STATEMENT OF FINDINGS FOR EXECUTIVE ORDER 11988

(FLOODPLAIN MANAGEMENT)

BRIDGE REPLACEMENT AT CEDAR GROVE

SEQUOIA AND KINGS CANYON NATIONAL PARKS

CALIFORNIA

Recommended:

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INTRODUCTION

The National Park Service (NPS) in cooperation with the Federal Highway Administration/Central Federal Lands Highway Division (FHWA) is proposing to replace the 142-foot bridge spanning the South Fork of the Kings River at Cedar Grove Village in Sequoia and Kings Canyon National Parks (parks), Fresno County, California. This evaluation is consistent with the following requirements and guidelines: Executive Order 11988 ("Floodplain Management"), NPS Director's Order #77-2 Floodplain Management (NPS 2003), and NPS Procedural Manual #77-2: Floodplain Management (NPS 2002).

This Statement of Findings (SOF) summarizes the floodplain development associated with actions included in the management preferred alternative as described and evaluated in the *Draft Environmental Assessment for the Bridge Replacement at Cedar Grove* (EA) (NPS 2009).

DESCRIPTION OF THE PROPOSED ACTION

Purpose

In its current condition, the bridge does not provide a safe, durable, sustainable passage for vehicles at Cedar Grove, is unsafe for pedestrians and bicycles, and restricts the free-flowing character of the South Fork of the Kings River, particularly during high water and flood events.

The purpose of this project is to maintain and enhance access for visitors, park employees, and concessioners in the Cedar Grove area, in a safe and sustainable manner.

The second purpose of this project is to meet the mandates of the Wild and Scenic Rivers Act (16 U.S.C. 1271 et seq.). The 7.6-mile segment of the South Fork of the Kings River, including the project area, is a designated Wild and Scenic River, classified as a recreational river segment. In accordance with the Wild and Scenic Rivers Act, this area will be administered in such a manner as to protect and enhance the values that caused it to be included, without limiting other uses that do not substantially interfere with public use and enjoyment of these values. NPS *Management Policies* directs the parks to take no management actions that could adversely affect the values that qualify a river for the national wild and scenic rivers system (4.3.4) (NPS 2006).

The final purpose of this project is to implement a component of the approved FGMP/EIS for the parks. The FGMP/EIS calls for the replacement of the Cedar Grove Village Bridge to reduce impacts and increase sustainability (NPS 2007).The FGMP/EIS directs the parks to protect the free-flowing character of river areas and to maintain and enhance the integrated ecological functions, natural hydrological, and free-flowing condition of park rivers.

Need

The need for the action is to reconstruct the bridge in a manner that would improve sustainability and meet standard weight requirements, to continue to provide for visitor and park access, while protecting and enhancing the values of the Cedar Grove Bridge, in accordance with the *Wild and Scenic Rivers Act*, NPS policies, and park goals.

The objectives of this project are to:

- Provide safe vehicular, pedestrian, and bicycle access to Cedar Grove Village in a manner that lessens resource impacts and improves sustainability;
- Provide utilities to the Cedar Grove Village in a safe and sustainable manner;
- Improve the Kings River's ability to flow in a wild and natural course and better protect the river's ORVs;

- Protect other natural and cultural resources in the project area, including floodplains, riparian areas, and wetlands; and
- Protect park facilities downstream of the bridge.

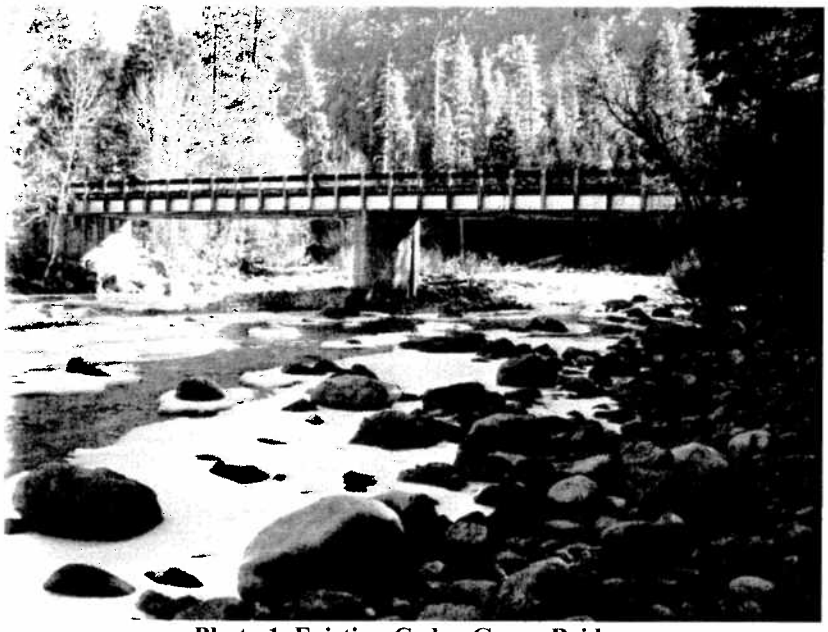

Photo 1. Existing Cedar Grove Bridge

The NPS identified and evaluated a range of alternatives to improve structural bridge deficiencies, improve natural and cultural resources protection, enhance visitor experience, and improve park operations.

The EA evaluates two alternatives, including Alternative A, the no action alternative. Alternative B, the management preferred alternative, includes the replacement of the existing 142-foot bridge with a new 280-foot bridge in the same location. The bridge would have steel girders placed on concrete bridge abutments and two concrete piers, and steel handrails with stone masonry pillars. The bridge would have a concrete deck to accommodate two 11-foot travel lanes and a sidewalk with a curb on the south side. Both roadway approaches would also be reconstructed.

The management preferred alternative would also include the installation a wood reinforced floodplain to restore this reach of the South Fork of the Kings River, which is classified as a recreational river, according to the Wild and Scenic Rivers Act. The current bridge length is inadequate and restricts the flow area of the river, particularly during high water and flood events. This has resulted in sediment deposition and erosion upstream of the bridge, altering the natural river channel and fluvial processes (Figure 1). Occasional maintenance and repairs, including bank hardening and the placement of rip rap, has been necessary to protect the bridge. Lengthening the bridge and removing the hardened materials from the embankment should reduce constriction and improve the natural processes in this reach of the river.

Figure 1. Aerial view of Cedar Grove Bridge (FHWA 2006a)

The removal of the existing bridge, the construction of the new bridge, and the installation of the reinforced floodplain would require some excavation and filling in the floodplain of the South Fork of the Kings River (Table 1).

Table 1. Volume of fill and riprap to be excavated as well as placed in the floodplain (FHWA, Karl Eikermann pers. comm. 2009, ENTRIX 2009).

Activity	Excavation Volume (yd^3)	Fill Volume (yd^3)	Net Removal (yd^3)	Net Fill Volume (yd^3)	Area of new disturbance (yd^2)
Construction (pier and abutment removal and construction, riprap construction, temporary riprap work pad)	1,405	1,205	200	—	880
Restoration (reinforced floodplain)	2,000	2,770	—	770	In disturbed part of the river caused by bridge constrict-ion
TOTAL	3,405	3,975	200	770	880

Floodplain Extent

The Cedar Grove Bridge crosses the South Fork of the Kings River between the Sentinel Campground and the Cedar Grove Lodge. When the bridge was originally constructed, a significant portion of the channel was filled in to form the left (west) abutment, which has caused a flow constriction at the bridge and an increase in water surface elevations upstream of the bridge. The 100-year floodplain has an average width of 240 feet through the project reach (FHWA 2006a).

General Characteristics of Flooding in the Area

No recording stream gauges were identified along this reach of the South Fork of the Kings River that could be used to verify the computed flows. The Watershed Modeling System was used to compute the drainage basin and discharges using a US Geological Survey regional regression equation for the Sierra Nevada. The data input to the equation consisted of site specific historic rainfall values from the National Oceanic and Atmospheric Administration (NOAA) Atlas 2, the Precipitation-Frequency Atlas of the Western United States. The drainage basin is approximately 357 square miles (FHWA 2006). The results of the peak flow discharge computations are in Table 2.

Table 2. USGS Regression Equation Computed Discharges for the South Fork Kings River at Cedar Grove Bridge (FHWA 2006).

Recurrence Interval (yrs)	Discharge (cfs)
2	1,600
5	3,935
10	5,800
25	9,980
50	13,300
100	18,500
500	33,300

According to park records, the South Fork of the Kings River at Cedar Grove has experienced 50-year flow events nine times in the past 70 years (1937, 1950, 1955, 1966, 1969, 1978, 1982, 1984, and 1997). The constriction created by the embankments and the pier has resulted in alterations of the stream channel under and immediately upstream of the bridge. These alterations include the formation of a new side channel on the west upstream side of the bridge and the formation of a depositional area in the main channel of the river. The flood damage in the 1955 and 1997 floods required significant quantities of fill and riprap material to repair damage done to the west embankment during the 1955 and 1997 floods (NPS, Austin, pers. comm. 2008).

JUSTIFICATION FOR USE OF THE FLOODPLAIN

Two other alternatives were considered but dismissed during the scoping process. One design option considered and dismissed allowed for the removal of the existing bridge and replacement with a 330-foot long bridge. This alternative would improve the river's ability to flow in a wild and natural course, to better protect the river's ORVs as a National Wild and Scenic River and provide a safe, durable, sustainable passage for vehicles, pedestrians, bicycles, and utilities crossing the South Fork of the Kings River at Cedar Grove Village. However, the construction of a 330-foot bridge would not provide greater hydraulic benefit than the construction of the 280-foot bridge (NPS Water Resources Division, Smillie and FHWA/CFLHD, Hogan, pers. comm. 2009) nor would it meet the project objectives better than the 280-foot bridge. Thus, the construction of the 330-foot long bridge would be very similar to the less

expensive 280-foot bridge alternative and, as a result, has been dismissed from further analysis. This alternative would have had the same impacts on floodplains as the proposed action.

The second alternative considered but dismissed allowed for the improvement of the North Side Road, including the west intersection. Many improvements would be made to the North Side Road, including the improvement of the turning radius at the west end where it joins the Kings Canyon Scenic Byway. The road would need to be widened to two lanes to better accommodate larger vehicles, such as RVs and vehicles with trailers. This widening would cause adverse impacts on wetlands. Low spots subject to flooding would also be raised, the shoulder hardened as required, and the surface paved for its entire length. The improvement of the turning radius at the west end where it intersects the Kings Canyon Scenic Byway would require removal of the rock face adjacent to the road, potentially resulting in an unstable slope, which may lead to more landslides and result in increased maintenance needs. A trail bridge would also be built across the river to provide passage for pedestrians, bicycles, and utilities after the demolition of the existing bridge. The road improvements proposed in this alternative would eliminate the need for the bridge at Cedar Grove Village. However, this alternative would not meet the project objective to provide safe, durable, sustainable passage for vehicles, and would also not be consistent with the direction of the FGMP/EIS, which specifically states that Cedar Grove Village bridge should be replaced (FGMP/EIS 2006), and would not be economically feasible. Therefore, this alternative was dismissed from further analysis. This alternative would have had similar impacts as the road bridge to floodplains resulting from the building of a trail bridge.

With the current bridge and west embankment removed, the downstream channel geometry would act to constrict the flow rather than the bridge. Since the 280-foot bridge configuration would span most of the floodplain, there would be no constriction scour. In addition, since the abutments would be buried and would not constrict the channel, no abutment scour would be anticipated and the hydraulic conditions of the river would be improved (FHWA 2006a). The construction of the new bridge would have scour from two piers.

The depositional area would be excavated and deposited upstream of the bridge filling in the eroded portion of the channel that has formed along the west bank. This would help to restore the channel to a configuration that more closely resembles the typical channel geometry in this reach and may also reduce the deposition potential upstream of the bridge. The abovementioned restoration activities would also help restore the channel configuration and improve the hydraulic conditions of the river (FHWA 2006a).

DESCRIPTION OF SITE-SPECIFIC FLOOD RISK

The 280-foot bridge would be wider than the natural channel section immediately downstream of the bridge allowing for natural stream flow passage to occur as well as passage of a 100-year flood. The 280-foot span would not constrict the flow of the channel. With the current bridge removed, the downstream channel geometry would act to constrict the flow rather than the bridge, allowing for a smooth transition beneath the bridge. For the 50-year event, the 280-foot bridge would lower the upstream water surface elevation by approximately 1 foot, while the reduction for a 100-year event is nearly 2 feet (FHWA 2006a).

DESIGN OR MODIFICATIONS TO MINIMIZE HARM TO FLOODPLAIN VALUES

Natural floodplain values include attributes of floodplains that contribute to ecosystem quality such as soils, vegetation, wildlife habitat, dissipation of flood energy, sedimentation processes, and groundwater discharge. The proposed bridge would improve the hydrology of this reach of the South Fork of the Kings River by decreasing contraction and abutment scour and lowering the upstream water surface elevation by 1 foot for a 50-year event and 2 feet for a 100-year event. By installing the reinforced floodplain described in the EA and planting willows and other native species, such as cottonwoods, on the new restoration, fish and wildlife habitat would be improved and flood energy would be dispersed. The restoration project would also prevent bank erosion.

CONCLUSION

The preferred alternative would improve the river's ability to flow freely and would improve the condition of the floodplain, which has become degraded as a result of the existing bridge. The replacement of the existing 142-foot bridge with a 280-foot long bridge would ease the constriction of the channel, improving the overall channel geometry and flow of the river. The reinforced floodplain and restoration of more natural river conditions would improve habitat and reduce flood energy by dispersion. The restoration project would also prevent bank erosion.

NPS has determined that the proposed actions associated with the preferred alternative as described in the EA (NPS 2009) would have no significant effect on human health or property or on natural or beneficial floodplain values. Mitigation and compliance with regulations and policies to prevent impacts on water quality, floodplain values, and loss of property or human life would be strictly adhered to during and after the construction. Individual permits with other federal, state and local agencies would be obtained prior to construction activities. No long-term adverse impacts on floodplains would occur from the preferred alternative. Therefore, NPS finds the preferred alternative to be consistent with Executive Order 11988 for the protection of floodplains.

References

Austin, J.T. (NPS, Sequoia and Kings Canyon National Parks).

2008 Personal communication: Email attachment Cedar Grove Bridge Background dated November 20, 2008.

Eikermann, K. (FHWA, CFLHD)

2009 Personal communication: Email attachment with itemized list of fill and excavation needs for the Kings River Bridge project, Sequoia and Kings Canyon National Parks dated January 28, 2009.

Federal Highway Administration

2006a Memorandum: Kings River Cedar Grove Village Bridge Replacement – Bridge Configuration Review. On file at the Denver Service Center, National Park Service.

2006b Bridge Inspection Report Summary, Cedar Grove Bridge. On file at the Denver Service Center, National Park Service.

U.S. Department of Interior, National Park Service

2009 *Environmental Assessment for the Bridge Replacement at Cedar Grove.* Sequoia and Kings Canyon National Parks, Tulare County, California.

2007 *Final General Management Plan/Environmental Impact Statement.* Sequoia and Kings Canyon National Parks, Tulare County, California.

2003 *NPS Director's Order #77-2 Floodplain Management.* Washington, D.C.

2002 *NPS Procedural Manual #77-2 Floodplain Management.* Washington, D.C.