioeconomic environment resulting from implementation of the preferred alternative may have short-term minor adverse and beneficial economic effects as discussed in the “Socioeconomics” section, but over the long term, effects would be beneficial. In addition, the park staff and planning team do not anticipate the impacts on the socioeconomic environment to appreciably alter the physical and social structure of nearby communities.

## **Wilderness**

On September 28, 1984, Congress designated approximately 83.5% (723,000 acres) of the parks as wilderness under the Wilderness Act of 1964. Additional acreage was designated as wilderness by the Omnibus Public Land Management Act of 2009 (HR 146). The total designated and managed wilderness for the parks is 837,962 acres—approximately 96.8% of the parks’ total acreage. Near the project area, designated wilderness is present west of Generals Highway for a distance of about 4.2 miles. The wilderness boundary is set at 100 feet from the centerline of the highway, from the southern end of the project area at Deer Ridge to the turnoff to Crystal Cave, and from about 0.25 mile south of the Pinewood picnic area to the north end of the project area. All proposed project work would occur within the existing road corridor and adjacent sideslopes within 100 feet of the centerline of the highway. The proposed project would not encroach into the wilderness area; therefore, there would be no direct disturbance to wilderness. Construction-related noise and disturbance would result in a local short-term negligible adverse effect on the natural quiet typically found in wilderness areas, but would have no long-term effect. The no action alternative would have no effect on wilderness. Because of the short-term negligible adverse effects on

wilderness during construction and the absence of direct adverse effects on wilderness resources and values, this topic was dismissed from further evaluation in this EA.

### **Wild and Scenic Rivers**

The Wild and Scenic Rivers Act (16 USC 1271-1287) establishes a National Wild and Scenic Rivers System and prescribes the methods and standards through which additional rivers may be identified and added to the system. The parks contain several river segments (middle and south forks of the Kings River and the north fork of the Kern River) that have been designated as wild and scenic rivers. In addition, the south fork of the San Joaquin River and five forks of the Kaweah River (north, marble, middle, east, and south) have been studied for their suitability and eligibility for inclusion in the national wild and scenic rivers system. None of these designated or potential wild and scenic rivers are near the project area. Because there would be no effects on wild and scenic rivers under either alternative, this topic was dismissed from further evaluation in this EA.

# **ALTERNATIVES**

## **INTRODUCTION**

This chapter describes the no action alternative and the preferred alternative for resurfacing, restoring, and rehabilitating a 7-mile segment of Generals Highway from Deer Ridge to Wolverton Road. The approximate 1-mile segment of road from Deer Ridge to Eleven Range also would be reconstructed under the preferred alternative and 1.3 miles of Wolverton Road would be rehabilitated. The no action alternative would not result in rehabilitation of the road and the present level of management, operations, and maintenance would continue. The preferred alternative was developed to address the purpose and need for the project to address deteriorating road conditions, while protecting and preserving park natural and cultural resources.

The preferred alternative presents the NPS's preferred management action and defines the rationale for the action in terms of resource protection and management, visitor and operational use, cost, and other applicable factors. Other alternatives that were considered but eliminated from detailed analysis are discussed in this chapter. Also included in this chapter is a comparison of how well the alternatives meet project objectives and a summary comparison of the environmental effects of each of the alternatives.

## **NO ACTION ALTERNATIVE**

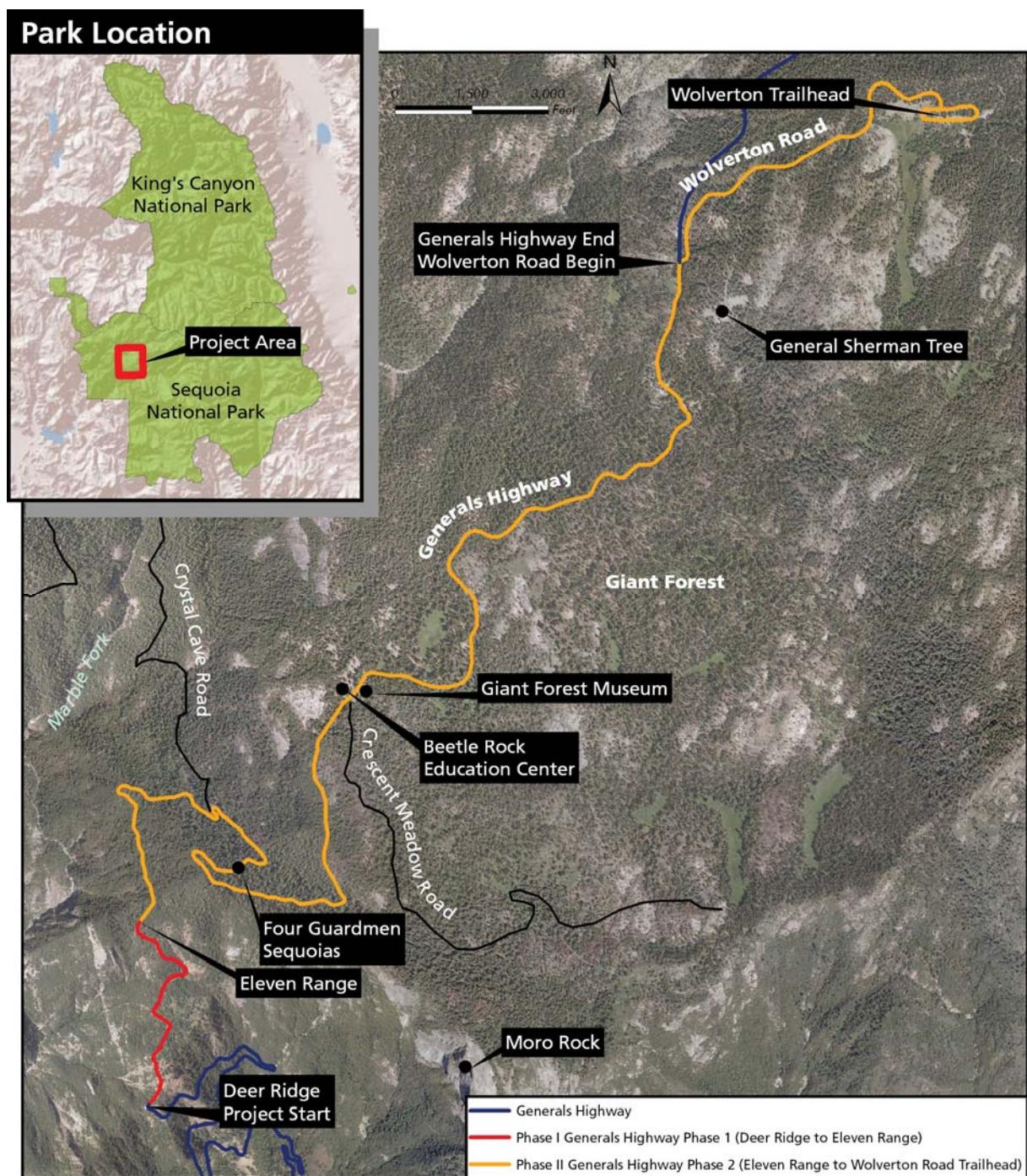
Under the no action alternative, the section of Generals Highway from Deer Ridge to Wolverton Road and Wolverton Road would not be rehabilitated. Park staff would continue to conduct routine road maintenance, asphalt patching and sealing, minor repairs, and snow removal as in the past. Road pavement and structural integrity would continue to deteriorate and the safety issues associated with the narrow section of road from Deer Ridge to Eleven Range would persist. Prevention of catastrophic failures would continue to rely on attention to maintenance of the infrastructure including pavement, retaining walls, culverts, and ditches. No highway funds would be expended for road reconstruction or improvements.

The no action alternative provides a basis for comparison with the preferred alternative and the respective environmental consequences. Should the no action alternative be selected, the NPS would respond to future needs and conditions without major actions or changes in the present course.

## **PREFERRED ALTERNATIVE**

The preferred alternative includes site-specific actions for reconstruction and rehabilitation of about 7 miles of Generals Highway and 1.3 miles of Wolverton Road. The proposed project is divided into two phases for discussion purposes. The sequence of construction may vary from the numbered phases. Phase 1 consists of an approximate 1-mile segment of Generals Highway from Deer Ridge to Eleven Range (Figure 2). Work on this

**FIGURE 2. GENERALS HIGHWAY PROJECT AREA**



segment is more extensive than other portions of the project and includes reconstruction of the road to widen narrow sections, construct new or rehabilitate existing retaining walls, improve drainage, construct new pullouts, and other improvements. The 6-mile segment of Phase 2 extends from Eleven Range to Wolverton Road and includes minor curve widening, repaving, and drainage work. This project also includes repaving Wolverton Road from the intersection with Generals Highway to the Wolverton Trailhead parking lot, including all quadrants of the Wolverton parking lot. If approved, the work is expected to begin in 2014, depending on available funding. Each phase would require two seasons to complete construction. The estimated construction cost for the two phases is about \$18 million. Additional information on project features is described below.

### Road Design

The existing paved road for the Phase 1 segment ranges in width from 19 to 23 feet and is in poor condition. This segment of the road would be resurfaced and widened to a consistent width using 10-foot-wide travel lanes with no shoulder for a total width of 20 feet. Road widening would require slight vertical and horizontal realignment at some locations to avoid road cuts or excessive fill. Upslope cuts would be avoided, but spot scaling to stabilize slopes may be needed. Short segments of damaged road would require subexcavation and reinforcement of the subgrade prior to repaving. Curbs would be used on the cut side for most of the road. Sharp curves would be widened about 1 foot to facilitate travel by larger vehicles. The existing posted speed limit of 25 miles per hour (mph) and 15 mph for some sharp curves would be maintained.

Road pavement widths for Phase 2 are generally adequate and would match the existing pavement width of about 22 feet with paved 10-foot travel lanes and 1-foot shoulders. In Phase 2, 1 foot of curve widening would be placed on all curves with additional curve widening beyond 1 foot added at Crystal Cave. All curve widening would be on the inside of the curve within the existing road bench. The Wolverton Road section would be rehabilitated to its existing 22-foot width with paved 11-foot travel lanes and 1-foot shoulders. The current road alignment would be maintained with only minor horizontal and vertical alignment adjustments. Subgrade problems would be corrected throughout the length of the project as needed.

The existing asphalt surface is in poor condition throughout both of the project phases with cracking, raveling, and rutting. To repair this damage, the existing road pavement in Phase 2 would be milled or pulverized and subgrade problems corrected, followed by an overlay of hot asphalt. Phase 1 would require complete reconstruction of the road prior to paving. To protect the roots of giant sequoia trees adjacent to the road, excavation within the approximate drip line of giant sequoia trees would be conducted using hand tools or precision-operated machinery in order to preserve roots larger than 4 inches in diameter. No machine pulverizing of the existing asphalt would occur within the same buffer around giant sequoias to protect tree roots. Pavement in these locations would be removed from the surface without disturbing the underlying soil and roots.

Proposed roadwork would result in a disturbance of about 4.8 acres outside of the existing paved road. The majority of the new disturbance (4.59 acres) would be temporary

and would be revegetated or stabilized following completion of road repairs. Road widening and new pullouts would add about 0.25 acre of new pavement.

### ***Structural Design***

Concrete retaining walls with a guardrail would be used at approximately six locations and cantilevered viaducts would be used at three locations in Phase 1 to provide the needed road width. The wall type and face treatment would be determined on a location-by-location basis. Guardrails would be placed on the top of retaining walls. Existing stone retaining walls would be preserved with minor modifications if needed. Stone of similar color and texture as existing stone would be used for repairs and modifications. Stone walls constructed with a crenulated (notched top) would be repaired using original or similar material. Any new wall construction or rehabilitation of existing historic walls would be in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1992a).

Road widening at one of the cantilevered viaduct locations occurs in a section of road that supports a historic crenulated stone wall. This section of road requires shifting the alignment laterally by about 5 feet. To avoid extensive cuts or fills on the steep slopes present at this location, construction of a cantilevered viaduct is proposed. Construction of the cantilevered viaduct would require removal of the top course of crenulated stone wall and the widened road would extend over the remaining wall. A separate support structure would be used to support the road. Stones removed from the wall would be used to repair other similar walls along Generals Highway that are missing stones. A guardrail would be constructed on the outside of the viaduct.

Existing painted metal guardrails would be replaced with weathering steel posts and W-beam rail. Areas of new guardrail would be kept to a minimum and where needed, would use the same weathering steel post and rail treatment.

A small wall would be constructed at the pullout above the Four Guardsmen in Phase 2 of the project. In addition, one existing guardrail would be replaced near a pullout in the Phase 2 segment.

### ***Drainage***

Phase 1 includes replacement of deteriorating or undersized culverts or drainage structures. This work typically involves removing the existing culvert and installing a new culvert with a drop inlet structure and a revet mattress basket or riprap used at the culvert outlet to provide erosion control. Some stone masonry headwalls at culvert outlets and inlets would be rehabilitated or replaced. Any new headwall construction or rehabilitation of existing headwalls would be in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1992a) and the Memorandum of Agreement currently in place with the California SHPO. A 2-foot-wide roadside drainage ditch would be used on the cut side of the road and ditch width would vary on the fill side.

Drainage work for Phase 2 would be primarily limited to cleaning existing culverts. An existing 42-inch culvert with a historic stone masonry headwall near Round Meadow would be replaced. Three sequoia trees, from 16 to 22 inches in diameter would be removed to install the new culvert. New sequoia trees would be replanted following construction. The stone masonry headwall would be rehabilitated in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1992a) and the Memorandum of Agreement currently in place with the California SHPO to maintain the integrity of the headwall. Trench drains or other drainage measures would be installed in the Giant Forest Museum accessible parking lot to improve drainage and prevent icing in the spring. Drainage improvements in the parking lot would include measures to maintain groundwater flow that helps support the adjacent giant sequoia forest.

### **Pullouts, Road Intersections, and Parking**

Phase 1 includes rehabilitating six existing roadside pullouts to provide well-defined safe locations for visitors to pull over. Phase 2 includes pulverizing and repaving approximately 18 existing pullouts. One new pullout would be constructed on the west side of the Four Guardsmen sequoia trees to provide visitors a safe location to view and photograph the trees. In addition, two existing pullouts that are poorly designed and located in areas that present safety concerns would be obliterated and revegetated. No pullouts are in the Wolverton section of the project.

The approaches for all road intersections with Generals Highway would be pulverized and repaved for a short distance to provide a smooth transition between roads. The Big Tree Trail parking area would be repaved; asphalt would be removed from the surface rather than pulverized to protect numerous large sequoias in this area. The removed asphalt would be recycled by the park and used to rehabilitate roads and parking lots outside of the project, but within other areas of the park. The large trailhead parking lot at the end of Wolverton Road also would be repaved.

### **Signage**

Existing signs within the project area would be removed and reset on new posts or removed and replaced as appropriate. All signs would use breakaway posts for safety. Advisory speed limit signs would be placed before sharp curves and reflective chevron signs would be placed on switchbacks and sharp curves. Standard centerline striping would be used for all road segments.

### **Vegetation Removal and Revegetation**

Limited roadside vegetation clearing would be conducted to improve sight distance and safety. For Phase 1, vegetation would be cleared 2 feet beyond cut and fill limits on each side of the road. For Phase 2, a vegetation clearing width of 2 feet from the pavement edge would be used at selected wall locations and a 1-foot clearing zone would be used in curb locations. No clear zone vegetation removal would be conducted where curbs or walls are not present. All temporarily disturbed areas would be revegetated or stabilized following construction. A

number of BMPs, as listed in Table 2, would be implemented to protect trees and vegetation and ensure restoration of disturbed areas.

### **Traffic Control and Scheduling**

Construction work is expected to occur from March 1 through mid-November, but could begin earlier or extend later depending on weather conditions. Work would likely be suspended from December through February because of weather conditions and safety concerns. Construction activities would occur from Monday through Friday. Generals Highway and Wolverton Road would remain open during proposed construction work, subject to temporary traffic delays as noted below:

#### **Deer Ridge to Eleven Range**

- Peak visitor season (mid-May through mid-October) one-hour maximum delays during daylight hours.
- Nonpeak visitor season (mid-October through mid-May) two-hour maximum delays during daylight hours.
- Night work would close the road for a maximum of 10 hours with one pass-through, and possibly two, to accommodate visitors and park operations.

#### **Eleven Range to Wolverton Road Intersection including the Wolverton Road.**

- Single lane closures with alternate one-way traffic control with maximum delays of one hour depending on the location of activities during daylight hours.
- Night work closures would be restricted to the replacement of deep culverts, which may require multi-hour delays.

The park would implement a number of steps to provide timely and accurate information to visitors during road rehabilitation to maintain a quality visitor experience. The park would provide clear and concise information on the status of construction work and any traffic delays. To facilitate visitor planning, the status of roadwork and traffic delays would be advertised two weeks in advance and updated daily. The status of road construction and travel restrictions would be communicated via a number of outlets: the park website, regional newspapers, radio, entrance stations, visitor centers, news releases, local newspapers, media outlets, and other locations.

### **Staging Areas**

Temporary staging areas for equipment and storage of materials during construction would occur in designated areas of existing disturbance. A segment of the Wolverton parking area located at the terminus of Wolverton Road would be used for staging equipment, materials, and excess topsoil. Alternative staging areas for the project may include the Upper Sherman material yard and Wolverton material yard. Pullouts and parking along Generals Highway also may be used for temporary staging, although no trailhead parking areas would be used for staging. Any excess rock, soil, or native material would be stored in existing

storage areas within the park accessible by existing roads. If necessary, excess material would be transported out of the park. Base aggregate, asphalt, and concrete would be delivered to the park from sources outside the park.

## Sustainability

The NPS has adopted the concept of sustainable design as a guiding principle of facility planning and development. The objectives of sustainability are 1) to design park facilities to minimize adverse effects on natural and cultural values, to reflect their environmental setting, and to maintain and encourage native biodiversity; 2) to construct and retrofit facilities using energy-efficient materials and building techniques; 3) to operate and maintain facilities to promote their sustainability; and 4) to illustrate and promote conservation principles and practices through sustainable design and ecologically sensitive use. Essentially, sustainability is living within the environment with the least impact on the environment. The preferred alternative subscribes to and supports the practice of sustainable planning, design, and use of Generals Highway within the parks by limiting and mitigating resource impacts and promoting conservation principles by recycling pavement materials.

## MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES

To prevent and minimize potential adverse impacts associated with the preferred alternative, mitigation measures and BMPs would be implemented during the construction and post-construction phases of the project (Table 2). General and resource-specific BMPs and mitigation measures for the project are listed below. (Note: This list is not all-inclusive, as there would be additional mitigation measures included in the contractor's specifications.)

TABLE 2. MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES

General Measures
<ul style="list-style-type: none"><li>• The NPS project manager or project specialist and park superintendent would ensure that the project remains within the construction limits and parameters established in the compliance documents and that mitigation measures are properly implemented.</li><li>• Construction zones would be signed at approach points. No construction activity would be permitted outside the construction limits.</li><li>• All protection measures would be clearly stated in the construction specifications/special construction requirements, and workers would be instructed to avoid conducting activities beyond the construction limits as defined by construction plans or marked limits..</li><li>• Garbage, trash, and other solid waste associated with construction operations would be disposed of in bear-proof trash bins and disposed of weekly, or sooner if warranted, outside the park.</li><li>• All contractor employees must attend a park-led bear training class.</li><li>• All tools, equipment, barricades, signs, surplus materials, and rubbish would be removed from the project work limits upon project completion. Any asphalt surfaces damaged during construction of the project would be repaired to original conditions. All demolition debris would be removed from the project site, including all visible concrete and metal pieces. This material would be disposed of outside the park in an approved location.</li><li>• Contractors would be required to properly maintain construction equipment (i.e., mufflers) to minimize noise from equipment use and follow California state idling regulations/laws.</li></ul>

- A hazardous spill plan would be in place, stating what actions would be taken in the case of a spill, notification measures, and preventive measures to be implemented, such as the placement of refueling facilities, storage, and handling of hazardous materials.
- Where appropriate and available, “environmentally friendly” grease, hydraulic oil, and bar and chain oil would be used. These lubricants are vegetable or mineral oil based, less toxic, and biodegradable.
- All equipment on the project would be maintained in a clean and well-functioning state to avoid or minimize contamination from mechanical fluids as well as meeting California Air Resource Board “Off-Road” and On-Road emission requirements. All equipment would be checked daily.
- BMPs for drainage and sediment control, as identified and used by the FHWA and NPS Stormwater Pollution Prevention Plan, would be implemented to prevent or reduce nonpoint source pollution and minimize soil loss and sedimentation in drainage areas. Use of BMPs in the project area for drainage area protection would include all or some of the following actions, depending on site-specific requirements:
  - Keeping disturbed areas as small as practicable to minimize exposed soil and the potential for erosion.
  - Locating waste and excess excavated materials outside of drainages to avoid sedimentation.
  - Installing silt fences, temporary earthen berms, temporary water bars, sediment traps, stone check dams, or other equivalent measures (including installing erosion-control measures around the perimeter of stockpiled fill material) prior to construction.
  - Conducting regular site inspections during the construction period to ensure that erosion-control measures were properly installed and are functioning effectively.
  - Storing, using, and disposing of chemicals, fuels, and other toxic materials in a proper manner.
- Delays for emergency response vehicles would be kept to a minimum by having the emergency responders notify the traffic monitors via park radio/frequency immediately when the vehicle is dispatched, thus allowing approximately 10 minutes to clear the road before the arrival of the emergency vehicle.

#### **Vegetation**

- Orange construction fencing would be used around large trees within construction limits to minimize the potential for inadvertent impact from heavy equipment during construction.
- No construction material would be located so as to affect vegetation outside of the work limits or protected vegetation within the work limits.
- Several measures would be used to protect sequoia trees adjacent to the road:
  - Mature trees close to the road would be fenced.
  - In order to protect giant sequoias, excavation or trenching activities in park-designated areas, as directed by the contracting Officer (CO), must be performed in a manner that allows precision control of equipment so that tree roots 4 inches in diameter or larger and tree boles are not damaged. Refined excavation and trenching activity near roots requires hand or manual removal of material in the vicinity of giant sequoia trees. Major roots (4 inches in diameter or larger) that are encountered during excavation and trenching shall be preserved and covered with wet burlap to prevent sun scald until the trench or excavation is backfilled. Smaller roots would be cut clean and straight with a saw.
  - In areas where giant sequoias are close to the road and pavement would normally be machine pulverized, the pavement would be removed in chunks using a combination of precision equipment and manual labor from the surface without disturbing the underlying soil and roots.
- No trees or other plants would be removed or injured without prior approval of the park CO. All tree trimming, pruning, and transplanting would be done under the direction of the park CO.
- In order to create an incentive for protecting vegetation, the contract would allow for assessment of monetary damages for causing certain types of damage to trees, roots, and other vegetation.
- Populations of small-flowered monkeyflower growing adjacent to the road corridor would be protected by limiting disturbance to the actual project footprint when working in the vicinity of the plant. Population locations would be mapped and provided to the contractors prior to the beginning of the project, and would be flagged on the ground by park staff.
- A revegetation plan would be developed for disturbances outside of the existing road pavement.

- Remedial actions would include installing erosion-control structures, reseeding, conserving and replacing topsoil and/or replanting the area, and controlling nonnative plant species with herbicide.
- Ground surface treatment would include grading to natural contours, conserving and replacing topsoil and, where necessary, hand-seeding, hydroseeding/hydromulching, or planting with native species. In some locations, topsoil placement and mulching with litter and duff would be the primary treatment. If insufficient litter and duff is salvaged from the project area, additional litter and duff would be gathered from adjacent areas to place as mulch over disturbed soil.
- Reclaimed areas would be monitored after construction to determine if reclamation efforts are successful or if additional remedial actions are necessary, as outlined in the revegetation plan developed by the NPS.
- Introduction of nonnative/noxious plant species would be minimized by implementing several BMPs, including:
  - Minimizing soil disturbance.
  - Pressure washing and/or steam cleaning all construction equipment to ensure that all equipment and machinery are cleaned and weed free before entering the parks. Construction equipment would be inspected by NPS or FHWA staff prior to entering the parks to ensure compliance with cleanliness requirements; inadequately cleaned equipment would be rejected.
  - Covering all haul trucks bringing fill materials (excluding asphalt) from outside the parks to prevent seed transport and dust deposition along the road corridor.
  - Limiting vehicle parking to existing roads, parking lots, or access routes.
  - Limiting disturbance to roadsides and culvert areas, including limiting equipment to the roadbed area – no machinery or equipment should access areas outside the construction limits.
  - Obtaining all fill, rock, or other earth materials from the project area, if possible. If not possible, obtaining weed-free earth materials from NPS-approved sources outside the parks.
  - Scraping away topsoil at the quarry, acquiring freshly exposed material with minimal seed deposition, and washing coarse materials (riprap) if the contractor cannot locate weed-free quarry sources.
  - No hay or straw bales would be used during revegetation or for temporary erosion control.
  - Initiating revegetation of disturbed sites immediately following construction activities.
  - Requiring that local staging areas outside the park are inspected for invasive plants and approved prior to use.
- To maximize vegetation restoration efforts after completion of construction activities, the following measures would be implemented:
  - Salvaging topsoil from construction areas for reuse during restoration of disturbed areas.
  - Incorporating native litter and duff layer in forested sites for replacement over salvaged topsoil.
  - Surveying for and treating invasive plants for three years prior to and one to three years after construction.

### **Wetlands**

- Impacts on wetlands would be avoided and minimized to the extent practicable. No wetland fill would occur without authorization from the Corps and appropriate permitting under the Clean Water Act.
- Appropriate permits (404 permit and 401 certification) would be acquired should there be any impacts on wetlands.

### **Water Quality**

- Sediment traps, erosion checks, and/or filters would be constructed above or below all culvert drains (if such drains are required) and in all other ditches before the water (runoff) leaves the project construction limits.
- At all cut and fill areas, erosion and sedimentation control would be implemented to minimize impacts on water quality.
- Surface restoration and revegetation of disturbed soils would be implemented to minimize long-term soil erosion.
- Water needed for construction and dust control would come from the existing developed water systems within the parks and would not be diverted from surface waters.

<b>Soils</b>
<ul style="list-style-type: none"> <li>Blasting would be allowed, in clearly identified areas, and an appropriate blasting plan would be established and strictly enforced.</li> <li>If blasting is needed, soils would be placed in suitable "pockets" within the disturbed area so that vegetation can be planted.</li> <li>Erosion and sediment control would be required (see the "General Measures" section).</li> <li>Topsoil would be removed from areas of construction and stored for later reclamation use. The topsoil would be redistributed as near the original location as possible and supplemented with scarification, mulching, seeding, and/or planting with native species.</li> </ul>
<b>Wildlife</b>
<ul style="list-style-type: none"> <li>Construction personnel would be informed of the occurrence and status of special status species and would be advised of the potential impacts on the species and penalties for taking or harming a special status species.</li> <li>To reduce noise disturbance and limit impacts on breeding California spotted owl and avian species, removal of suitable nesting trees would be conducted from August 15 to March 1, where feasible. If trees need to be removed outside of this time frame, they would be identified for removal and evaluated for nesting or roosting use prior to removal.</li> <li>Park biologists would check for the presence of active Pacific fisher denning prior to the removal of any trees of suitable size for fisher use.</li> <li>Feeding or approaching wildlife would be prohibited by construction personnel.</li> <li>Any wildlife collisions would be reported to park personnel.</li> <li>The park biologist or ranger would be notified if bears loiter in the area or if fisher sightings occur.</li> <li>Contractors must attend park-led training on food storage, garbage removal, and have on-site inspectors.</li> <li>A litter-control program would be implemented during construction to eliminate the accumulation of trash. All food would be stored in bear-proof containers. Food in vehicles would be stored in bear-proof containers. Spilled food would be cleaned up. Visitors in traffic delays would be instructed by NPS staff, when available, to not approach or feed wildlife.</li> <li>The clearing limits (construction limits) outside of the existing road prism would be clearly marked or flagged prior to construction. All construction activities, including staging areas, would be located within previously disturbed areas and fenced, if necessary.</li> <li>Trees would be removed from November 1 through March 1 if feasible, to avoid impacting actively roosting bats. If tree removal occurs at other times of the year, cut trees would be allowed to lie for 24 hours before being sectioned, chipped, or mulched to allow foliage roosting bats to arouse and leave.</li> </ul>
<b>Air Quality and Natural Soundscapes</b>
<ul style="list-style-type: none"> <li>Dust control would occur, as needed, on active work areas where dirt or fine particles are exposed using water from developed sources.</li> <li>Asphalt plants would be located outside Sequoia and Kings Canyon National Parks. Small quantities of asphalt may be stored short term only at the designated staging areas.</li> <li>Construction debris would be hauled from the parks to an appropriate disposal location.</li> <li>Visitors would be asked to not idle their vehicles while waiting for the traffic delay to be reopened.</li> <li>The following measures would be taken to limit noise and disturbance from vehicles and construction equipment: <ul style="list-style-type: none"> <li>Equipment would not be allowed to idle longer than necessary.</li> <li>All motor vehicles and equipment would have mufflers conforming to original manufacturer specifications that are in good working order and are in constant operation to prevent excessive or unusual noise, fumes, or smoke.</li> <li>Mufflers and sound attenuation devices (such as rubber strips or sheeting) would be installed and maintained on all equipment, if feasible. This includes truck tail and other gate dampeners (both opening and closing) for all dump trucks in the project area.</li> <li>Use of air horns within the park would be limited to emergencies only.</li> </ul> </li> </ul>

### Cultural Resources

- Known historic sites and isolated occurrences would be flagged and avoided during construction, and a NPS archeologist would be on-site during the entire ground disturbance near the site.
- All new stone masonry features or rehabilitation of an existing historic stone masonry feature would be in accordance with the *Secretary of the Interior Standards for the Treatment of Historic Properties* (1992a), Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings (Weeks and Grimmer 1995), and per the PA (NPS 2008).
- Contractor-selected, noncommercial areas outside of the project limits including, but not limited to, material sources, disposal sites, waste areas, haul roads, and staging areas, would not encroach upon sites listed or eligible for listing in the national register. Written proof satisfactory to the NPS and the California SHPO shall document, for compliance with section 106, that no historic properties would be affected because:
  - there are no historic resources present, or
  - there is no effect on historic properties present.
- Protection of Archeological Remains: In the event of the inadvertent discovery of historic properties such as archeological resources, suspected human remains, funerary objects, sacred sites, or objects of cultural patrimony, the park archeologist and superintendent would be immediately notified. Work in the affected area(s) would stop immediately until the historic properties are reviewed by the park. As appropriate, consultation with the California SHPO and any affected American Indian tribes would also take place regarding disposition of affected artifacts and remains. During consultation, reasonable measures would be taken to protect the discovery site, including any appropriate stabilization or covering; to ensure the confidentiality of the discovery site; and to restrict access to the discovery site.
- Should unknown archeological resources be uncovered during construction, work would be halted in the discovery area, the site would be secured, and the appropriate Sequoia and Kings Canyon National Parks staff would consult with the California SHPO and affiliated tribes, if necessary, according to 36 CFR 800.13 and, as appropriate, provisions of the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA).
- In compliance with the NAGPRA, the NPS would also notify and consult concerned American Indian tribal representatives for the proper treatment of human remains, funerary, and sacred objects should these be discovered during project construction.
- Archeological specimens found within the construction area would be removed only by the NPS or their designated representatives.

### Visitor Use and Experience

- A detailed traffic control plan would be implemented to minimize impacts on visitors and complete construction work as quickly and efficiently as feasible.
- Generals Highway and Wolverton Road would remain open throughout construction, subject to temporary delays.
- Access to trailhead parking lots, Crystal Cave, the Giant Forest, Giant Forest Museum, and through traffic to the Lodgepole visitor center and Wuksachi Village would remain open during construction, subject to traffic delays.
- The park would provide information (e.g., brochures, signs, telecommunication, and interpretative programs) to inform visitors, concessioners, the U.S. Forest Service, and employees of alternative routes and the project schedule.
- Visitors would be notified when road closures or traffic delays would occur and information would be posted in neighboring communities, on the park website, at visitor centers, and at entrance stations.
- At the traffic delay locations and if conditions warrant, a NPS interpreter would be present to answer questions from visitors and advise them of procedures and construction expectations.

Park Operations
<ul style="list-style-type: none"><li>As necessary, future park utility conduits may be incorporated into the project to reduce the damage and removal of any new road surface.</li><li>Once the winter season halts construction, the turnouts should be cleared of all construction storage equipment and materials.</li><li>Delays for emergency response vehicles would be kept to a minimum by having the emergency responders notify the traffic monitors via park radio/frequency immediately when the vehicle is dispatched, thus allowing approximately 10 minutes to clear the road before the arrival of the emergency vehicle.</li></ul>
Health and Safety
<ul style="list-style-type: none"><li>Traffic monitors would have park radios with the appropriate park frequency, appropriate safety clothing, and reflective signs.</li><li>Visitors and NPS staff would not be allowed to stop/park in a pullout or on the road in the construction zone. Emergency vehicles would be allowed on an as-needed basis.</li></ul>

## ALTERNATIVES CONSIDERED, BUT ELIMINATED FROM DETAILED ANALYSIS

### Resurface Existing Road

Minor improvements to the road surface, such as milling and overlay or chip and seal, would not address the underlying structural, geotechnical, and drainage issues contributing to the road problems or the widening necessary from Deer Ridge to Eleven Range to improve safety. Maintenance costs would increase in the long term if structural and drainage deficiencies are not corrected. Resurface-only options were eliminated because they would not meet the project purpose and need or current safety standards.

### Divert Road around the Four Guardsmen Sequoias

One alternative that was considered to protect the giant sequoias known as the Four Guardsmen, was to divert the road around the sequoias. The abandoned roadbed could then potentially be used as an interpretive stop for visitors. Maintaining the current road configuration through the Four Guardsmen has several issues:

- (1) The current road configuration leads to occasional damage to the sequoias when they are struck by snowplows or other vehicles, leaving some open wounds.
- (2) The sequoias will continue to grow in diameter, making the passage between them narrower and narrower over time. While this is not a concern for the immediate future (such as the next 5 or 10 years), it could potentially become an issue in the long term (such as 50 or more years).

Relocating the road away from the Four Guardsmen would result in impacts on previously undisturbed forest land. Because it may be several decades before access through the site is an issue, the park has decided to review possible options at the Four Guardsmen in the future rather than consider realignments in this area as part of the proposed action. The preferred alternative would address the immediate needs of repairing a deteriorating road to meet near-term safety needs. An in-depth evaluation of vehicle passage for future use would

be conducted at a later date. For the above reasons, this alternative was dismissed from detailed evaluation in this EA.

## **ENVIRONMENTALLY PREFERABLE ALTERNATIVE**

According to the CEQ regulations implementing NEPA (43 CFR 46.30), the environmentally preferable alternative is the alternative “that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources. The environmentally preferable alternative is identified upon consideration and weighing by the Responsible Official of long-term environmental impacts against short-term impacts in evaluating what is the best protection of these resources. In some situations, such as when different alternatives impact different resources to different degrees, there may be more than one environmentally preferable alternative.”

The preferred alternative, rehabilitation and reconstruction of Generals Highway, is the environmentally preferable alternative for several reasons: 1) it would best preserve the natural and cultural features along the road because it implements structural improvements that would provide long-term protection of environmental and cultural resources adjacent to the road; 2) drainage improvements would reduce the potential for erosion and impacts on water quality and cultural resources; 3) it would support sustainable design concepts and energy efficiency by providing for the reuse of existing asphalt. For these reasons, the preferred alternative causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources, thereby making it the environmentally preferable alternative.

By contrast, the no action alternative is not the environmentally preferable alternative because although there would be no construction or ground-disturbing activities that would damage previously undisturbed elements of the biological and physical environment 1) it would not protect park natural and cultural resources, as the road would continue to deteriorate without rehabilitation; 2) inadequate drainage could lead to erosion and impacts on water quality, natural resources, and cultural resources; and 3) continued high maintenance requirements would not be energy efficient.

## **ALTERNATIVES COMPARISON TABLE**

A comparison of the alternatives and the degree to which each alternative fulfills the needs and objectives of the proposed project is summarized in Table 3.

**TABLE 3. ALTERNATIVES COMPARISON**

No Action Alternative	Preferred Alternative Rehabilitate Generals Highway
Under the no action alternative, the NPS would not implement road rehabilitation or improvements. Routine road maintenance would continue, but the road pavement and structural integrity would continue to deteriorate. There would be no improvements to surface pavement, subgrade, drainage, walls, parking, pullouts, and no widening.	Under the preferred alternative, the NPS would implement the rehabilitation, repairs, and improvements necessary to restore the condition of the road. The proposed improvements would repair structurally deficient areas of the road, correct drainage issues, widen select portions, construct or rehabilitate retaining walls, add new pullouts, repave the road and parking areas, replace signs, and other improvements.
Meets Objectives?	
The no action alternative would not fulfill project objectives. The efficiency of park operations would not be improved because deteriorating road conditions and structural damage would not be addressed. Road maintenance requirements and costs would increase if needed road repairs are not implemented. Visitor enjoyment and safety objectives would not be addressed because problems associated with the condition of the road surface, drainage, narrow roadway, and other structural repairs would not be made. Safety concerns and the risk of accidents would not be improved. Park natural and cultural resources and the scenic quality of the road would be compromised by deteriorating road conditions and inadequate drainage. Damage to historic cultural features is possible with continued deterioration of the road.	The preferred alternative fulfills the project objectives by implementing needed road repairs and improvements. The efficiency and cost of park operations would improve from better road conditions and reduced maintenance requirements. Visitor enjoyment and safety would benefit from measures to improve the condition of the road, widen narrow sections, add new pullouts, improve drainage, repave the entire road, and other rehabilitation measures. Road and facility infrastructure improvements would make travel by vehicles easier and safer and would reduce the risk of accidents. Park cultural resources, including the highway's eligibility for the national register, would be protected by proposed road rehabilitation and structural repairs that reduce the potential for deterioration of historic features. Road repairs and improvements would be implemented in a manner to minimize visitor impacts during construction and provide long-term access and enjoyment of the parks. The scenic character of the road and adjacent natural resources would be protected. The preferred alternative would meet project objectives.

## IMPACT SUMMARY

A summary of potential environmental effects for the alternatives is presented in Table 4.

**TABLE 4. IMPACT SUMMARY TABLE**

Impact Topic	No Action Alternative	Preferred Alternative Rehabilitate of Generals Highway
Vegetation and Special Status Plant Species	The no action alternative would have local long-term negligible to minor adverse effects on vegetation and special status plant species adjacent to the road from erosion, drainage problems, and periodic maintenance.	The preferred alternative would have local short-term minor adverse effects on vegetation from road rehabilitation disturbances that are estimated to temporarily affect about 4.59 acres and a long-term minor adverse effect from the loss of up to 0.25 acre of vegetation from paving. Approximately 30 small to medium-sized trees would be removed, including big-leaf maples, which are at the edge of their range in the parks. In addition, three giant sequoias from

Impact Topic	No Action Alternative	Preferred Alternative Rehabilitate of Generals Highway
<b>Vegetation and Special Status Plant Species (continued)</b>		16 to 22 inches in diameter would be removed for culvert replacement. A loss of individuals of small-flowered monkey flower, an annual species with a limited distribution, from roadside construction disturbance would occur, but no adverse impact on this species population is expected. Weed establishment in areas of disturbed soil also is possible, but would be minimized with weed-control practices. Improvements to drainage and reductions in erosion would have a long-term beneficial effect on vegetation and special status plant species.
<b>Water Resources</b>	The no action alternative would result in local long-term minor adverse effects on water resources from ongoing drainage and erosion problems associated with the deteriorating condition of the road and inadequate drainage.	Proposed road rehabilitation work and drainage improvements would have local short-term minor adverse effects on water resources from surface disturbances that may generate erosion and increased sediment runoff. Proposed erosion-control measures to minimize erosion during construction and revegetation of disturbed areas would minimize impacts. Road rehabilitation work would result in a long-term beneficial impact on water resources by improving conveyance of drainage structures and improving or restoring hydrologic functions. An increase in impervious surface area of 0.25 acre would have a negligible adverse effect on runoff and surface flows.
<b>Historic Structures</b>	Impacts on historic structures are anticipated to be local, long-term, and negligible for typical maintenance work with implementation of stipulations provided for in the existing PA. However, should there be a failure to a structural feature of the highway, impacts on historic structures would be local, short- to long-term, minor to moderate, and adverse.	The proposed highway rehabilitation is designed to repair and replace deteriorating structural features that contribute to the highway's eligibility for listing in the national register. However, a long-term moderate adverse effect on historic structures would occur from removal of the top course of stones from a historic crenulated stone wall for construction of a cantilevered viaduct and use of the stones in repairing other crenulated walls. Implementation of the provisions provided for in the existing PA would be used to mitigate identified adverse effects.
<b>Cultural Landscape</b>	Impacts on the cultural landscape are anticipated to be local, long-term, and negligible for typical maintenance work with implementation of the provisions provided for in the existing PA. However, should there be a failure to a structural feature of the road, adverse impacts on the cultural landscape would be local, short- to long-term, and minor to moderate.	The proposed road rehabilitation would have a local short-term negligible impact on the cultural landscape from improvements designed to repair and replace deteriorating structural features that contribute to the integrity of the highway. No adverse impact on the cultural landscape would occur with implementation of the provisions provided for in the existing PA.
<b>Visitor Use and Experience</b>	The no action alternative would have local long-term minor to moderate adverse effects on visitor use and experience from ongoing deterioration of the road and structural	Traffic delays would inconvenience visitors traveling along Generals Highway and Wolverton Road during construction. In response to construction activities, some

Impact Topic	No Action Alternative	Preferred Alternative Rehabilitate of Generals Highway
<b>Visitor Use and Experience (continued)</b>	features that contribute to the quality of the visitor experience, and that provide access to recreation resources. Although the road would remain open to visitor access, as road conditions deteriorate, periodic maintenance projects or road failure would require traffic delays or road closure at random times and locations, which would inconvenience visitors.	visitors may avoid the park, visit other portions of the park, or choose alternate routes for regional travel connections. The parks would inform visitors in advance of construction via a number of sources so visitors can best plan their schedule and activities and minimize impacts. The effect on visitor experience and recreation resources would be local and parkwide, short-term, minor to moderate, and adverse during construction. The preferred alternative would provide local long-term beneficial effects on the quality of the visitor experience following construction by improving the quality and condition of the highway.
<b>Socioeconomics</b>	The no action alternative would have regional long-term minor adverse effects on the economy from increased road maintenance costs and potential adverse effects on visitor attendance and regional businesses as the road deteriorates.	The preferred alternative would have regional short-term beneficial effects on the economy from construction-related spending and employment. Traffic delays would deter some visitors from coming to the parks, resulting in regional short-term minor adverse economic impacts. While some park visitors may be inconvenienced during construction, no substantial change in visitor attendance is anticipated. All of the park campgrounds, concessioners, and attractions along Generals Highway and Wolverton Road would remain open and accessible. Long-term socioeconomic effects would be beneficial to regional businesses from improvements to the quality of the visitor experience along the highway.
<b>Public Health and Safety</b>	The no action alternative would result in local long-term minor to moderate adverse effects on public health and safety by not addressing safety issues and needed road rehabilitation and repairs. The potential for accidents would be similar to existing conditions and may increase as the road continues to deteriorate and the need for maintenance increases.	Proposed rehabilitation and improvements would address public health and safety concerns associated with Generals Highway and Wolverton Road. Improvements to road pavement, visibility, sight distance, road widening, and drainage would improve safety and driving conditions. The preferred alternative would result in local long-term beneficial effects on public health and safety from improvements to the structural features of the road and safety measures that reduce the potential for accidents.

Impact Topic	No Action Alternative	Preferred Alternative Rehabilitate of Generals Highway
<b>Park Operations</b>	<p>The no action alternative would result in local long-term minor to moderate adverse effects on park operations by not addressing safety issues and needed road repairs. Maintenance requirements and costs would increase as the road and associated infrastructure continues to deteriorate.</p>	<p>The proposed road rehabilitation and improvements would address road maintenance concerns in the project area. Road widening, structural repairs, new pavement, drainage work, and other repairs would improve driving conditions and would reduce the risk of future road failure. Construction work and associated traffic delays would cause a disruption in normal traffic patterns, parking, and visitor activities in the parks; and would place a greater demand on park staff. Completion of the preferred alternative would result in local and parkwide short-term moderate adverse impacts during construction and parkwide long-term beneficial effects on park operations by improving the road surface and decreasing maintenance requirements.</p>

# AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

## INTRODUCTION

This chapter provides a description of the resources potentially impacted by the alternatives and the likely environmental consequences. The chapter is organized by impact topics that were derived from internal park and external public scoping. Impacts are evaluated based on context, duration, intensity, and whether they are direct, indirect, or cumulative. More detailed information on resources in the park may be found in the GMP (NPS 2007).

## GENERAL METHODS

This chapter contains the environmental impacts, including direct and indirect effects, and their significance for each alternative. The analysis is based on the assumption that the mitigation measures identified in the “Resource Protection Measures” section in the “Alternatives” chapter would be implemented for the preferred alternative. Overall, the NPS impact analyses and conclusions were based on the review of existing literature and park studies, information provided by experts within the park and other agencies, professional judgment and park staff insights, and public input.

The following terms are used in the discussion of environmental consequences to assess the impact intensity threshold and the nature of impacts associated with each alternative.

*Type:* Impacts can be beneficial or adverse.

*Context:* Context is the setting within which an impact would occur, such as local (in the project area near the road), parkwide (in the park outside of the project area), or regional (in Tulare County, California).

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

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

*Direct and Indirect Impacts:* Effects can be direct, indirect, or cumulative. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later or farther away, but are still reasonably foreseeable.

*Threshold for Impact Analysis:* The duration and intensity of effects vary by resource. Therefore, the definitions for each impact topic are described separately. These definitions

were formulated through the review of existing laws, policies, and guidelines; and with assistance from park staff, regional NPS specialists, and Washington office NPS specialists. Impact intensity thresholds for negligible, minor, moderate, and major adverse effects are defined in a table for each resource topic.

## **CUMULATIVE EFFECTS**

Cumulative effects are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time. The CEQ regulations that implement NEPA require an assessment of cumulative effects in the decision-making process for federal projects.

### **Methods for Assessing Cumulative Effects**

Cumulative effects were determined by combining the impacts of the preferred and no action alternatives with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects in the parks or the surrounding region that might contribute to cumulative effects. The geographic scope of the analysis includes actions along the Generals Highway corridor, as well as other actions in Sequoia and Kings Canyon National Parks where overlapping resource impacts are possible. The temporal scope includes projects within a range of approximately 10 years.

Past, present, and reasonably foreseeable future actions were then assessed in conjunction with the impacts of the alternatives to determine if they would have any added adverse or beneficial effects on a particular natural or cultural resource, park operation, or visitor use. The impact of reasonably foreseeable actions varies for each of the resources. Cumulative effects are considered for each alternative and are presented in the environmental consequences discussion for each impact topic.

### **Past Actions**

Past actions include activities and events that have influenced and affected the current condition of the environment in the project area. Identified past actions include road maintenance and reconstruction, and removal of facilities and structures from the Giant Forest area.

#### ***Road Maintenance and Reconstruction***

Reconstruction of the historic Generals Highway is a long-term project that has been occurring in phases since the 1990s, beginning with reconstruction at the southern park boundary near the community of Three Rivers and continuing north into the park. Work to

date has been completed from Ash Mountain to Amphitheater Point. In 2010, rehabilitation was completed on the section of Generals Highway from the Wolverton Road intersection to the Little Baldy pullout. In addition, the park has conducted periodic maintenance and repairs to Generals Highway as needed, including repaving the Crescent Meadow/Moro Rock Road. A parkwide chip and seal of 95% of park roads and parking lots will be completed prior to completion of the proposed project.

### ***Removal of Facilities and Structures from the Giant Forest Area***

The 1980 Development Concept Plan (NPS 1980) and the 1996 Giant Forest Interim Management Plan (NPS 1996) called for removing concession and NPS facilities from the Giant Forest and relocating them to Wuksachi so that the giant sequoia forest could be restored to more natural conditions. The demolition was phased over five major projects, spanning the years from 1997 to 2005. From 1997 to 1999, hundreds of structures in two historic districts were removed in accordance with an agreement with the California SHPO. The project included the 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 Education Center, which is being reused as a community building and education center. Other historic buildings (ranger residence and restrooms) have been rehabilitated. Museum exhibits, waysides, and trail centers have been built. Limited parking is available within the Giant Forest, while other visitors arrive to the area via the shuttle system.

### **Current and Future Actions**

The park is planning several actions in or near the Generals Highway corridor in the future that could contribute to the cumulative effects from road rehabilitation. These actions include road maintenance and reconstruction, and rehabilitation of a water distribution system.

#### ***Road Maintenance and Reconstruction***

Road reconstruction is currently occurring on the section of Generals Highway from Amphitheater Point to Deer Ridge and is anticipated to be completed in 2012. The park began a multiyear project in 2010 at the Halstead Meadow section of Generals Highway where work is needed to stabilize the road and restore the meadow from substantial erosion that occurred at culvert outlets.

Future roadwork includes rehabilitating and resurfacing the remaining 17.4 miles of Generals Highway from Little Baldy to 1 mile south of the Grant Grove Road.

#### ***Rehabilitation of a Water Distribution System***

The park is currently evaluating measures to address deficiencies in the existing water distribution system that serves Giant Forest, Wolverton, Lodgepole, Wuksachi, and the Red

Fir maintenance area. Alternative actions could include a new well and replacing water lines, vaults, valves, and other water distribution infrastructure.

## **VEGETATION AND SPECIAL STATUS PLANT SPECIES**

### **Affected Environment**

The parks contain a variety of native plant communities with more than 1,500 vascular plant taxa. The diversity of plant species in the parks is the result of a wide range of habitat types from xeric low-elevation oak woodlands to high-elevation alpine communities. Variations in topography and physical influences such as aspect, slope position, soils, elevation, precipitation, and past glacial action further contribute to the diversity of plant communities. The project area ranges from approximately 4,700 feet in elevation where foothills chaparral are dominated by black oak (*Quercus kelloggii* Newb.) to 7,200 feet in elevation where Sierran mixed conifer forests consist of red fir (*Abies magnifica*), white fir (*Abies concolor*), various pines (*Pinus* spp.), montane chaparral, and montane meadows. Much of this type of forest has been preserved in the parks and as a result, the parks contain the largest remaining stands of old growth forest in the southern Sierra Nevada mountains. Approximately 220 species of vascular plants were identified during field surveys of the project area (NPS 2011c).

Numerous large trees occur near the highway in the project area, including giant sequoias (*Sequoiadendron giganteum*). Although not a federally listed, state-listed, or rare species, the giant sequoia is a special status species in the park and a tree of national and historical significance. Sequoias grow in geographically limited areas, or groves, in the Sierra Nevada mountains. About 37 of the known 75 sequoia groves, including about a third of all naturally occurring sequoias, are found in the parks. Big-leaf maples (*Acer macrophyllum*) occur along the highway in the Phase 1 southern portion of the project area proposed for reconstruction work. Although not a listed species, big-leaf maple approaches the southern end of its Sierran range in Sequoia National Park.

Special status plant species include federally listed threatened, endangered, and species of concern; state-listed threatened, endangered, and rare species, and species monitored by the parks. No federally listed threatened or endangered plant species are known to occur in the parks. One state-listed rare plant species, Tompkins sedge (*Carex tompkinsii*), is known to occur in the parks. Tompkins sedge reaches the southern edge of its distribution at the south fork of the Kings River. Neither Tompkins sedge nor other federally threatened or endangered species or state-listed rare species were found during field surveys of the project area (NPS 2011c). Plant surveys did locate 14 populations of small-flowered monkey flower (*Mimulus inconspicuous*) along the highway corridor. This California endemic annual is listed by the California Native Plant Society as having limited distribution, but is considered “not very endangered” (CNPS 2011).

One of the primary vegetation stressors in the parks is the introduction of invasive nonnative plant species. A plant survey in the project area identified 11 species of nonnative plants (plants that are not native to the park), none of which are listed as California state noxious weeds. Of the nonnative species in the project area, the California Invasive Plant

Council (2006) rates cheat grass (*Bromus tectorum*) as High. An assessment of nonnative species in the parks (Gerlach et al. 2003) found the following species present in the project area as those that could cause harm to native plant communities: yellow salsify (*Tragopogon dubius*), cheat grass, orchard grass (*Dactylis glomerata*), Kentucky bluegrass (*Poa pratensis*), and bulbous bluegrass (*Poa bulbosa*). Most of these species are rare or patchy in the project area, with the exception of cheat grass, which is more widespread.

The parks are notable in that the plant communities in the mid to upper elevations are largely free of invasive plants, including Phase 2 of this project. Of particular note is the absence in the parks of the highly invasive yellow star thistle (*Centaurea solstitialis*), which is abundant in California. Yellow star thistle has been introduced, detected, and eradicated several times in the last two decades, including 12 plants that were introduced during Phase 2 of the Generals Highway reconstruction project. Preventing further introductions and detecting and eradicating any new introductions early, before plants reproduce and spread, is a high park priority. The parks currently have an invasive plant species control team that actively monitors and controls invasive plants.

### **Impact Intensity Threshold**

Predictions about impacts were based on the expected disturbance to vegetation communities and professional judgment and experience with previous projects. The thresholds of change for the intensity of an impact on vegetation and special status plant species are defined in Table 5.

**TABLE 5. VEGETATION AND SPECIAL STATUS PLANT SPECIES IMPACT AND INTENSITY THRESHOLDS**

Impact Intensity	Intensity Description
Negligible	The impacts on vegetation (individuals or communities) would not be measurable. The abundance or distribution of individuals would not be affected or would be slightly affected. The effects would be on a small scale and no special status plants would be affected. Ecological processes and biological productivity would not be affected. No nonnative plants would be spread from within the park or introduced.
Minor	The action would not necessarily decrease or increase the project area's overall biological productivity. The action would affect the abundance or distribution of individuals in a localized area, but would not affect the viability of local or regional populations or communities. Mitigation to offset adverse effects, including special measures to avoid affecting special status plants, would be required and would be effective. Movement/spread of nonnative plants already abundant in the parks. Mitigation may be needed to offset adverse effects, would be relatively simple to implement, and would likely be successful.
Moderate	The action would result in effects on some individual native plants, and also would affect a sizeable segment of the species' population over a relatively large area. Permanent impacts would occur to native vegetation, but in a relatively small area. Some special status plants also would be affected. Introduction of new nonnative species into the parks that are not detected and are allowed to spread, or large-scale spread of previously limited populations into the entire project area, such that it cannot be feasibly controlled. Mitigation measures would be necessary to offset adverse effects and would likely be successful.
Major	The action would have considerable effects on native plant populations, including special status species, and would affect a relatively large area within and outside the park. Introduction of high abundances of new nonnative species into the parks that cannot be feasibly controlled (as through large amounts of contaminated fill used on the surface). Extensive mitigation measures to offset the adverse effects would be required; the success of the mitigation measures would not be guaranteed.

Short-term impact—following project completion, recovery takes less than one year.

Long-term impact—following project completion, recovery takes more than one year.

## **Environmental Consequences**

### **No Action Alternative**

**Direct and Indirect Impacts.** There would be no project-related ground disturbance with the potential to adversely impact vegetation and special status plant species. Vegetation adjacent to the existing road could be affected by erosion and sediment deposition. Periodic maintenance activities to repair road damage could result in vegetation disturbance or introduction of invasive plant species. These potential impacts on vegetation and special status plant species would occur periodically and would be local, short-term, negligible to minor, and adverse.

**Cumulative Effects.** Past actions, such as road maintenance and reconstruction, have resulted in vegetation clearing and the introduction of invasive nonnative plants. Relocating facilities from the Giant Forest area to Wuksachi from 1997 to 2005 resulted in temporary disturbances to vegetation, but also restored the Giant Forest area to more natural conditions. Ongoing work on the Halstead Meadow section of Generals Highway would restore the meadow in an area where erosion has occurred at culvert outlets, resulting in a benefit to vegetation. Future road maintenance and reconstruction also would result in temporary disturbances to vegetation and the potential for weed introduction. Future rehabilitation of the water distribution system for Giant Forest, Wolverton, Lodgepole, Wuksachi, and the Red Fir maintenance area would result in temporary disturbances to vegetation. The combined effects of past, present, and reasonably foreseeable actions on vegetation and special status plant species would be local, long-term, minor, and adverse. The overall cumulative effects on vegetation and special status plant species from the no action alternative in combination with past, present, and reasonably foreseeable future actions would be local, long-term, minor, and adverse. Impacts from the no action alternative would be a relatively small contribution to the overall cumulative effect.

**Conclusion.** The no action alternative would have local long-term negligible to minor adverse effects on vegetation and special status plant species adjacent to the road from erosion, drainage problems, and periodic maintenance. Cumulative effects would be local, long-term, minor, and adverse.

### ***Preferred Alternative—Rehabilitate Highway***

**Direct and Indirect Impacts.** Road rehabilitation would occur primarily within the existing disturbed road prism, but small areas of tree and vegetation removal would be necessary to maintain the standard road width, allow minor realignments, road widening, and to better define turnouts. Limited roadside vegetation clearing would be conducted to improve sight distance and safety. For Phase 1, vegetation would be cleared 2 feet beyond cut and fill limits on each side of the road. For Phase 2, a vegetation clearing width of 2 feet from the pavement edge would be used at selected wall locations and a 1-foot clearing zone would be used in curb locations. No clear zone vegetation removal would be conducted where curbs or walls are not present. Drainage and culvert work, embankment stabilization, and other actions also would result in disturbances to vegetation. The total disturbance outside of the pavement edge would be about 4.8 acres, including 1.48 acres for Phase 1 and 3.36 acres for Phase 2. This includes unvegetated areas of the road shoulder, as well as adjacent

roadside vegetation. The majority of the disturbed area (4.59 acres) would be revegetated or stabilized following construction, while about 0.25 acre of new pavement would be added for both phases.

Small-flowered monkey flower, a California Native Plant Society listed species may be affected from surface disturbances at several locations in the southern portion of the project area. This species is a fairly common annual that is relatively tolerant of disturbance and is often found immediately adjacent to the road and in drainage ditches. Monkeyflower would be protected by limiting disturbance to the actual project footprint when working in their vicinity. Population locations would be mapped and provided to the contractors prior to the beginning of the project, and would be flagged on the ground by park staff. A local short-term minor adverse effect on individual plants may occur, but it would not adversely affect the species population. No other special status plant species would be affected by the proposed rehabilitation and reconstruction.

Approximately 30 trees adjacent to the road would need to be removed to accommodate road widening in Phase 1. Estimated trees to be removed include 19 big-leaf maples, 4 canyon live oaks, 3 incense cedars, 3 black oaks, and 1 California bay leaf laurel. Three sequoia trees (16 to 22 inches in diameter) would be removed to install a new culvert near Round Meadow in Phase 2. These trees are believed to be less than 50 years old and are relatively young and small compared to other giant sequoias in the park. Replacement sequoias would be planted following construction. Tree stems close to the road can be wounded inadvertently by equipment. To minimize this potential impact, orange construction fencing would be used around large trees located from 2 to 5 feet from the road edge to minimize the potential for inadvertent impact from heavy equipment during construction. In addition, tree roots can be damaged by pulverizing the surface asphalt as part of road rehabilitation prior to repaving. To minimize impacts on giant sequoia tree roots under the road, asphalt would be removed from the surface without disturbing soil or roots, instead of by pulverizing. Park staff would identify specific locations where machine pulverizing would be restricted.

Drainage improvements in the Giant Forest Museum accessible parking lot have the potential to reduce groundwater discharge into the adjacent giant sequoia forest. Sequoias are supported by groundwater and thrive where groundwater is abundant. Drainage improvements would be designed to correct the icing conditions in the parking lot without significantly interrupting natural groundwater dynamics. Parking lot drainage work would affect a small area, so impacts on sequoia trees from the proposed work is expected to have a local long-term minor adverse effect on sequoia trees near the parking lot.

All temporarily disturbed areas would be revegetated with native plant species following construction. Duff and litter from adjacent areas would be spread on disturbed road shoulders. To minimize impacts on native vegetation and special status species and to avoid the introduction of invasive species, the area of disturbance and tree removal would be limited to the minimum amount necessary to complete construction. The infestation and spread of invasive nonnative plants is possible from construction activities. Weeds frequently invade disturbed ground where they are easily established and have a competitive advantage relative to native species under environmental conditions created by human activities if left unchecked. A number of BMPs, as listed in Table 2, would be implemented to protect trees and vegetation, minimize the potential for weed establishment, and ensure restoration of

disturbed areas. Revegetation of disturbed areas is expected to take more than one year because of the short growing season.

Overall, the preferred alternative would have local short-term minor adverse effects from the temporary construction disturbance of up to about 4.59 acres of vegetation and a long-term adverse impact from the loss of up to 0.25 acre of vegetation from additional pavement. Rehabilitation work that reduces erosion and promotes soil stability would have long-term beneficial effects on vegetation and special status plant species.

**Cumulative Effects.** Past actions, such as road maintenance and reconstruction, have resulted in vegetation clearing and the introduction of invasive nonnative plants. Relocating facilities from the Giant Forest area to Wuksachi from 1997 to 2005 resulted in temporary disturbances to vegetation, but also restored the Giant Forest area to more natural conditions. Ongoing work on the Halstead Meadow section of Generals Highway would restore the meadow in an area where erosion has occurred at culvert outlets, resulting in a benefit to vegetation. Future road maintenance and reconstruction also would result in temporary disturbances to vegetation and the potential for weed introduction. Future rehabilitation of the water distribution system for Giant Forest, Wolverton, Lodgepole, Wuksachi, and the Red Fir maintenance area would result in temporary disturbances to vegetation. The combined effects of past, present, and reasonably foreseeable actions on vegetation and special status plant species would be local, long-term, minor, and adverse. The overall cumulative effects on vegetation and special status plant species from the preferred alternative in combination with past, present, and reasonably foreseeable future actions would be local, long-term, minor, and adverse. The new vegetation disturbance from the preferred alternative would be a relatively minor contribution to the overall cumulative effects.

**Conclusion.** The preferred alternative would have local short-term minor adverse effects on vegetation from road rehabilitation disturbances that are estimated to temporarily affect about 4.59 acres and a long-term minor adverse effect from the loss of up to 0.25 acre of vegetation from paving. Approximately 30 small to medium-sized trees would be removed, including big-leaf maples, which are at the edge of their range in the parks. In addition, three giant sequoias, 16 to 22 inches in diameter, would be removed for culvert replacement. A loss of individuals of small-flowered monkey flower, an annual species with a limited distribution, from roadside construction disturbance would occur, but no adverse impact on this species population is expected. Weed establishment in areas of disturbed soil also is possible, but would be minimized with weed-control practices. Improvements to drainage and reductions in erosion would have a long-term beneficial effect on vegetation and special status plant species. Cumulative effects would be local, long-term, minor, and adverse.

## **WATER RESOURCES**

### **Affected Environment**

Four large river systems occur within the parks: the north fork of the Kern River, the five forks of the Kaweah River, the south and middle forks of the Kings River, and the south fork of the San Joaquin River. The project area is in the Marble Fork Kaweah River watershed.

The highway crosses several streams, including Little Deer Creek, Sherman Creek, and several smaller unnamed drainages between Deer Ridge and the northern end of the project area at Wolverton. These streams are tributaries to the Marble Fork of the Kaweah River. Surface water flow in park streams follows an annual cycle, with the lowest flows in August and the highest flows in May or June. Spring flows result primarily from snowmelt, changing to primarily groundwater by late August. Surface hydrology and drainage patterns have been affected by existing roads and development that have required bridge or culverts to convey streams under roads. Roads, parking areas, and pullouts have also increased the amount of impervious surface, which influences the timing and volume of runoff.

Surface waters in the parks are very pure and clear, containing low concentrations of dissolved solids, with low turbidity. Park surface waters are generally well oxygenated and cold. Concentrations of nutrients such as phosphate and nitrate are very low and ammonia is generally undetectable. Surface waters are typically acidic, but can range to slightly alkaline. Water quality in the parks is influenced by atmospheric deposition of pollutants. Water quality also is influenced by vehicle deposition of oils, chemicals, and rubber on roads and parking areas; and the subsequent runoff that can reach streams during runoff. Periodic maintenance or ground disturbance as part of park operations that expose soil material increases the potential for erosion and sedimentation in streams.

### **Impact Intensity Threshold**

Available information on water resources in the project area was compiled from previous studies and assessments for the proposed project. Potential impacts from the alternatives are based on professional judgment, experience with similar actions, and project disturbance. The thresholds of change for the intensity of an impact on water resources are defined in Table 6.

**TABLE 6. WATER RESOURCES IMPACT AND INTENSITY THRESHOLDS**

<b>Impact Intensity</b>	<b>Intensity Description</b>
Negligible	The action would have no measurable or detectable effects on water quality or the timing or intensity of streamflows.
Minor	The action would have measurable effects on water quality or the timing or intensity of streamflows. Water quality effects could include increased or decreased loads of sediment, debris, chemical or toxic substances, or pathogenic organisms.
Moderate	The action would have clearly detectable effects on water quality or the timing or intensity of flows, and potentially would affect organisms or natural ecological processes. In addition, an impact would be visible to visitors.
Major	The action would have substantial effects on water quality or the timing or intensity of flows, and potentially would affect organisms or natural ecological processes. In addition, an impact would be easily visible to visitors.

Short-term impact—following project completion, recovery takes less than one year.

Long-term impact—following project completion, recovery takes more than one year.

### **Environmental Consequences**

#### **No Action Alternative**

**Direct and Indirect Impacts.** The no action alternative would not result in any new disturbances that would impact water resources. Road drainage problems would persist,

which would lead to erosion or possible road damage that would transport sediment into adjacent drainages. The effects of the no action alternative on water resources would be local, long-term, minor, and adverse.

**Cumulative Effects.** Past and ongoing actions, such as road construction and maintenance activities, have resulted in short-term adverse effects on water quality during construction. Ongoing work on the Halstead Meadow section of Generals Highway would restore the meadow in an area where erosion has occurred at culvert outlets, resulting in a benefit to water quality. Future road maintenance and reconstruction activities also would potentially cause short-term adverse effects on water quality, but would have long-term beneficial effects. Future rehabilitation of the water distribution system for Giant Forest, Wolverton, Lodgepole, Wuksachi, and the Red Fir maintenance area potentially would result in temporary adverse effects on water quality from construction disturbance. The combined effects of past, present, and reasonably foreseeable actions on water resources would be local, short-term, minor, and adverse. The overall cumulative effects on water resources from the no action alternative in combination with past, present, and reasonably foreseeable future actions would be parkwide beneficial effects over the long-term, with a relatively minor adverse contribution from the no action alternative.

**Conclusion.** The no action alternative would result in local long-term minor adverse effects on water resources from ongoing drainage and erosion problems associated with the deteriorating condition of the road and inadequate drainage. Cumulative effects would be local, long-term, minor, and adverse.

#### ***Preferred Alternative—Rehabilitate Highway***

**Direct and Indirect Impacts.** The proposed road rehabilitation and reconstruction would temporarily expose soil and increase the potential for erosion and stream sedimentation until vegetation is established, paving is completed, drainage work is installed, and other stabilization work is finished. Temporary adverse effects on water quality are possible during construction. Proposed drainage improvements such as culvert replacement, culvert cleaning, and other drainage work would improve hydrologic conditions, prevent erosion, and protect water quality. Construction of drainage improvements would temporarily introduce sediments into drainages, but would have a long-term benefit by restoring or improving drainage functions and protecting structural and natural features. Replacement or lining of the culvert on Hazelwood Creek near Round Meadow would include temporarily rerouting streamflow around the construction zone to minimize impacts on water quality. This would have a short-term minor adverse effect on water quality and a long-term benefit by maintaining adequate channel capacity and stream stability and function.

Drainage improvements in the Giant Forest Museum accessible parking lot may result in slight changes in surface and groundwater drainage from installation of trenches or other drainage features to prevent icing. Minor changes in drainage from a small parking lot would have a local, long-term negligible effect on surface and groundwater hydrology or water quality.

There would be a small increase in impervious surface area (0.25 acre) from road widening and formalizing or paving existing pullouts. BMPs would be used to protect disturbed areas from erosion and sediment transport as noted in Table 2. Water needed for construction would be extracted from existing developed sources.

Overall, the planned road structural and drainage improvements would result in a local short-term minor adverse impact on water resources from ground disturbances that introduce sediment into drainages and a long-term beneficial effect from rehabilitation of deteriorating road conditions and improved drainage conveyance. The addition of 0.25 acre of new pavement would have a local long-term negligible adverse effect on runoff and surface flow.

**Cumulative Effects.** Past and ongoing actions such as road construction and maintenance activities have resulted in short-term adverse effects on water quality during construction. Ongoing work on the Halstead Meadow section of Generals Highway would restore the meadow in an area where erosion has occurred at culvert outlets, resulting in a benefit to water quality. Future road maintenance and reconstruction activities also would potentially cause short-term adverse effects on water resources, but would have long-term beneficial effects. Future rehabilitation of the water distribution system for Giant Forest, Wolverton, Lodgepole, Wuksachi, and the Red Fir maintenance area potentially would result in temporary adverse effects on water resources from construction disturbance. Past, present, and reasonably foreseeable future actions would have parkwide beneficial effects on water resources over the long-term. As previously described, implementation of the preferred alternative would result in both short-term minor adverse impacts and long-term beneficial impacts on water resources. The impacts of the preferred alternative in combination with other past, present, and reasonably foreseeable future actions would result in parkwide long-term beneficial cumulative effects. The beneficial effects of the preferred alternative would be a relatively small component of the cumulative effects.

**Conclusion.** Proposed road rehabilitation work and drainage improvements would have local short-term minor adverse effects on water resources from surface disturbances that may generate erosion and increased sediment runoff. Proposed erosion-control measures to minimize erosion during construction and revegetation of disturbed areas would minimize impacts. Road rehabilitation work would result in a long-term beneficial impact on water resources by improving conveyance of drainage structures and improving or restoring hydrologic functions. An increase in impervious surface area of 0.25 acre would have a negligible adverse effect on runoff and surface flows. Cumulative effects would be parkwide, long-term, and beneficial.

## HISTORIC STRUCTURES

### Affected Environment

“Historic properties,” as defined by the implementing regulations of the NHPA (36 CFR 800), are a prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the national register. This term includes artifacts, records, and the remains that are related to and located within such properties, as well as traditional and

culturally significant sites and historic landscapes. The term “eligible for inclusion in the national register” includes both properties formally determined eligible and all other properties that meet national register listing criteria.

The significance of historic properties is generally judged against a property's ability to meet, at a minimum, one of the four criteria for inclusion in the national register (36 CFR 60):

- Association with events that have made a significant contribution to the broad patterns of our history; or
- Association with the lives of persons significant in our past; or
- That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- That has yielded, or may be likely to yield, information important in prehistory or history.

Properties may be eligible for the national register for contributions at the national, state, or local level. Ordinarily, properties achieving significance within the last 50 years are not considered eligible unless they are integral parts of historic districts or unless they are of exceptional importance. Additionally, in order for a structure or building to be listed in the national register, it must possess historic integrity of those features necessary to convey its significance (i.e., location, design, setting, workmanship, materials, feeling, and association).

Authorized by the NHPA of 1966, the national register is the nation's official list of districts, sites, buildings, structures, and objects in both public and private ownership that are significant in American history, architecture, archeology, engineering, and culture. Sequoia and Kings Canyon National Parks have 19 historic structures and 4 districts listed in the national register. None of these structures or districts, other than the Generals Highway District, are located within the area of potential effect. In 1992 the NPS determined that the Generals Highway was eligible for listing in the national register. The listing identified 92 contributing features, specifically identifying stone masonry headwalls, stone masonry drainage ditches, stone masonry retaining walls, stone curbing, stone masonry guardwalls, specific turnouts, stone masonry bridges, stone embankment walls, and signs. Sixteen of these original features are located within the area of potential effect. An addendum inventory to the 1992 national register listing documented 96 additional contributing features along the length of Generals Highway (NRHP Addendum 2006). None of the additional contributing features are within the current area of potential effect (NRHP Addendum 2006).

A Programmatic Agreement (PA) among the Sequoia National Forest, Sequoia and Kings Canyon National Park and the California SHPO was signed in 2008, to address rehabilitation work on Generals Highway (NPS 2008).

### **Impact Intensity Threshold**

In order for a structure or building to be listed in the national register, it must be associated with an important historic event or person(s) or embody distinctive characteristics

or qualities of workmanship. The thresholds of change for the intensity of an impact on historic structures are defined in Table 7.

**TABLE 7. HISTORIC STRUCTURES IMPACT AND INTENSITY THRESHOLDS**

<b>Impact Intensity</b>	<b>Intensity Description</b>
Negligible	The impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for Section 106 would be no effect.
Minor	The alteration of a feature(s) would not diminish the overall integrity of the resource. The determination of effect for Section 106 would be no adverse effect.
Moderate	The alteration of a feature(s) would diminish the overall integrity of the resource. The determination of effect for Section 106 would be adverse effect. A PA is executed among the NPS and applicable state or tribal historic preservation officer and, if necessary, the ACHP in accordance with 36 CFR 800.6(b). Measures identified in the PA to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA.
Major	The alteration of a feature(s) would diminish the overall integrity of the resource. The determination of effect for Section 106 would be adverse effect. Measures to minimize or mitigate adverse impacts cannot be agreed upon between the NPS and applicable state or tribal historic preservation officer and/or ACHP, and they are unable to negotiate and execute a PA in accordance with 36 CFR 800.6(b).

Short-term impact— occurs only during the construction period.

Long-term impact— occurs during and continues after the construction period.

## Environmental Consequences

### No Action Alternative

**Direct and Indirect Impacts.** Under the no action alternative, continued routine maintenance of the road and associated features would occur, but rehabilitation of the road would not take place. The NPS would continue management actions that would include minor repairs of the stone masonry headwalls, endwalls, retaining walls, and other historic stone features within the project area. Continued deterioration of the road from piecemeal road maintenance, vegetation, erosion, and structural deficiencies could lead to adverse impacts on the road and associated features such as stone and timber retaining walls, stone guardwalls, shoulders, turnouts, stone-lined drainage ditches, culvert headwalls, and cutstone curbs. Impacts on historic structures are anticipated to be local, long-term, negligible to minor, and adverse based on the current level of maintenance; however, should there be a failure to a structural feature, adverse impacts on historic structures would be local, short- to long-term, and minor to moderate.

**Cumulative Effects.** Past actions such as road maintenance and reconstruction have affected the historic structures along Generals Highway. Previous actions that have added new structural features or changes to the highway also have contributed to the current condition of historic structures. Previous rehabilitation of other sections of Generals Highway from Ash Mountain to Deer Ridge and from Wolverton Road to the Little Baldy pullout have removed some of the historic stone masonry structures when they lacked structural integrity, could not be incorporated into the required highway design, or were repaired or rebuilt with materials or workmanship not compatible with their historic design. The 1992 national register nomination for Generals Highway notes that many of the contributing Civilian Conservation Corp (CCC)-era structures have lost physical integrity due to the lack of maintenance. These features were replaced with either similar stone masonry structures or simulated stone (concrete form-liner) structures that received

California SHPO concurrence. Past and planned future work on Generals Highway would be conducted in accordance with the existing PA and the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1992a). Because the existing PA stipulates for the preservation and treatment of historic structures, past, present, and reasonably foreseeable future projects would have a parkwide long-term negligible impact on historic structures. The overall cumulative effect on historic structures from the no action alternative in combination with past, present, and reasonably foreseeable future actions would be parkwide, long-term, and negligible. The no action alternative would contribute negligible impacts from continued deterioration of the road and ongoing maintenance activities. An adverse effect on historic resources is possible if road failure occurs.

**Conclusions.** Impacts on historic structures are anticipated to be local, long-term, and negligible for typical maintenance work with implementation of stipulations provided for in the existing PA. However, should there be a failure to a structural feature of the highway, impacts on historic structures would be local, short- to long-term, minor to moderate, and adverse. Cumulative effects would be parkwide, long-term, and negligible.

#### ***Preferred Alternative—Rehabilitate Highway***

**Direct and Indirect Impacts.** The planned rehabilitation of Generals Highway is intended to protect, restore, and rehabilitate the deteriorating structural components of the highway. Proposed rehabilitation work would be conducted to preserve the integrity, design characteristics, and craftsmanship of structural features. Rehabilitation would be conducted in accordance with the existing PA (NPS 2008) and meet the *Secretary of the Interior's Standards for Rehabilitation* (NPS 1992b), including reuse of original material, repairing and replacing features in-kind, and using compatible designs when adding new features. Road stabilization and paving would maintain the structural integrity of the highway. Construction activities such as adding pullouts, adding guardrails, replacing guardrails, increasing the height of stone walls, and adding curbs under guardrails would add new elements to the landscape or reinforce existing structural features adjacent to the highway, but design specifications call for constructing the walls to match the historic workmanship and design of existing structural elements. Stone walls constructed with a crenulated (notched top) would be repaired using original or similar material. An existing historic crenulated stone wall where a cantilevered viaduct would be constructed would be preserved, but the top course of stone would be removed and used for repair of other sections of crenulated walls missing stones. Miscellaneous culvert repairs, replacement, and new drainage would maintain the historic design and materials using original material whenever possible.

Road rehabilitation work would address deteriorating road conditions and maintaining and protecting the historic features that contribute to the highway's eligibility for listing in the national register. However, removal of the top course of stones of a historic crenulated stone wall for construction of a cantilevered viaduct for use in repairing three other crenulated walls as needed, would have a long-term moderate adverse effect on a contributing element to Generals Highway. The park would comply with applicable stipulations in the existing PA between the SHPO and the park (NPS 2008) to address identified adverse effects of the preferred alternative. This includes 1) identifying and evaluating historic properties (nonarcheological) (stipulation 3.a); 2) preparing an

Assessment of Effects (stipulation 4); and 3) applying a treatment of adverse effects for a historic, nonarcheological property (stipulation 5.a). In addition, the park would revise the Generals Highway National Register Nomination to add the four crenulated walls as contributing elements to the historic district and to reflect proposed modifications to crenulated walls.

**Cumulative Effects.** Past actions such as road maintenance and reconstruction have affected the historic structures along Generals Highway. Previous actions that have added new structural features or changes to the highway also have contributed to the current condition of historic structures. Previous rehabilitation of other sections of Generals Highway from Ash Mountain to Deer Ridge and from Wolverton Road to the Little Baldy pullout have removed some of the historic stone masonry structures when they lacked structural integrity or could not be incorporated into the required highway design. These features were replaced with either similar stone masonry structures or simulated stone (concrete form-liner) structures that received California SHPO concurrence. Past and planned future rehabilitation work on Generals Highway would be conducted in accordance with the existing PA and the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. The combined impacts of past, present, and reasonably foreseeable future actions would result in parkwide long-term negligible to minor impacts on historic structures. The overall cumulative effects on historic structures from the preferred alternative in combination with past, present, and reasonably foreseeable future actions would be local, short-term, and negligible with implementation of the provisions provided for in the existing PA.

**Conclusions.** The proposed highway rehabilitation is designed to repair and replace deteriorating structural features that contribute to the highway's eligibility for listing in the national register. However, a long-term moderate adverse effect on historic structures would occur from removal of the top course of stones from a historic crenulated stone wall for construction of a cantilevered viaduct and use of the stones in repairing other crenulated walls. Implementation of the provisions provided for in the existing PA would be used to mitigate identified adverse effects. Cumulative effects would be parkwide, short-term, and negligible.

## CULTURAL LANDSCAPES

### Affected Environment

Cultural landscapes are the result of the interaction between people and their geographic surroundings and the influence of the individuals' beliefs and actions exhibited on their landscapes. The land may be shaped or modified because of land-use, politics, laws, technology, or economics. Cultural landscapes provide a living dynamic record of an area's past, a chronicle of its history. Because it is a living record, the long-range preservation can be a land manager's challenge.

According to DO – 28: *Cultural Resource Management Guideline* (page 87), a cultural landscape is:

...a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions.

Generals Highway and associated historic structures comprise a cultural landscape. The highway was determined eligible for listing in the national register in 1992, but has not been formally listed (NPS 1997). Additional structures were added to the nomination as an addendum in 2006. The highway has at least 188 contributing features. The stone masonry retaining walls, parapet walls, culvert headwalls, and bridges are all contributing features to the national register nomination and are part of the larger built environment of the parkwide cultural landscape. The NPS manages the highway as if it were listed in the national register under a PA with the California SHPO.

The highway's areas of significance are transportation, entertainment/recreation, engineering, landscape architecture, and social history. The period of significance is 1922 to 1942, which includes the highway's construction and the period from 1933 to 1942, when the Civilian Conservation Corps (CCC), a national public works program, added rustic elements to the basic road. The section of the highway in the project area was first completed as a gravel road, opening in 1926. This portion of the highway was originally 18 to 20 feet wide and was paved in 1929 and 1930. During the 1930s, CCC work crews constructed features such as stone and timber retaining walls, stone guardwalls, shoulders, turnouts, stone-lined drainage ditches, culvert headwalls, and cut-stone curbs. Rustic highway stones also were installed. During this period, the CCC crews gave the highway its rustic character, making it more compatible with its natural surroundings, and lessening its impact on the landscape.

### **Impact Intensity Threshold**

For purposes of analyzing potential impacts on cultural landscapes, the thresholds of change for the intensity of an impact are defined in Table 8.

**TABLE 8. CULTURAL LANDSCAPES IMPACT AND INTENSITY THRESHOLDS**

Impact Intensity	Intensity Description
Negligible	The impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for Section 106 would be no adverse effect.
Minor	The alteration of a pattern(s) or feature(s) of the landscape would not diminish the overall integrity of the landscape. The determination of effect for Section 106 would be no adverse effect.
Moderate	The alteration of a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. The determination of effect for Section 106 would be adverse effect. A PA is executed among the NPS and applicable state or tribal historic preservation officers and, if necessary, the ACHP in accordance with 36 CFR 800.6(b). Measures identified in the PA to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from major to moderate.
Major	The alteration of a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. The determination of effect for Section 106 would be adverse effect. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the NPS and applicable state or tribal historic preservation officers and/or ACHP are unable to negotiate and execute a PA in accordance with 36 CFR 800.6(b).

Short-term impact—occurs only during the construction period.

Long-term impact—occurs during and continues after the construction period.

## Environmental Consequences

### *No Action Alternative*

**Direct and Indirect Impacts.** Under the no action alternative, continued routine maintenance of the road and associated features would occur, but rehabilitation of the road would not take place. Maintenance activities would temporarily introduce visual, audible, and atmospheric elements into the landscape setting of Generals Highway; however, these intrusions would be short-term, lasting only as long as construction and repairs.

Routine maintenance would continue to repair important landscape features and characteristics to the extent feasible. However, continued deterioration of the road from structural deficiencies could lead to adverse impacts on the road and associated features such as stone and timber retaining walls, stone guardwalls, shoulders, turnouts, stone-lined drainage ditches, culvert headwalls, and cut-stone curbs. Damage to contributing elements of the road is difficult to predict, but could range from minor to moderate. Structural failures that lead to temporary road closure and associated repairs would affect the land use, topography, vegetation, and circulation patterns of the cultural landscape. Impacts on the cultural landscape are anticipated to be local, long-term, and negligible based on the stipulations provided for in the PA that maintain the historic integrity of the structures during routine maintenance; however, should there be a failure to a structural feature, adverse impacts on the cultural landscape would be local, short- to long-term, and minor to moderate.

**Cumulative Effects.** Past actions such as road maintenance and reconstruction have affected the features of the cultural landscape along Generals Highway. Previous actions that have added new structural features or changes to the highway also have contributed to the current condition of the cultural landscape. Removal of hundreds of structures from the Giant Forest area and relocation of facilities to the Wuksachi area helped restore the giant sequoia forest in the area to more natural conditions and resulted in changes to the cultural

landscape. Planned future road maintenance and reconstruction would be carried out to be compatible with the cultural landscape. Past, present, and reasonably foreseeable future projects would have a parkwide long-term negligible impact on the cultural landscape. The overall cumulative effects on the cultural landscape from the no action alternative in combination with past, present, and reasonably foreseeable future actions would be parkwide, long-term, and negligible with implementation of the provisions provided for in the existing PA. Minor to moderate adverse impacts are possible with damage to contributing elements from road deterioration or failure.

**Conclusions.** Impacts on the cultural landscape are anticipated to be local, long-term, and negligible for typical maintenance work with implementation of the provisions provided for in the existing PA. However, should there be a failure to a structural feature of the road, adverse impacts on the cultural landscape would be local, short- to long-term, and minor to moderate. Cumulative effects would be parkwide, long-term, and negligible.

#### ***Preferred Alternative—Rehabilitate Highway***

**Direct and Indirect Impacts.** Planned rehabilitation of Generals Highway is intended to protect, restore, and rehabilitate the deteriorating structural components of the highway. Proposed rehabilitation work would be conducted to preserve the integrity, design characteristics, and craftsmanship of structural features. Any reconstruction or rehabilitation of contributing features would be conducted in accordance with the existing PA (NPS 2008) and meet the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* (NPS 1992a), including reuse of original material, repairing and replacing features in-kind, and using compatible designs when adding new features. Road stabilization and paving would maintain the structural integrity and visual appearance of the road. Construction activities such as adding pullouts, adding guardrails, replacing guardrails, increasing the height of stone walls, and adding curbs under guardrails would add new elements to the landscape or reinforce existing structural features adjacent to the road, but design specifications call for constructing the walls to match the historic workmanship and design of existing structural elements. Miscellaneous culvert repairs, replacement, and new drainage would maintain the historic design and materials using original material whenever possible.

A few short sections of the road would require removal of small and medium-sized trees during road widening in Phase 1 and three giant sequoias less than 22 inches in diameter would be removed for culvert replacement. Temporary vegetation disturbances would be restored with native species. The proposed rehabilitation would maintain the aesthetic quality, scenic views, and natural features along the road. There would be local short-term negligible impacts on the cultural landscape setting during project construction. Overall, the proposed rehabilitation work would have a short-term negligible impact on the cultural landscape by addressing deteriorating road conditions and maintaining and protecting the historic features that contribute to the road's eligibility for listing in the national register. No adverse impact on the cultural landscape would occur with implementation of the provisions provided for in the existing PA.

**Cumulative Effects.** Past actions such as road maintenance and reconstruction have affected the historic structures and features of the cultural landscape along Generals Highway. Previous actions that have added new structural features or changes to the highway also have contributed to the current condition of the cultural landscape. Removal of hundreds of structures from the Giant Forest area and relocation of facilities to the Wuksachi area helped restore the giant sequoia forest in the area to more natural conditions and resulted in changes to the cultural landscape. Planned future road maintenance and reconstruction would be carried out to be compatible with the cultural landscape. The combined impacts of past, present, and reasonably foreseeable future actions would result in parkwide long-term negligible impacts on the cultural landscape. The overall cumulative effects on the cultural landscape from the preferred alternative in combination with past, present, and reasonably foreseeable future actions would be local and short- to long-term, with a negligible impact from the preferred alternative.

**Conclusions.** The proposed road rehabilitation would have a local short-term negligible impact on the cultural landscape from improvements designed to repair and replace deteriorating structural features that contribute to the integrity of the highway. No adverse impact on the cultural landscape would occur with implementation of the provisions provided for in the existing PA. Cumulative effects would be parkwide, long-term, and negligible.

## VISITOR USE AND EXPERIENCE

### Affected Environment

The parks are within driving distance of the two largest metropolitan areas in California – about 240 miles north of Los Angeles and 240 miles southeast of San Francisco. Sequoia National Park hosted more than 1 million visitors in 2010, while Kings Canyon hosted nearly 600,000 (NPS 2011a). Park visitation typically is highest on weekends, especially during the summer. About 80% of visitation occurs between May and October, with peak visitation occurring in July and August. The lowest visitation occurs during December, January, and February (NPS 2011a). Most visitors arrive at the parks by private automobile. About 98% of visitor use occurs in frontcountry areas, with the remaining 2% of visitor use occurring in wilderness areas. A visitor survey conducted in March and May 1998 indicated that 45% of the visitors were day use visitors staying on average 4.5 hours (BRW, Inc. and Lee Engineering 1999). About 14.6% of the visitors stayed two days and 14% stayed three days. About one-quarter of all visitors stayed four days or longer. Recreational activities in the parks include driving park roads, photography, hiking, camping, bicycling on park roads, wildlife watching, swimming and wading, and fishing. Cross-country skiing, snow play, snowshoeing, and sledding are popular winter activities, especially at Wolverton.

The section of Generals Highway in the project area is open year-round and is one of the most heavily used areas of the parks, providing access to attractions such as Crystal Cave, Giant Forest, Giant Forest Museum, and the General Sherman Tree. The highway also is a destination itself because many visitors enjoy viewing scenery while driving along the highway and often stop at pullouts to take photographs and observe wildlife. Visitors traveling the section of highway in the project area often continue north to visit other

attractions in the parks such as the Lodgepole visitor center, Wuksachi Village, and Grant Grove. Generals Highway and Wolverton Road provide access to several trailheads, including the General Sherman Tree, the Big Trees Trail, and trails at Wolverton. No campgrounds are within the project area; however, the road provides access to campgrounds at Lodgepole Village and Dorst Creek, and five other campgrounds within the parks.

In the summer, the Sequoia Shuttle offers three free bus routes serving destinations in and around the Giant Forest and Lodgepole area. The Sequoia Shuttles typically run from late May through late September, seven days a week. The shuttles provide an opportunity for park visitors to access many of the popular sites in the park.

### **Impact Intensity Threshold**

*NPS Management Policies 2006* state that the enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks, and that the NPS is committed to providing appropriate high-quality opportunities for visitors to enjoy the parks. Part of the purpose of the parks is to offer opportunities to present and future generations to experience and understand park resources and values. The thresholds of change for the intensity of an impact on visitor use and experience are described in Table 9.

**TABLE 9. VISITOR USE AND EXPERIENCE IMPACT AND INTENSITY THRESHOLDS**

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

Short-term impact—effects occur only during project implementation activities.

Long-term impact—effects extend beyond the project implementation activities.

### **Environmental Consequences**

#### **No Action Alternative**

**Direct and Indirect Impacts.** There would be no change in the fundamental nature and quality of the visitor experience or recreational opportunities along Generals Highway under the no action alternative. The highway would remain open and visitors would continue to have access to park resources. Periodic maintenance projects to address deteriorating road conditions would require traffic delays at random times and locations, which would inconvenience visitors. Road conditions would deteriorate to the point that the quality of the visitor experience is diminished from a visibly damaged road, structural deficiencies in road subgrade, and deterioration of other structural features. The quality of recreational experiences from driving the road would decline due to the poor condition of the road. The potential for road failure and road closure for repairs would increase. The effects on visitor

use and experience under the no action alternative would be local, long-term, minor to moderate, and adverse.

**Cumulative Effects.** Construction of Generals Highway and Wolverton Road provided visitors an opportunity to explore Giant Forest, Grant Grove, and other areas of the parks and access other destinations. Past and ongoing road maintenance, road reconstruction, and other improvement projects have allowed visitors to enjoy this portion of the park year-round. Some visitors indicate that past removal of the facilities and structures from Giant Forest resulted in an adverse effect on their experience by removing the opportunity to stay among the giant trees. However, by removing the structures from the Giant Forest, the NPS has protected one of the primary resources that the park was established to protect – the giant sequoias – and as a result, has ensured for the future an improved visitor experience in this area. Future road maintenance and reconstruction for additional sections of Generals Highway and other roads parkwide would result in temporary traffic delays for visitors, but would improve safety and travel conditions for visitors over the long term. Past, present, and reasonably foreseeable future projects would have a long-term beneficial effect on visitor use and experience. The overall cumulative effects on visitor use and recreation experience from the no action alternative in combination with past, present, and reasonably foreseeable future actions would be parkwide, long-term, and beneficial. The no action alternative would have a long-term minor to moderate adverse contribution to cumulative effects.

**Conclusion.** The no action alternative would have local long-term minor to moderate adverse effects on visitor use and experience from ongoing deterioration of the road and structural features that contribute to the quality of the visitor experience, and that provide access to recreation resources. Although the road would remain open to visitor access, as road conditions deteriorate, periodic maintenance projects or road failure would require traffic delays or road closure at random times and locations, which would inconvenience visitors. Cumulative effects would be parkwide, long-term, and beneficial with an adverse contribution from the no action alternative.

#### ***Preferred Alternative—Rehabilitate Highway***

**Direct and Indirect Impacts.** The quality of the visitor experience and access to recreation resources, such as Crystal Cave and the Giant Forest, would be temporarily impacted by construction activities required to rehabilitate and reconstruct Generals Highway and repave Wolverton Road. Traffic delays, short-term closures, and closed parking areas and pullouts would inconvenience visitors traveling along the road. The visitor experience would be temporarily affected by a change in scenic quality from the presence of construction equipment and construction-related disturbance and noise. Orange construction fencing used to protect giant sequoia trees during construction would detract from visitor views while driving the road.

Construction work is expected to occur from March through mid-November, but could begin earlier or extend later depending on weather conditions. Work would likely be suspended from December through February because of weather conditions and safety concerns. Construction work would occur from Monday through Friday. Night work may be necessary for selected activities such as concrete pours and deep culvert installation.

Generals Highway and Wolverton Road would remain open during the proposed work, subject to temporary traffic delays. The Sequoia Shuttle service in the Giant Forest and Lodgepole areas would continue to operate during construction; however, schedule modifications may be needed and shuttle service would be subject to the same traffic delays as other vehicles. Shuttles may provide a more convenient method of travel during construction and would reduce private vehicle traffic and congestion.

As described in Table 2, the park would implement a number of measures to reduce visitor impacts, and maintain the quality of the visitor experience and access to recreation resources during construction. The parks would provide clear and concise information on the status of rehabilitation work and any traffic delays. To facilitate visitor planning, the status of roadwork and traffic delays would be advertised two weeks in advance and would be updated daily. The status of road construction and travel restrictions would be communicated via a number of outlets—the park website, newspapers, radio, entrance stations, visitor centers, news releases, media outlets, postings in local businesses, and other locations.

A short-term minor to moderate adverse effect on the quality of the visitor experience would occur at the local and parkwide level during periods of construction. While construction activities and traffic delays would temporarily inconvenience visitors, substantial changes in the number of visitors to the park are not expected. Over the long term, the proposed improvements to the condition of the highway, pullouts, and associated features would provide a beneficial effect on the quality of the visitor experience, and ensure protection of the highway's structural features for visitor enjoyment and safe travel for many years.

**Cumulative Effects.** Construction of Generals Highway and Wolverton Road provided visitors an opportunity to explore Giant Forest, Grant Grove, and other areas of the parks and access other destinations. Past and ongoing road maintenance, road reconstruction, and other improvement projects have allowed visitors to enjoy this portion of the park year-round. Some visitors indicate that past removal of the facilities and structures from Giant Forest resulted in an adverse effect on their experience by removing the opportunity to stay among the giant trees. However, by removing the structures from the Giant Forest, the NPS has protected one of the primary resources that the park was established to protect – the giant sequoias – and as a result, has ensured for the future an improved visitor experience in this area. Future road maintenance and reconstruction for additional sections of Generals Highway and other roads parkwide would result in temporary traffic delays for visitors, but would improve safety and travel conditions for visitors over the long term. Past, present, and reasonably foreseeable future projects would have a long-term beneficial effect on visitor use and experience. The overall cumulative effects on the visitor experience and recreation resources from the preferred alternative in combination with past, present, and reasonably foreseeable future actions would be long-term and beneficial, but the preferred alternative would contribute short-term minor to moderate adverse effects on the quality of the visitor experience during construction.

**Conclusion.** Traffic delays would inconvenience visitors traveling along Generals Highway and Wolverton Road during construction. In response to construction activities, some visitors may avoid the park, visit other portions of the park, or choose alternate routes

for regional travel connections. The parks would inform visitors in advance of construction via a number of sources so visitors can best plan their schedule and activities and minimize impacts. The effect on visitor experience and recreation resources would be local and parkwide, short-term, minor to moderate, and adverse during construction. The preferred alternative would provide local long-term beneficial effects on the quality of the visitor experience following construction by improving the quality and condition of the highway. Cumulative effects would be short-term and adverse, and long-term and beneficial.

## SOCIOECONOMICS

### Affected Environment

The parks are in Fresno and Tulare counties, and most visitors pass through these two counties because of relatively easy access on California 180 from Fresno and on California 198 from Visalia. The primary industries in these two counties are services, state and local government, retail, and agriculture. The gateway community of Three Rivers is just outside the Ash Mountain entrance to Sequoia National Park. Three Rivers offers grocery stores, restaurants, lodging, gasoline, and other goods and services. Fresno and Visalia are the other primary gateway communities. The community of Visalia has partnered with the parks and developed a shuttle system that brings park visitors staying in the valley up to the parks through the Ash Mountain entrance where the shuttle users are transferred to an internal NPS shuttle system at Giant Forest.

Several concessioner operations within and near the parks are accessed via Generals Highway. Lodgepole Village is near the north end of the project area and has a grocery store/gift shop, restaurants, showers, and laundry facilities. Wuksachi Village also is north of the project area along the highway and has lodging, dining, a gift shop, conference facilities, and ski/snowshoe rentals. Grant Grove Village is at the north end of Generals Highway in King's Canyon National Park and has a restaurant, grocery store, and gift shop. Cross-country ski and snowshoe rentals are available at Grant Grove in the winter. Additional privately operated facilities are on the section of the highway between Sequoia and Kings Canyon National Parks in Giant Sequoia National Forest. Montecito Sequoia Lodge is a year-round resort with lodging, water sports, equestrian activities, and cross-country skiing and snowshoeing in the winter. Stony Creek Lodge has 11 hotel rooms and is open May through October.

Crystal Cave is off Generals Highway via the Crystal Cave Road (Figure 2). The cave is operated by the Sequoia Natural History Association and is open mid-May through October. Daily tours generally operate on the hour between 10:00 a.m. and 5:00 p.m., but vary according to day of the week and season. The admission is \$13 for adults and \$7 for children.

A study to evaluate the effect of visitor spending on the local economy as a result of tourism generated by the parks determined that visitor spending in 2002 that was directly attributable to the parks was \$65 million (Stynes and Sun 2003). Park visitor spending generated \$22.3 million in direct personal income (wages and salaries) for residents and supported 1,243 jobs in the area. The average party of visitors consisted of 3.18 people and they spent \$121 per day in the local area. Visitors staying in hotels outside the parks

accounted for 60% of total park visitor spending, followed by overnight visitors at park lodges (11%). In 2002, about 5% of total tourism spending and 15% of lodging sales in Fresno and Tulare counties was attributable to park visitors (Stynes and Sun 2003).

### **Impact Intensity Threshold**

Socioeconomic issues were identified through the scoping process. Concerns covered by this section include effects on the economic contribution of Sequoia National Park to the local economies in the gateway communities and the potential effects associated with rehabilitating or not rehabilitating the highway. The thresholds of change for the intensity of impacts on socioeconomics are described in Table 10.

**TABLE 10. SOCIOECONOMICS IMPACT AND INTENSITY**

Impact Intensity	Intensity Description
Negligible	No effects would occur or the effects on socioeconomic conditions would be below the level of detection.
Minor	The effects on socioeconomic conditions would be detectable. Any effects would be small and if mitigation were needed to offset potential adverse effects, it would be simple and successful.
Moderate	The effects on socioeconomic conditions would be readily apparent. Any effects would result in changes to socioeconomic conditions on a local scale. If mitigation is needed to offset potential adverse effects, it could be extensive, but would likely be successful.
Major	The effects on socioeconomic conditions would be readily apparent and would cause substantial changes to socioeconomic conditions in the region. Mitigation measures to offset potential adverse effects would be extensive and the success could not be guaranteed.

Short-term impact—effects lasting for the duration of the treatment action.

Long-term impact—effects lasting longer than the duration of the treatment action.

### **Environmental Consequences**

#### **No Action Alternative**

**Direct and Indirect Effects of the Alternative.** Under the no action alternative, the highway would remain open to traffic and there would be no disruption in visitor travel. Access to concessioner operations would not be affected by construction-related traffic delays. The cost to maintain the highway would increase over time as the road continues to deteriorate, and failure to address structural problems with the road, deteriorating pavement, and drainage issues would result in damage to retaining walls, guardwalls, and the road substrate, requiring more extensive repairs at a greater cost than addressing problems in the near term. Road maintenance costs also would escalate if repairs are not implemented. Deteriorating road conditions could lead to road failure or unplanned maintenance operations that impact visitor access. Although immediate impacts on tourism or tourist-related spending are unlikely, deteriorating highway conditions would affect visitor attendance. Thus, failure to implement needed road repairs under the no action alternative would have regional long-term minor adverse effects on the economy or businesses dependent on visitors to the parks.

**Cumulative Effects.** Past road maintenance, road reconstruction, and other improvements to park facilities and infrastructure have resulted in short-term construction-related spending and long-term improvements that maintain the parks as a popular tourist destination. Future road maintenance and rehabilitation work along Generals Highway

would have a cumulative beneficial effect on the regional economy from measures that add to the quality of the visitor experience and allow continued visitor access. Traffic delays during implementation of road improvements could deter some visitors, but substantial impacts on visitor numbers or spending are unlikely. Rehabilitation of the water distribution system that serves Giant Forest, Wolverton, Lodgepole, Wuksachi, and the Red Fir maintenance area would result in some local spending that would benefit the regional economy. Past, present, and reasonably foreseeable future projects would have regional long-term beneficial effects on socioeconomics. Cumulative effects would be regional, long-term, and beneficial, with a relatively small adverse contribution from the no action alternative.

**Conclusion.** The no action alternative would have regional long-term minor adverse effects on the economy from increased road maintenance costs and potential adverse effects on visitor attendance and regional businesses as the road deteriorates. Cumulative effects would be regional, long-term, and beneficial with an adverse contribution from the no action alternative.

#### ***Preferred Alternative—Rehabilitate Highway***

**Direct and Indirect Impacts of the Alternative.** Implementation of the preferred alternative would result in construction-related spending of about \$18 million. Construction expenditures would be used for labor, supplies, equipment, and other services. Labor would likely come from regional communities in Fresno and Tulare counties. Secondary economic effects from construction-related spending also would generate economic benefits to the region. Construction-related spending would have a short-term beneficial effect on the regional economy.

Construction activity and traffic delays would deter some visitors from coming to the parks or traveling on the highway. As described in Table 2—Visitor Experience, the parks would implement a number of actions to minimize impacts on park visitors during construction. Chief among these measures would be clearly and accurately communicating to the public the status of construction work and the timing of traffic delays or suspensions. While some park visitors may be inconvenienced during construction, no substantial change in visitor attendance is anticipated. All of the park campgrounds, concessioners, and attractions along Generals Highway and Wolverton Road would remain open and accessible. The preferred alternative would result in regional short-term minor adverse effects on the economy if visitor numbers decrease during construction. Maintaining the quality of the highway and the visitor experience over the long term would contribute to sustaining park visitation and tourist-related spending. Over the long term, highway improvements would provide beneficial economic effects on regional businesses from actions that increase the quality of the visitor experience and support continued visitation to the park.

**Cumulative Effects.** Past road maintenance, road reconstruction, and other improvements to park facilities and infrastructure have resulted in short-term construction-related spending and long-term improvements that maintain the parks as a popular tourist destination. Future road maintenance and rehabilitation along Generals Highway would have a cumulative beneficial effect on the regional economy from measures that add to the quality of the visitor experience and allow continued visitor access. Traffic delays during

implementation of road improvements could deter some visitors, but substantial impacts on visitor numbers or spending are unlikely. Rehabilitation of the water distribution system that serves Giant Forest, Wolverton, Lodgepole, Wuksachi, and the Red Fir maintenance area would result in some spending that would benefit the regional economy. The overall cumulative effects on socioeconomics from the preferred alternative in combination with past, present, and reasonably foreseeable future actions would be long-term, regional, and beneficial, with both a short-term beneficial contribution from the preferred alternative from construction-related spending and long-term benefits from road improvements that support tourism and the regional economy. Past, present, and reasonably foreseeable future projects would have regional long-term beneficial effects on socioeconomics; however, the preferred alternative would add slightly to the adverse effect from visitors who were turned away, or chose not to visit, due to construction work in the park.

**Conclusion.** The preferred alternative would have regional short-term beneficial effects on the economy from construction-related spending and employment. Traffic delays would deter some visitors from coming to the parks, resulting in regional short-term minor adverse economic impacts. While some park visitors may be inconvenienced during construction, no substantial change in visitor attendance is anticipated. All of the park campgrounds, concessioners, and attractions along Generals Highway and Wolverton Road would remain open and accessible. Long-term socioeconomic effects would be beneficial to regional businesses from improvements to the quality of the visitor experience along the highway. Cumulative effects would be regional, long-term, and beneficial with a slight short-term adverse contribution from the preferred alternative for visitors that choose not to visit the park during construction.

## PUBLIC HEALTH AND SAFETY

### Affected Environment

Road conditions that influence safe vehicle travel are a concern in the parks. When Generals Highway was constructed in the 1920s and 1930s, traffic was less frequent and vehicles were smaller than today. Hairpin turns, inconsistent lane widths, and poorly designed parking areas and pullouts create hazards for drivers, especially for large vehicles such as buses and recreational vehicles. Large vehicles often need to use part of the oncoming traffic lane to negotiate a turn, resulting in a safety risk. The poor design of pullouts and limited sight distance often creates hazardous conditions for vehicles, bicycles, and pedestrians. In many places CCC-era stone walls serve as guardwalls; however, these walls do not meet FHWA safety standards or NPS road standards for crash worthiness or safety.

Multiple fatalities, both visitor and employee, have occurred on the highway and numerous serious and minor accidents have occurred. Several high-accident road segments have been identified within the project area, with accident rates ranging from 5.4 to 38.6 accidents per million vehicle miles traveled (NPS 2007). The highest accident rates in the project area were recorded at Buena Vista Point (milepost (MP) 15.2–15.3) and in the Giant Forest area (MP 16.45–16.6 and MP 16.8–17.5).

## Impact Intensity Threshold

Public health and safety refers to the ability of the NPS to provide a healthy and safe environment for visitors and park staff, to protect human life, and to provide for injury-free visits and appropriate responses when accidents and injuries occur. The thresholds of change for the intensity of an impact on public health and safety are described in Table 11.

**TABLE 11. PUBLIC HEALTH AND SAFETY IMPACT AND INTENSITY THRESHOLDS**

Impact Intensity	Intensity Description
Negligible	The effects would be at low levels of detection and would not have appreciable effects on public health and safety.
Minor	The effects would be detectable and would be of a magnitude that would not have appreciable effects on public health and safety.
Moderate	The effects would be readily apparent and would result in a change in public health and safety that would be noticeable to park staff and the public.
Major	The effects would be readily apparent; would result in a substantial change in public health and safety in a manner noticeable to park staff and the public; and would be markedly different from existing operations.

Short-term impact—effects occur only during project implementation activities.

Long-term impact—effects extend beyond the project implementation activities.

## Environmental Consequences

### No Action Alternative

**Direct and Indirect Impacts.** The parks would continue with ongoing road maintenance and traffic control under the no action alternative. Public safety concerns on Generals Highway associated with deteriorating road pavement, poor design of pullouts, and limited sight distance would not be addressed. The potential for traffic accidents would be similar to existing conditions and may increase as the road continues to deteriorate. The no action alternative would result in local long-term minor to moderate adverse effects on public health and safety if road rehabilitation is not implemented.

**Cumulative Effects.** Measures previously implemented to improve public health and safety include ongoing maintenance; construction of pullouts, guardrails, and guardwalls; and rehabilitation and reconstruction of sections of Generals Highway and other roads within the parks. Past removal of concessioner and NPS facilities from the Giant Forest area improved safety by converting this area to a day use area and reducing the potential for visitors and staff to be struck by falling trees. Planned future maintenance, reconstructing additional sections of highway, and resurfacing other roads parkwide would improve travel conditions, resulting in improved safety for visitors and park staff. Past, present, and reasonably foreseeable future projects would have parkwide long-term beneficial effects on public health and safety. Cumulative effects would be parkwide, long-term, and beneficial, with a noticeable adverse contribution from the no action alternative.

**Conclusion.** The no action alternative would result in local long-term minor to moderate adverse effects on public health and safety by not addressing safety issues and needed road rehabilitation and repairs. The potential for accidents would be similar to existing conditions and may increase as the road continues to deteriorate and the need for maintenance

increases. Cumulative effects would be parkwide, long-term, and beneficial with a noticeable adverse contribution from the no action alternative.

#### ***Preferred Alternative—Rehabilitate Highway***

**Direct and Indirect Impacts.** Proposed road rehabilitation and improvements would address safety and road maintenance concerns associated with deterioration of Generals Highway and Wolverton Road. Improvements to road pavement, selective road widening, new pullouts, increased sight distance, and drainage work would improve safety and driving conditions. The potential for traffic accidents would be reduced. Maintaining a safe environment for park staff, contractors, and visitors during and after construction would be a primary objective. A variety of BMPs would be used during construction to inform and direct visitors through construction zones, and to protect contractors and park staff (Table 2). Upon completion of construction work, local long-term beneficial effects on public health and safety are expected from road improvements.

**Cumulative Effects.** Measures previously implemented to improve public health and safety include ongoing maintenance; construction of pullouts, guardrails, and guardwalls; and rehabilitation and reconstruction of sections of Generals Highway and other roads within the parks. Past removal of concessioner and NPS facilities from the Giant Forest area improved safety by converting this area to a day use area and reducing the potential for visitors and staff to be struck by falling trees. Planned future maintenance, reconstructing additional sections of Generals Highway, and resurfacing other roads parkwide would improve travel conditions, resulting in improved safety for visitors and park staff. Past, present, and reasonably foreseeable future projects would have parkwide long-term beneficial effects on public health and safety. Cumulative effects would be parkwide, long-term, and beneficial, with a local long-term beneficial contribution from the preferred alternative.

**Conclusion.** Proposed rehabilitation and improvements would address public health and safety concerns associated with Generals Highway and Wolverton Road. Improvements to road pavement, visibility, sight distance, road widening, and drainage would improve safety and driving conditions. The preferred alternative would result in local long-term beneficial effects on public health and safety from improvements to the structural features of the road and safety measures that reduce the potential for accidents. Cumulative effects would be parkwide, long-term, and beneficial.

## **PARK OPERATIONS**

### **Affected Environment**

Park staff is responsible for the day-to-day maintenance of Generals Highway and other roads and park facilities in the project area to provide a safe environment for park visitors. Roadwork and maintenance along the highway includes patching, striping, and shoulder work, and culvert and ditch maintenance. Generals Highway is vital to park operations. Park staff use the highway and Wolverton Road to access portions of the parks for visitor services, maintenance, law enforcement, search and rescue, resource management, and emergency

vehicle access. Many park employees drive the section of the highway in the project area regularly on their way to and from work. Snowplowing allows the road to remain open throughout the winter.

Structural and design deficiencies, as well as normal wear from traffic and weather have resulted in deterioration in the road condition and increasing maintenance. Currently about 90% of this section of Generals Highway is either in fair or poor condition. Road shoulders, retaining walls, and culverts are deteriorating. In several areas the base and subgrade material is in poor condition and requires excavation and replacement. The curb and drain structures throughout this section of the highway are in need of repair to allow for proper drainage to protect the road surface and subgrade. The CCC-era stone masonry drainage structures require cleaning and maintenance. Potholes, collapsing historic walls, and failing road shoulders may go undetected for long periods because of major snow events. Further deterioration of the road could lead to failure of the road shoulder, retaining walls, or other structural damage.

### **Impact Intensity Threshold**

Park operations, for the purposes of this EA, refers to the quality and effectiveness of the infrastructure, and the ability of park staff to maintain the infrastructure used in park operations to protect and preserve vital resources and provide for a high-quality visitor experience. The thresholds of change for the intensity of an impact on park operations are described in Table 12.

**TABLE 12. PARK OPERATIONS IMPACT AND INTENSITY THRESHOLDS**

Impact Intensity	Intensity Description
Negligible	The effects would be at low levels of detection and would not have appreciable effects on park operations.
Minor	The effects would be detectable and would be of a magnitude that would not have appreciable effects on park operations. If mitigation is needed to offset adverse effects, it would be simple and likely successful.
Moderate	The effects would be readily apparent and would result in a change in park operations that would be noticeable to park staff and the public. Mitigation measures would be necessary to offset adverse effects and would likely be successful.
Major	The effects would be readily apparent, would result in a substantial change in park operations in a manner noticeable to staff and the public, and would be markedly different from existing operations. Mitigation measures to offset adverse effects would be needed and extensive, and success could not be guaranteed.

Short-term impact—effects last for the duration of the treatment action.

Long-term impact—effects continue after the treatment action.

### **Environmental Consequences**

#### **No Action Alternative**

**Direct and Indirect Impacts.** The park would continue ongoing maintenance, traffic control, and administrative operations under the no action alternative. Maintenance work would increase as the condition of the road deteriorates. Underlying structural problems that result in increased maintenance would not be addressed. Road failure leading to closure of a

portion of the parks is a possibility at some locations if structural issues are not addressed. The cost for maintaining the road and addressing periodic structural failures would increase. The no action alternative would result in local long-term minor to moderate adverse effects on park operations.

**Cumulative Effects.** Past and ongoing maintenance and repair of Generals Highway and other park facilities along the road corridor have been implemented to improve park operations. Removal of concessioner and NPS facilities from the Giant Forest area to Wuksachi has improved the quality of visitor services and the efficiency of park operations. Planned maintenance and rehabilitation of additional sections of Generals Highway and resurfacing other roads parkwide would benefit park operations by improving travel conditions and reducing maintenance. Future rehabilitation of the drinking water distribution system for Giant Forest, Wolverton, Lodgepole, Wuksachi, and the Red Fir maintenance area would improve the efficiency of the water system and would reduce maintenance requirements. Past, present, and reasonably foreseeable future projects would have parkwide long-term beneficial effects on park operations. Cumulative effects would be parkwide, long-term, and beneficial, with a minor to moderate adverse contribution from the no action alternative.

**Conclusion.** The no action alternative would result in local long-term minor to moderate adverse effects on park operations by not addressing safety issues and needed road repairs. Maintenance requirements and costs would increase as the road and associated infrastructure continues to deteriorate. Cumulative effects would be parkwide, long-term, and beneficial with a minor to moderate adverse contribution from the no action alternative.

#### ***Preferred Alternative—Rehabilitate Highway***

**Direct and Indirect Impacts.** Proposed road rehabilitation and improvements would reduce maintenance requirements and costs. Road widening, structural repairs, new pavement, drainage work, and other repairs would improve driving conditions and would reduce the risk of future road failure. Park maintenance operations would be substantially improved by implementing road repairs that reduce the need for continual repairs to deteriorating infrastructure. The service life of the roads, pullouts, guardwalls, culverts, and other structural features would be extended by several decades. Additional demands would be placed on park staff during construction to coordinate construction activities and visitor use. Construction work and traffic delays would cause a disruption in normal traffic patterns, parking, and visitor activities in the parks. The parks would take special measures to notify visitors of the status of the road and potential traffic delays. The preferred alternative would have local and parkwide short-term moderate adverse impacts on park operations during construction. Traffic-control measures would be implemented to protect visitors. Upon completion of construction work, parkwide long-term beneficial effects on park operations are expected from road improvements.

**Cumulative Effects.** Past and ongoing maintenance and repair of Generals Highway and other park facilities along the road corridor have been implemented to improve park operations. Removal of concessioner and NPS facilities from the Giant Forest area to Wuksachi has improved the quality of visitor services and the efficiency of park operations.

Planned maintenance and rehabilitation of additional sections of Generals Highway and resurfacing other roads parkwide would benefit park operations by improving travel conditions and reducing maintenance. Future rehabilitation of the drinking water distribution system for Giant Forest, Wolverton, Lodgepole, Wuksachi, and the Red Fir maintenance area would improve the efficiency of the water system and reduce maintenance requirements. Past, present, and reasonably foreseeable future projects would have parkwide long-term beneficial effects on park operations. Cumulative effects on park operations would be parkwide, long-term, and beneficial. The preferred alternative would contribute parkwide and short-term moderate adverse impacts during construction, but long-term impacts would be beneficial.

**Conclusion.** The proposed road rehabilitation and improvements would address road maintenance concerns in the project area. Road widening, structural repairs, new pavement, drainage work, and other repairs would improve driving conditions and would reduce the risk of future road failure. Construction work and associated traffic delays would cause a disruption in normal traffic patterns, parking, and visitor activities in the parks; and would place a greater demand on park staff. Completion of the preferred alternative would result in local and parkwide short-term moderate adverse impacts during construction and parkwide long-term beneficial effects on park operations by improving the road surface and decreasing maintenance requirements. Cumulative effects on park operations would be parkwide, long-term, and beneficial with a short-term minor adverse contribution from the preferred alternative.

# **CONSULTATION AND COORDINATION**

## **INTERNAL SCOPING**

Internal scoping was conducted by an interdisciplinary team of professionals from Sequoia and Kings Canyon National Parks, Denver Service Center staff, FHWA, and consultants. Team members met multiple times in 2010 and 2011 to discuss the purpose and need for the project, various treatment options for road rehabilitation, potential environmental impacts, reasonably foreseeable actions that may have cumulative effects, and resource protection measures and BMPs.

## **EXTERNAL SCOPING**

External scoping began with a public scoping notice released on January 20, 2011 describing the preferred alternative and soliciting comments or concerns with the proposal to rehabilitate, restore, resurface, and reconstruct about 7 miles of Generals Highway and 1.3 miles of Wolverton Road (Appendix A). The park sent letters describing the proposed project and asking for comments to more than 240 interested individuals; organizations; state, county, and local governments; federal agencies; local businesses; and media outlets describing the preferred alternative and asking for comments. The results of scoping are discussed in the “Scoping” section in the “Purpose and Need” chapter.

## **AGENCY CONSULTATION**

Compliance with section 106 of the NHPA is not being subsumed under NEPA, but is being conducted separately through ongoing consultation with the California SHPO, who was notified of the proposed project by letter on January 20, 2011. Identified adverse effects on historic features including crenulated stone walls would be addressed under the existing PA with California SHPO (NPS 2008), which was developed for all of the ongoing improvements to Generals Highway. The park is coordinating with the SHPO on the assessment and treatment of adverse effects per the stipulations found in the 2008 PA. This EA also was forwarded to the California SHPO for review and comment.

In accordance with the Endangered Species Act, the NPS contacted the U.S. Fish and Wildlife Service by letter on January 20, 2011 to solicit input on threatened, endangered, and species of concern for the proposed project. Since the park has determined there would be no effect on federally listed species, no additional consultation with the U.S. Fish and Wildlife Service is required.

## **AMERICAN INDIAN CONSULTATION**

The parks contacted American Indian tribes and organizations, including the Kern Valley Indian Community, Tule River Indian Reservation, Big Pine Paiute Tribe of Owens Valley,

Bishop Indian Tribal Council, Tubatulabals of Kern Valley, Big Sandy Rancheria of Mono Indians, Dunlap Band of Mono Indians, Table Mountain Rancheria, Fort Independence Paiute Indians, Cold Springs Rancheria of Mono Indians, Native American Heritage Commission, Sierra Foothill Wuksachi Tribe, Wuksachi Indian Tribe, North Fork Rancheria of Mono Indians, Wukchumni Tribal Council, Paiute-Shoshone of Lone Pine, Santa Rosa Rancheria, Sierra Nevada Native American Coalition, California Native American Heritage Commission, and the California Basketweavers Association on January 20, 2011 informing them of the proposed project and soliciting comments. Information from the tribes also was requested to determine if any ethnographic resources are in the project area and if the tribes wanted to be involved in the environmental compliance process. The parks have not received any written comments as of the date of this EA. American Indian tribes traditionally associated with the lands of the parks also will have an opportunity to review and comment on this EA and will be contacted individually to determine if they desire formal government-to-government consultation.

## **ENVIRONMENTAL ASSESSMENT REVIEW AND LIST OF RECIPIENTS**

The EA will be released for a 30-day public comment period. To inform the public of the availability of the EA, the NPS will publish and distribute a letter to the parks' general mailing list; area tribes; and federal, state, and local agencies. The parks will provide a press release to the area media. In addition, the parks will provide hard copies of the EA to area libraries:

- California State University: San Joaquin Sierra Unit
- Fresno County Libraries
- Bear Mountain Branch Library
- Central Branch Library
- Sunnyside Branch Library
- Fowler Branch Library
- Kingsburg Branch Library
- Orange Cove Branch Library
- Parlier Branch Library
- Reedley Branch Library
- Sanger Branch Library
- Selma Branch Library
- San Joaquin Valley College: Hanford Extension; Visalia Campus; Fresno Campus
- Tulare County Law Library
- Tulare County Libraries: Exeter Branch; Lindsay Branch; Three Rivers Branch

Interested individuals may obtain a copy of the EA upon request. The EA will also be available for review at the parks' visitor centers and on the Internet at <http://parkplanning.nps.gov/seki>. Comments can be submitted through this website or provided by writing to: Superintendent, Attn: Generals Highway Project, 47050 Generals Highway, Three Rivers, CA 93271.

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# COMPLIANCE WITH FEDERAL AND STATE REGULATIONS

The NPS and Federal Highway Administration would comply with all applicable federal and state regulations when implementing the preferred alternative to rehabilitate Generals Highway. Permitting and regulatory requirements for the preferred alternative are listed in Table 13.

**TABLE 13. ENVIRONMENTAL COMPLIANCE REQUIREMENTS**

Agency	Statute, Regulation, or Order	Purpose	Project Application
			Federal
National Park Service	National Environmental Policy Act	Applies to federal actions that may significantly affect the quality of the environment.	Environmental review of the preferred alternative and decision to prepare a FONSI or EIS.
	National Historic Preservation Act, Section 106	Protection of historic and cultural resources.	The parks are consulting with the California SHPO to address anticipated effects and mitigation for cultural resources.
	EO 11990, "Protection of Wetlands"	Requires avoidance of adverse wetland impacts where practicable and mitigation, if necessary.	Minor temporary wetland disturbance possible from construction activities.
	EO 11988, "Floodplain Management"	Requires avoidance of adverse floodplain impacts where practicable and mitigation, if necessary.	No floodplains would be affected by the preferred alternative.
	DO – 77-2: <i>Floodplain Management</i>	Protection of natural resources and floodplains.	No floodplains would be affected by the preferred alternative.
U.S. Army Corps of Engineers	Clean Water Act – Section 404 Permit to discharge dredge and fill material	Authorizes placement of fill or dredge material in waters of the U.S. including wetlands.	The park would seek a Nationwide 404 Permit for work that would impact wetlands or waters of the U.S.
U.S. Fish and Wildlife Service	Endangered Species Act	Protection of federally listed threatened or endangered species.	The park has determined there would be no effect on listed species and, therefore, no further consultation is required
<b>State of California</b>			
California Environmental Protection Agency – State Water Resource Control Board	General Permit for Discharges of Storm Water Associated with Construction Activity	Erosion control and protection of water quality.	A stormwater pollution prevention plan would be developed prior to grading and surface disturbances.

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## **APPENDIXES**

Appendix A — Public Scoping Notice

Appendix B — Special Status Species



## **Appendix A**

### **Scoping Notices**





National Park Service  
U.S. Department of the Interior

Sequoia and Kings Canyon  
National Parks

47050 Generals Hwy.  
Three Rivers, CA 93271

559 565-3341 phone  
559 565-3730 fax

## Sequoia and Kings Canyon National Parks News Release

**For Immediate Release:** January 20, 2011

**Contact:** Dana M. Dierkes

**Phone Number:** (559) 565-3131

### **Public Comments Requested about Proposed Additional Phases of Construction along the Generals Highway**

The National Park Service (NPS) is seeking public comments, including any concerns and potential issues, about the proposed rehabilitation and resurfacing of 7 miles of the Generals Highway, one of two main access roads into Sequoia and Kings Canyon National Parks and the only year-round access for visitors traveling to Sequoia National Park. Public comments will be used in the development of an environmental assessment to evaluate alternatives and analyze the effects of the project, which would extend from Deer Ridge (12.5 miles from the Sequoia National Park entrance station off of Hwy. 198) to Wolverton Road (19.5 miles from the Sequoia National Park entrance station off of Hwy. 198). The project, which is expected to start in the spring of 2013 and last 3-4 years, would involve excavation and replacement of the road bed and surface; replacement of existing pavement; rehabilitation or replacement of drainage structures; redesign of drainage; replacement of asphalt curbs and guardrails; and the rehabilitation and building of road shoulders, as necessary. Rehabilitation work would also be done on selected turnouts and scenic overlooks. Without this project, continued deterioration of the highway – which has been in continuous use since 1935 – would result in damage to the adjacent environment, higher maintenance costs, loss of historic features, and hazardous driving conditions.

More information about the proposed project is available online at the NPS Planning, Environment and Public Comment website at <http://parkplanning.nps.gov/seki> under “Sequoia and Kings Canyon National Parks.” **All comments must be received in writing by February 22, 2011.** Comments may be submitted at this website by clicking on “Open for Comment” in the bar on the left-hand side. In addition, comments may be submitted by fax at 559-565-4202 or via mail or hand-delivery to:

Superintendent  
Sequoia and Kings Canyon National Parks  
Attn: Generals Highway Project  
47050 Generals Highway  
Three Rivers, CA 93271

*Note:* It is the practice of the NPS to make all comments, including the names and addresses of those who comment, available for public review in their entirety after the close of the National Environmental Policy Act process. However, individuals not representing businesses or organizations may request that the NPS withhold their names and/or addresses from the record. The NPS will honor this request to the extent allowable by law, but you should be aware that your comment—including your personal identifying information—may be made publicly available at any time.

For questions, please contact 559-565-3131.

—NPS—

## Appendix B

### Special Status Species

The proposed road rehabilitation would have a local short-term negligible impact on the cultural landscape from improvements designed to repair and replace deteriorating structural features that contribute to the integrity of the highway. No adverse impact on the cultural landscape would occur with implementation of the provisions provided for in the existing PA.

#### Federal Agencies

FE= Federal Endangered Species  
 FT= Federal Threatened Species  
 FC= Federal Candidate Species  
 X= Critical Habitat  
 USFS-S= Federal Forest Service: Sensitive  
 BLM-S= Bureau of Land Management Sensitive Concern  
 USFWS-BCC= Bird of Conservation Concern

#### California State Agencies

SE= State Endangered Species  
 ST= State Threatened Species  
 SC= State Candidate Species  
 CDFG-FP= CA Dept. of Fish & Game: Fully Protected  
 CDFG-SSC= CA Dept. of Fish & Game: Species of Special  
 CDFG-WL= CA Dept of Fish & Game: Watch List  
 CDF-S= CA Dept. of Forestry & Fire Protection: Sensitive

#### Other Organizations

ABC= American Bird Conservancy  
 WBWG= Western Bat Working Group  
 IUCN= International Union for Conservation of Nature  
 AFS= American Fisheries Society

T&E Listed			Sensitive Listing		
	Federal	State	Federal	State	Other
<b>Birds</b>					
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Delisted	Delisted	USFWS-BCC	CDF-S; CDFG-FP
American Yellow Warbler	<i>Dendroica petechia</i>				CDFG-SSC
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Delisted	SE	USFS-S; USFWS-BCC	CDF-S; CDFG-FP
Black Swift	<i>Cypseloides niger</i>	-	-	USFWS-BCC	CDFG-SSC
California Condor	<i>Gymnogyps californianus</i>	FE; X	SE	-	CDF-S
California Gull	<i>Larus californicus</i>				CDFG-WL
California Spotted Owl	<i>Strix occidentalis occidentalis</i>	-	-	BLM-S; USFS-S; USFWS-BCC	CDFG-SSC
Cooper's Hawk	<i>Accipiter cooperii</i>	-	-	-	CDFG-WL
Ferruginous Hawk	<i>Buteo regalis</i>				CDFG-WL

		T&E Listed		Sensitive Listing		
		Federal	State	Federal	State	Other
Golden Eagle	<i>Aquila chrysaetos</i>	-	-	USFWS-BCC	CDF-S; CDFG-FP; CDFG-WL	IUCN
Great Gray Owl	<i>Strix nebulosa</i>	-	SE	USFS-S	CDF-S	IUCN
Great Grey Shrike	<i>Lanius excubitor</i>				CDFG-SSC	
Harlequin Duck	<i>Histrionicus histrionicus</i>				CDFG-SSC	
Horned Lark	<i>Eremophila alpestris</i>				CDFG-WL	
Long-eared Owl	<i>Asio otus</i>	-	-	-	CDFG-SSC	IUCN
Merlin	<i>Falco columbarius</i>				CDFG-WL	
Northern Goshawk	<i>Accipiter gentilis</i>	-	-	BLM-S; USFS-S	CDFG-SSC; CDF-S	IUCN
Northern Harrier	<i>Circus cyaneus</i>				CDFG-SSC	
Osprey	<i>Pandion haliaetus</i>				CDFG-WL	
Prairie Falcon	<i>Falco mexicanus</i>	-	-	USFWS-BCC	CDFG-WL	IUCN
Purple Martin	<i>Progne subis</i>	-	-	-	CDFG-SSC	IUCN
Sharp Shinned Hawk	<i>Accipiter striatus</i>	-	-	-	CDFG-SSC	-
Short-eared Owl	<i>Asio flammeus</i>	-	-	-	CDFG-SSC	ABC; IUCN
Swainson's Hawk	<i>Buteo swainsonii</i>	-	ST	USFWS-BCC; USFS-S	-	ABC, IUCN
Vaux's Swift	<i>Chaetura vauxi</i>				CDFG-SC	
White-tailed Kite	<i>Elanus leucurus</i>				CDFG-FP	
Willow Flycatcher	<i>Empidonax traillii</i>	-	SE	USFS-S; USFWS-BCC	-	ABC; IUCN
Yellow Warbler	<i>Dendroica petechia brewsteri</i>	-	-	USFWS-BCC	CDFG-SSC	-
<b>Mammals</b>						
American Badger	<i>Taxidea taxus</i>	-	-	-	DFG-SSC	IUCN
American Marten	<i>Martes americana</i>	-	-	USFS-S	-	IUCN
Bighorn Sheep	<i>Ovis canadensis</i>	FE	SE			
California Wolverine	<i>Gulo gulo</i>	FC	ST	USFS-S	CDFG-FP	IUCN
Fringed Myotis	<i>Myotis thysanodes</i>	-	-	BLM-S	-	IUCN; WBWG
Long-eared Myotis	<i>Myotis evotis</i>	-	-	BLM-S	-	IUCN; WBWG
Mountain Beaver	<i>Aplodontia rufa</i>				CDFG-SSC	
Pacific Fisher (West Coast DPS)	<i>Martes pennanti</i>	FC	-	BLM-S; USFS-S	CDFG-SSC	-
Pallid Bat	<i>Antrozous pallidus</i>	-	-	BLM-S; USFS-S	CDFG-SSC	IUCN; WBWG

		T&E Listed			Sensitive Listing	
		Federal	State	Federal	State	Other
Sierra Nevada Red Fox	<i>Vulpes vulpes necator</i>	-	ST	USFS-S	-	-
Small-footed Myotis	<i>Myotis leibii</i>			BLM-S		
Spotted Bat	<i>Euderma maculatum</i>	-	-	BLM-S	CDFG-SSC	IUCN; WBWG
Townsend's Big-eared Bat	<i>Corynorhinus townsendii</i>	-	-	BLM-S; USFS-S	CDFG-SSC	IUCN; WBWG
Western Mastiff Bat	<i>Eumops perotis</i>	-	-	BLM-S	CDFG-SSC	WBWG
Western Red Bat	<i>Lasiurus blossevillii</i>	-	-	USFS-S	CDFG-SSC	IUCN; WBWG
Yuma Myotis	<i>Myotis yumanensis</i>	-	-	BLM-S	-	IUCN; WBWG
<b>Amphibians and Reptiles</b>						
California Legless Lizard	<i>Anniella pulchra</i>			USFS-S	CDFG-SSC	
Coast Horned Lizard	<i>Phrynosoma coronatum</i>			USFS-S; BLM-S	CDFG-SSC	
Foothill Yellow-legged Frog	<i>Rana boylei</i>			USFS-S; BLM-S	CDFG-SSC	
Mountain Yellow-legged Frog	<i>Rana muscosa</i>	FC	SC	USFS-S	CDFG-SSC	
Pacific Pond Turtle	<i>Actinemys marmorata</i>			USFS-S; BLM-S	CDFG-SSC	
Yosemite Toad	<i>Bufo canorus</i>	FC		USFS-S	CDFG-SSC	
<b>Fish</b>						
California Golden Trout	<i>Oncorhynchus mykiss aguabonita</i>			USFS-S	CDFG-SSC	
California Roach	<i>Hesperoleucus symmetricus</i>				CDFG-SSC	
Hardhead	<i>Mylopharodon conocephalus</i>			USFS-S	CDFG-SSC	
Kern Golden Trout	<i>Oncorhynchus mykiss gilberti</i>				CDFG-SSC	
Little Kern Golden Trout	<i>Oncorhynchus mykiss whitei</i>	FT				
Mount Lyell Salamander	<i>Hydromantes platycephalus</i>				CDFG-SSC	

Sources: California Natural Diversity Database, State & Federal Listed Endangered & Threatened Animals of Calif., July 2010, (CDFG 2010) and California Natural Diversity Database, Special Animals (898 taxa), January 2011 (CDFG 2011b).





As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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U.S. Department of the Interior

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