Pinnacles National Monument

National Park Service
U.S. Department of the Interior

Pinnacles National Monument
Paicines, CA

Sandy Creek Bridge Reconstruction Environmental Assessment

June 2011

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Introduction

This environmental assessment (EA) was written pursuant to the National Environmental Policy Act (NEPA),[1] which requires federal agencies to evaluate the environmental effects of a proposed action, and alternatives to it, before making a decision on the action. Other agencies and interested parties were informed early in the process of writing this document in order to determine any significant issues related to the action, and to develop a reasonable set of alternatives for the decision maker to consider.

Following publication of this EA, public comment will be solicited for a thirty (30) day review period. If no significant environmental impacts are found through this process, a decision will subsequently be made public in a separate document called a "Finding of No Significant Impact (FONSI)."

Background

Pinnacles National Monument is located in the Gabilan Mountains east of central California's Salinas Valley. The Monument is noted for its rock spires, ramparts, crags, massive monoliths, sheer-walled canyons, and boulder-covered caves that are the remains of ancient volcanoes. Pinnacles was proclaimed a National Monument in 1908.

The project site is located on Sandy Creek adjacent to the Pinnacles Campground and the 331 acre Ben Bacon Ranch Historic District. The Historic District is the core area of the larger 1,967 acre Pinnacles Ranch, which was acquired and added to Pinnacles National Monument in 2006. Pinnacles Ranch is located on the east side of Pinnacles National Monument, west of Highway 25 (Airline Highway) and largely to the south of Highway 146 (Pinnacles Highway or Entrance Road). The original Sandy Creek crossing was constructed in the late nineteenth century and reconstructed several times. The existing wooden bridge was built in 2006. The bridge accesses the ranch land from Highway 146 and was acquired by Pinnacles National Monument with the ranch in 2006. The bridge is single lane, without guard rails, spans 40-feet, and is about 15-feet above Sandy Creek. The bridge abutments were heavily damaged in rainstorms of mid-January 2010 and the bridge is currently not safe for use.

There are two entrance routes on to the Sandy Creek Valley floor comprising the historic district, called the "Bottomlands". One is a dirt track from California State Highway 25 and the second from California State Highway 146. The Highway 146 entrance is a short paved driveway leading to the existing storm-damaged bridge, located 30 feet from the highway. The short distance and poor visibility due to nearby trees make it hazardous to enter and exit the highway to access the bridge. There is a very high probability of vehicle accidents at this junction, especially for park staff vehicles towing trailers.

Vehicular access across Sandy Creek is needed on a daily basis for park management; operations and maintenance of the ranch lands, utilities, roads, buildings, fences and leases. It is anticipated that the general public will not use the bridge by motorized forms of transport, except by special permit, but would have pedestrian and bicycle access. The NPS has proposed that the new bridge access be through the existing campground. This would eliminate the traffic hazard to Park staff exiting and entering Highway 146 at the existing bridge crossing and provide safer access to the ranch by Park staff and by visitors.

[1] Specific processes are required under the Council on Environmental Quality (CEQ) regulations at 40 CFR Parts 1500-1508.

Authorities for Action

This action is undertaken through the authority provided in the National Park Service Organic Act, the Administrative Procedures Act, as amended, and other applicable laws and regulations. It is fully consistent with the 2006 Management Policies.[2] Authorities specific to each resource impact topic are provided in the affected environment section, by topic. These include such laws as the Clean Air Act, The Clean Water Act, The National Historic Preservation Act, The Endangered Species Act, and other laws and regulations relevant to park management.

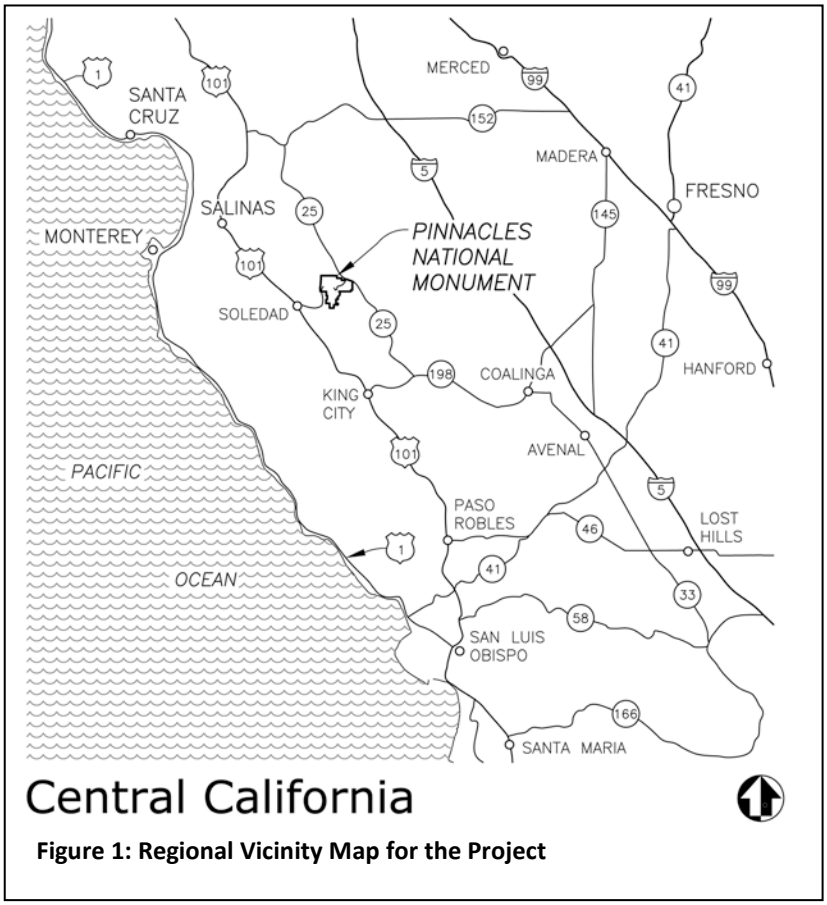


Figure 1: Regional Vicinity Map for the Project

This action is consistent with and supportive of the purposes for which the park was established. The *park purpose* is the most fundamental criterium against which the appropriateness of all plan recommendations, operational decisions, and actions are tested. The purpose is derived from law and policy. Pinnacles National Monument was established by presidential proclamation in 1908 to reserve and protect "the natural formations, known as the Pinnacles Rocks, with a series of caves underlying them, which are situated upon public lands, within the Pinnacles National Forest, in the State of California, are of scientific interest, and it appears that the public interests would be promoted by reserving these formations and caves as a National Monument, with as much land as may be necessary for the proper protection thereof."

The 2000 Presidential Proclamation added an additional 7,900 acres to the park. This legislation stated that the boundary enlargement "is central to the continued preservation of the Pinnacles National Monument's unique resources. In addition to containing pieces of the same faults that created the tremendous geological formations throughout the monument, the expansion lands hold part of the headwaters that drain into the basin of the monument … Additionally, these lands contain a biological system that must be protected if the wild character and ecosystem of the monument are to be preserved … By expanding the monument, these unique biological resources can be afforded more complete protection to maintain and enhance the

[2] References to specific management policies are made throughout this document. It should be understood that the policy document from which are these are taken is titled Management Policies – The Guide to Managing the National Park System, August 31, 2006.

ecosystems of the monument."

The expressed purpose of Pinnacles National Monument is to protect the volcanic Pinnacle Rocks formation, talus caves, associated lands and ecosystems for their scientific, educational and cultural values, by caring for their natural processes and wild character and providing opportunities for public enjoyment and understanding of these resources. This project contributes to the enhanced appreciation and management of the Ben Bacon Ranch Historic District as a cultural value, and it seeks to do so by minimizing impacts on the physical and biological resources of the park.

Further, this action is consistent with the developing General Management Plan (GMP) for Pinnacles National Monument (referred to henceforth as Pinnacles N.M.). The draft GMP proposes, in three alternatives, a new trail loop beginning at the visitor center and crossing Sandy Creek. The Sandy Creek Bridge reconstruction would be necessary should the finished GMP include the trail. Features considered to be in common for all GMP alternatives fully support this proposed action.

Chapter 1 - Statement of Purpose and Need for Federal Action

Purpose and Need (Existing versus Desired Condition)

Historically, within the project area, a structure crossing Sandy Creek was necessary to access the Pinnacles Ranch facilities from California State Highway (CSH) 146. The structure has been reconstructed several times since its original construction in about 1870. The exact original location is unknown, and may have varied within about a 200' stretch of Sandy Creek. In 2006, the NPS obtained these lands, and have subsequently used the bridge crossing on a daily basis for several purposes, including general park management, resource protection, and facility maintenance. The ranch and its facilities are incorporated into a specially designated area, the Ben Bacon Ranch Historic District. Management of the area requires vehicular access. Although the integrity of the existing bridge has been a concern since the ranch was obtained, the bridge structure was undermined by high stream flows in January 2010, and determined to be unsafe for use. Administrative access had to be routed to the only other way in, from CSH 25. The Highway 25 access route is a gated, one lane unpaved track through former pasture land at the base of the hills. It winds 1.8 miles over mostly flat terrain to reach the Butterfield and Bacon homesteads and associated outbuildings. This overland drive is potentially causing resource damage due to increased use. This describes the existing management condition in relation to the Sandy Creek bridge access.

The desired condition is to provide safe bridge access for the established administrative purposes, that will accommodate vehicles necessary for resource protection and other operational needs as described earlier. It is also desired that the bridge fit the historic rural setting, be designed and constructed to enhance resource values associated with Sandy Creek and its riparian environment, and be recognizable as an effective use of public funds. Public access and use of the bridge is to be accommodated in support of existing public use, which is to be limited to pedestrians, bicycles or specially permitted vehicles. In short, a new bridge is desired to replace the old, unusable structure in support of existing access needs. No expansion of public use that would require a different type of structure is contemplated.

Scope of Analysis

The scope of analysis is local, circumscribing the area of the proposed bridge access and the surrounding area and the uses which it serves. Most of the use and public benefit derives from local and area residents. The area of analysis includes the park ingress from CSH 25, and the area which it serves, owing to the sole currently available access without the Sandy Creek Bridge. The analysis of impacts will focus primarily on the section of Sandy Creek that incorporates all the alternative bridge locations, and both the long and short term potential effects of each alternative will be assessed. Also, the potential for cumulative impacts will be assessed over areas appropriate to the resources being considered. Please see Figures 1 and 2, which shows the project area location and its regional vicinity.

It is intended that the analysis provided in this, or attached to it in an appendix, will serve as the biological assessment necessary for consultation with USFWS regarding the California red-legged frog. This document will also serve as Assessment of Effect for compliance with Section 106 of the National Historic Preservation Act.

Decision to be made

The decision to be made is whether or not to remove the existing bridge and whether to construct a replacement bridge crossing over Sandy Creek and if so, what conditions and specifications would be applied. The decision for building a replacement bridge will be based upon the potential environmental impacts disclosed in this EA for the action alternatives. A determination will be made regarding the alternative which best meets the purpose and need for action as well as other criteria the decision maker may consider. These could include cost, public benefit, public input, or other factors beyond strictly environmental considerations. The rationale used in coming to the decision will be documented in a Finding of No Significant Impact (FONSI), as appropriate.

Figure 2: Existing Condition

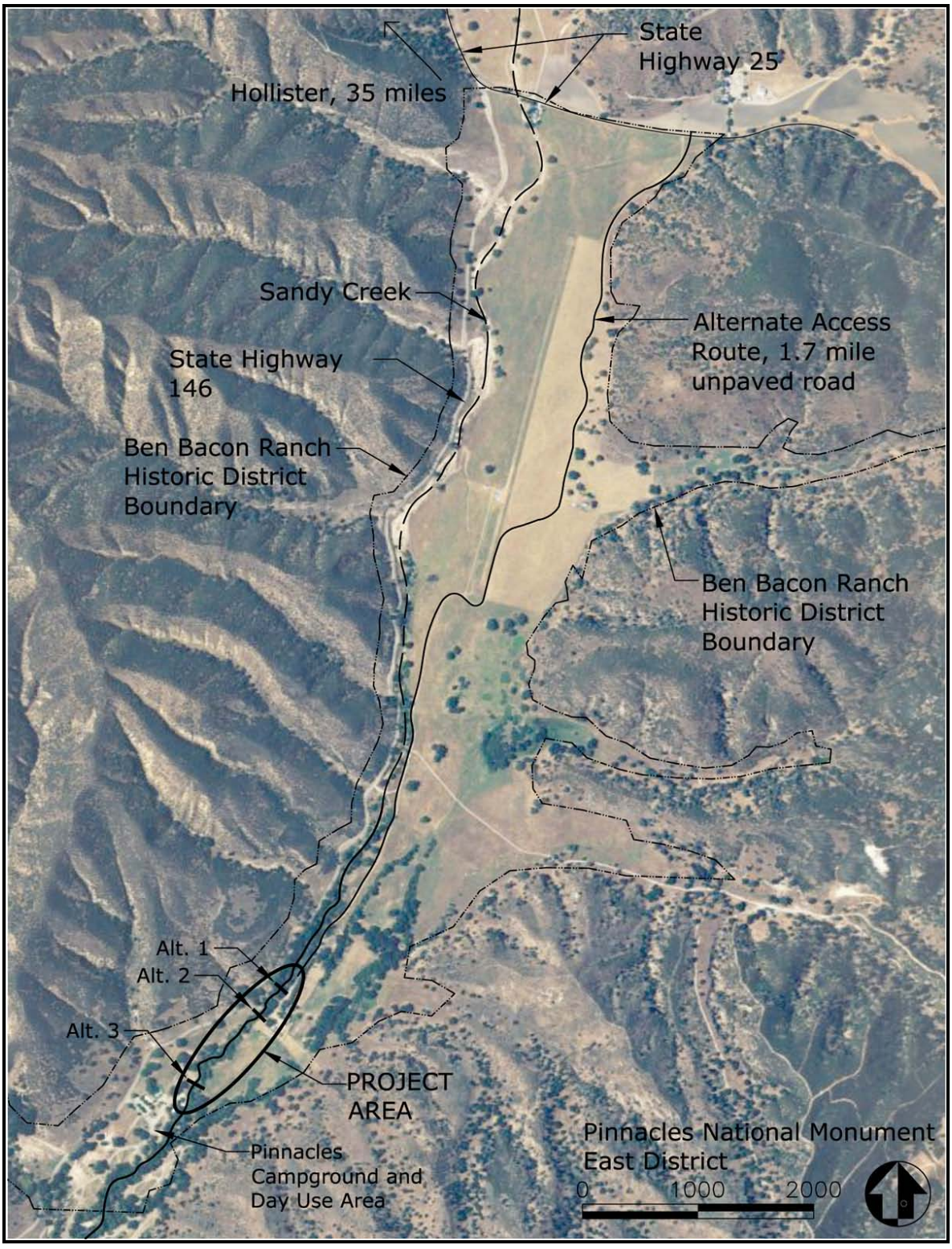


Figure 3: Project Area Location

Public Scoping

A public scoping notice was issued on June 22, 2010, and comments were requested by July 23. Letters including a response postcard and website, email and phone information for the park were sent directly to 141 known potentially interested or affected parties, including local residents, public agencies, libraries and public media such as radio/TV stations and newspapers. Representatives of state and local government were contacted with these letters in addition a variety of interest groups and other federal agencies. The scoping mailing list may be found in Appendix A. Four comments were received. Their content is summarized below. There were no formal public meetings held on this proposed action. The scoping notice was placed on the Pinnacles N.M. web site at https://parkplanning.nps.gov/pinn and www.nps.gov/pinn, and it was posted in the east and west side Visitor Centers.

Substantive Issues Resulting from Public Scoping

All four commenters indicated a desire to be kept informed of the project is it develops, and some wished to receive printed copies of the public draft EA and FONSI. One commenter expressed a preference for no new bridge but if a bridge was required it should be near the campground to reduce development (Alternative 3). Another also preferred a bridge near the campground (Alternative 3) because it proposes an access road in the least obtrusive fashion. Another comment supported Alternative 2, but no rationale was provided. The San Benito Library expressed interest in having a printed copy of the EA. From this body of public comment, the one substantive issue of visual concern in regard to the access road may be derived.

Analysis Issues and Impact Topics Evaluated

Park Service personnel have identified several issues associated with the current location of the bridge. Because of this, there is a need to look at alternative sites that address these issues, while still meeting the purpose and need for action. Based on further field surveys, analysis, and comments from the public, the preliminary alternatives identified for the scoping process have been reviewed and refined.

Impact topics that are evaluated in this EA are presented below. This proposed action and the EA is essentially driven by public safety, as well as park operations and management. The topic is fundamental to the purpose and need for action, and all alternatives incorporate public health and safety, in the sense that they eliminate a potential hazard for park employees and the visiting public. References are made to this topic in a number of areas within the EA, most notably in the purpose and need for action. Only the topics listed below are included in the Affected Environment and Consequences section of this document.

Natural resource requirements and conservation potential

There are a variety of natural resources within the project area that require conservation pursuant to NPS law and policy that could be affected by bridge and road construction. These include the physical resources of air, water, soil, and soundscapes and the biological resources of vegetation, fish and wildlife.

Water Quality, Wetlands and Floodplains

Creek values could be affected by the new abutments and rip-rap as well as overall construction. The evaluation of this topic, in terms of the hydrologic regime of Sandy Creek, is relevant to the decision to be made and included under the topic heading of Water Resources.

Endangered or threatened plants and animals (Special Status Species)

Three federally listed species occur at Pinnacles N.M., California condor (*Gymnogyps californianus*), California tiger salamander (*Ambystoma californiense*) and California red-legged frog (*Rana draytonii*). Habitat for the California red-legged frog exists in Sandy Creek. This issue will be analyzed under Special Status Species.

Important cultural resources, including historic properties

The Ben Bacon Ranch Historic District, as part of Pinnacles National MN.M., is a chief concern relating to the proposed action. No other properties under the heading of this topic, including archeological resources other than the described cultural landscape have been identified.

National Monument Visitor Use and Experience

Park purposes include the necessity to protect, conserve or enhance natural resources in order to provide for enjoyment by current and future generations. The project area includes use by visitors for camping, day use and general recreation.

Potential Issues and Impact Topics Dismissed from Further Analysis

Potential impact topics, as presented in the NPS DO-12 Handbook, are reviewed here as to their applicability in this analysis. The rationale for this review stems from the essential purpose of an EA, to determine whether there would be significant impacts requiring the preparation of an environmental impact statement to proceed with the action.[3] The dismissal of these topics, with rationale, demonstrates there is no concern at least in those areas.

Depletable resource requirements and conservation potential

There are no depletable resources, or facilities for their production and use, involved in this proposed action. This topic is dismissed.

Possible conflicts between the proposal and land use plans, policies or controls (local, state or Indian tribe) for the area

The proposal does not affect land use to any degree that would affect adjacent jurisdictions, and there are no overlapping jurisdictions in the project area. Any regulatory concerns of other agencies have played a role in the analysis of each alternative, and they will be effectively mitigated through standard permitting processes as they apply. During scoping and during planning discussions with other agencies, no such conflicts have been identified.

[3] (Ref. 40 CFR 1502.15). CEQ topics required for the determination of significance may be found in 40 CFR 1508.27. CEQ provides that agencies develop their own processes for performing environmental assessments (as opposed to EIS's). NPS provides the DO 12 Handbook, page 53, on which there is a list of mandatory topics.

Archeological Resources

An Archeological Survey was conducted in the project area in January and March 2001 and concluded that no archeological resources would be affected by the proposed action or alternatives to it.[4] Therefore, this topic is dismissed from further analysis.

Energy requirements and conservation potential

The proposed action does not affect the production, conservation or demand for energy-related resources.

Prime and unique agricultural lands

While the project area includes access to a historic district and cultural landscape of rural character, there are no designated prime and unique agricultural lands involved.

Natural Lightscapes

Natural lightscapes are park resources managed under the authorities of the NPS Organic Act and Management Policy 4.10 (Lightscape Management). The National Park Service strives to preserve natural lightscapes, which exist in the absence of human-caused light sources. Values that are connected to lightscapes, specifically the preservation of naturally dark nighttime skies, include visitor experience and habitat values for a variety of species dependent on that condition for procreation, cover, and foraging.

The area affected by the proposed action can be characterized as one with very limited intrusions by human-caused light during the night hours. The night skies are dark and stars are highly visible. The night glow from Fresno, is barely perceptible except during the darkest nights. Local sources of light pollution include lights on buildings at the Pinnacles Visitor Center and related facilities, lights from campers in the Pinnacles Campground, and the headlights of passing cars on Hwy 146. The greatest impacts on dark night skies at Pinnacles are from the Soledad Prison to the northwest and Hollister/San Jose to the north. The reader should note that most, if not all, of the resources presented here are to be managed not only for their own intrinsic value, but also because they are enjoyed by people. Natural lightscapes is one of these, being an important component of an enjoyable experience for visitors.

The only potential impact on lightscapes from this proposed action would be if security lighting were to be used for the storage of construction equipment on site. Since the construction area will be enclosed, but not lit for overnight security, there would be no impact. Therefore, this topic is dismissed from any further analysis.

Ecologically critical, specially designated areas, or unique resources

The project area, in whole or in part, is not deemed to be ecologically critical or unique. While geology and the protection of unique geologic features represent the basis for Pinnacles N.M., no such features are present within or could be affected by the proposed action. Other than ecological or historic concerns as represented under other topics, there are no specially designated areas involved such as Wilderness, Wild, Scenic or Recreation Rivers, National Scenic Trails, and National Natural or Historic Landmarks.

[4] An archeological survey was completed, wherein test pits at potential resource sites found no items. The archeology report and letter to the SHPO will state there would be negligible or minor impact.

Social and Economic Values

Socioeconomics is a generally a required topic or an issue of concern for analysis in an EA or EIS. NPS has no specific mandate other than NEPA to deal with this subject. However, NPS Management Policy 8 deals broadly with "use of the parks." Policy 8.2 covers visitor use, and 8.5 directs use by American Indians and other traditionally associated groups. Further, EO 12898 (Environmental Justice) requires federal agencies to evaluate the effect of proposed actions on minorities and economically disadvantaged populations.

There are no economically disadvantaged populations in the area that would be disproportionally affected by the proposed action. The social makeup of local community is reflected in the identification of potentially interested or affected parties as provided in the scoping mailing list (Appendix A). The community is largely based in ranching and agriculture, and that community is represented in local government and various social groups.

Other than visitors to the park, who may come from outside the local community, social and economic interest revolves around the historical use embodied and celebrated in the Ben Bacon Ranch Historic District, and the typical forms of recreation visitors engage in. There is additional interest from the environmental and conservation community, which overlaps the local rural community to a small degree. To date, this portion of the Monument contributes very little to the rural economy. Economic contributions to the local community mostly come from approx. 30 Pinnacles staff who live in the area and use local businesses; from hiring maintenance work performed by local contractors; and expenditures that visitors make in Hollister, Paicines, or Tres Pinos on their way to and from the park. Very little recreation occurs on these lands recently obtained by the park system. Impacts on visitor use and experience, sometimes treated as a social impact, is evaluated under its own topic heading. Under the auspices of a new general management plan, yet to be completed, there may be a future emphasis on recreation facility use and development involving the historic district, in part. Should that occur, there may also be opportunities for additional economic activity locally and perhaps regionally on a small scale.

Economic values are generally calculated and considered at the county level. Considering the nature of the proposed action, that it involves the construction of 1000 feet or less of natural surface road, and the placement of a prefabricated bridge over a two week period, few jobs would be created. Against the total economic output of the county, this project is not measurable in terms of potential jobs and income created. It certainly would not have a negative impact on the county. Therefore, no further economic analysis is necessary.

Affiliated Native American Tribes, Sacred Sites and Indian Trust Resources

Among the local area tribes in the Gabilan Mountain region, the Amah Mutsun Tribal Band includes the Pinnacles as part of their traditional territory. The tribe is state recognized, with tribal enrollment of over 500 people. The members are the direct descendants of the aboriginal tribal groups whose villages and territories fell under the sphere of influence of Missions San Juan Bautista and Santa Cruz during the late 18th through the early 20th centuries. Pinnacles N.M. respects the traditional territory and traditional knowledge of the Amah Mutsun, and involves the Tribe in various park projects.

Chapter 2 - Alternatives Including the Proposed Action

Features Common to all Action Alternatives

With all action alternatives, there will be the necessity to provide measures that protect or enhance local resource values, including the monitoring of resources during and after project implementation. Generally speaking, these are standard management and construction practices that are intended to prevent, avoid or detect both long and short term impacts. The need to remove the existing unsafe crossing structure is part of each action alternative. Finally, the essential bridge type will be selected as befitting the rural character of the area and the adjacent historic district, no matter which alternative is finally selected. This bridge design is incorporated into the EA, and shown in Appendix E.

The bridge will be built to a 10-ton load limit rating rather than the standard HS-20 load rating for public access bridges. Building a lighter bridge will reduce project costs, reduce impacts on the site and satisfy the park needs. The 10 ton bridge will accommodate maintenance vehicles, resources vehicles and horse trailers, and ambulances. It will not accommodate full-sized fire trucks or unlimited public access. Bollards at the end of the road and at each end of the bridge will prevent public access by vehicle, but not restrict pedestrian or bicycle access.

In the area of about 100' upstream and within the existing failed bridge abutments there is a population of exotic invasive periwinkle (*Vinca major*). In order to prevent its spread it would be treated and removed. This species can be difficult to eradicate using mechanical methods and may require the use of herbicide. The means and timing of removal is discussed in Chapter 4 under Vegetation and Special Status Species.

General Construction Activities

All action alternatives would implement the same general construction activities. These include the initial geotechnical surveys which must be completed in order to study the subsurface characteristics of the bridge construction site. Actual site preparation and bridge construction would follow, along with blading a natural surface road for access to the bridge. Finally, in all alternatives the damaged bridge would be removed. Mitigation measures will be applied through all phases of construction.

Geotechnical Surveys. Geotechnical Investigation borings are to be drilled and subsurface material sampled at the proposed bridge site for a total of two borings, one at each abutment. Boring locations are anticipated to be placed along the centerline at the toe of the proposed abutment. Utility locate personnel will be contacted and the boring locations cleared for utilities prior to drilling commencement. Borings will be advanced with hollow stem auger and wire-line core techniques utilizing a local drilling contractor. Boring depths are anticipated to be between 30 and 60 feet in depth requiring approximately 1 day of drill time each. Standard Penetration Tests (SPT's) will be taken at 5-foot intervals for the entire depth of the boring. Borings will be logged by FHWA personnel and samples will be transported to a FHWA soils laboratory for testing. All borings will be backfilled with remaining drill cuttings.

Bridge Construction. The first phase of work would consist of geotechnical boring investigations during the engineering phase using a truck mounted drill rig. After construction documents have been completed, the construction project will be bid and awarded. The first construction work performed will likely be the new

road/trail access to facilitate equipment accessing the new bridge site. The road will be excavated approximately 4" and the topsoil windrowed to the side. Aggregate base will be placed and compacted and the windrowed shoulders replaced to keep the new road/trail flush with the existing soil surface. The bridge girders will be prefabricated off-site, and on-site the concrete bridge footings and abutments would be formed and poured. The stream banks will be graded to a smooth contour, removing 2-3 feet of soil in some places. The abutments would be located in the upper third of the stream channel cross section. This construction phase would take approximately one week to complete. No further bridge construction would likely occur for 14 to 28 days, in order to allow the concrete to cure. The prefabricated bridge girders would be delivered by truck, set into place in approximately one day by a boom crane. The final phase of work, estimated to take another week, would consist of making structural connections and adding bridge guardrails and wood decking. Rip rap will be placed in both creek banks, keyed in and partially covered with soil. Cuttings of native creek plants will be planted in the riprap and exposed stream banks. All construction work would be undertaken only during weekdays, normally between one-half hour after sunrise to one-half hour before sunset. Staging of construction materials will be in the field near the bridge on the north side or in the disturbed area of the Bacon Homestead. No fencing or lighting will be used. No materials or equipment will be stored within the drip line of oak trees. All area disturbed will be returned to pre-construction conditions at the end of construction.

Traffic control (flaggers) may be required on Hwy 146 for short periods as equipment arrives to remove the old bridge, trucks enter the road to haul the pieces away, and the crane is brought in and out of the park at the beginning and end of construction.

Old Bridge Removal. Under all action alternatives, the damaged bridge structure would be removed. The deconstruction activities would likely proceed as follows. The existing bridge would be cut into pieces manageable for a track hoe excavator to pick up safely from the existing driveway behind the abutment. A small crane may be used but due to the small size of this structure would not be a necessity. The removal of the bridge would be done by cutting longitudinally through the timber deck and through the steel diaphragms so that the bridge is in two or three longitudinal strips. These would be lifted by the track hoe onto a dump truck or flatbed for disposal outside of the park. It is assumed this will be done from the Highway 146 side of the creek to avoid the power line and vertical lifting conflicts. Alternatively, the contractor may elect to cut the deck into smaller longitudinal or transverse strips, remove the strips, then cut the remaining steel girders into manageable pieces to pick up with his excavator.

The existing concrete abutments would be excavated to the bottom of cap elevation with an excavator and then cut or hammer drilled into sections. The track hoe would then load the concrete pieces into dump trucks for disposal. The concrete blocks lining the banks would be picked up from the top of the embankments by crane and lifted onto dump trucks for disposal. All man-made or excess plant materials would be disposed of in suitable repositories outside the park. Any excess soil would be used within the park. The existing driveway leading from Highway 146 to the bridge would be pulverized and the remaining asphalt (about 1250 square feet) removed. The timeframe for this demolition work is estimated to be between 3 and 5 days with a normal work crew.

Bank restoration and stabilization will be performed using the excavator and small compactor. The bank grades are currently steep and unstable due to the existing bridge abutments and will be graded back to a lower, more stable slope contiguous with the adjacent creek banks after the bridge is removed. Erosion

control measures will be implemented during removal and grading and the site will be revegetated with cuttings and seed of vegetation obtained from the Sandy Creek riparian corridor.

Figure 4. Damaged bridge crossing to be removed.

Mitigation. Apart from standard measures for protection that will be common to all alternatives (listed in Appendix C), specific alternatives may require specific mitigation measures due to their particular circumstances and conditions. These mitigation measures are incorporated into the actions of the alternatives themselves such that, if selected, mitigation is automatic.

Connected Actions

With each alternative, access to the bridge must be considered as a connected action. These measures vary among the alternative sites, as do the approaches and other design features of the structure. Other connected actions would include ancillary developments such as staging areas for construction material and equipment, as well as potential uses of the facilities following construction. Finally, the activities associated with the removal of the old bridge structure need to be evaluated as connected actions.

Alternative Descriptions

The following sections describe the alternatives being considered in detail, including the No Action Alternative. Accompanying each description is a photo that depicts the stream channel section that would be bridged. After the narrative descriptions, illustrations of the alternative site locations and proposed bridge cross-sections may be found.

Alternative 1:

Reconstruct the bridge at its existing location. A new bridge span, meeting design criteria provided in Appendix B, would be 50 feet long. A new unpaved road would be constructed between the visitor center area and the bridge site on the highway side of Sandy Creek. This road would be 12 feet wide and about 1,065 feet long. Access from the highway would be via the existing road to the visitor center, through the campground day use area and along the unpaved road parallel to Highway 146. The new road would wind between the large oak trees between the creek and Highway 146, and it would be necessary to remove several of the large grey pines near the construction site. Riprap would be necessary to protect the bridge abutments from scour during high flows. All day use and campsites would remain open in this alternative.

Rationale for Alternative 1: seeks to locate the bridge at its existing location so that a new site would not be affected. Please see general construction activities, above, which outlines the procedures that would be used to implement this alternative.

Figure 5: Downstream view from Alternative 1 Bridge Site

Alternative 2: Preferred Alternative

Reconstruct the bridge approximately 300 feet downstream from the existing structure. A span of 50 feet would be necessary to cross the creek, meeting design criteria provided in Appendix B. A new unpaved road would be constructed between the visitor center area and the bridge site on the highway side of Sandy Creek. This road would be 12 feet wide and 770 feet long. Access from the highway would be via the existing road to the visitor center, through the campground day use area and along a secondary unpaved road parallel to Highway 146. All day use and campsites would remain open in this alternative.

Rationale for Alternative 2: seeks to lessen the visibility of the access road from the highway, and disturb fewer acres of soil and vegetation. Please see general construction activities, above, which outlines the

procedures that would be used to implement this alternative. Riprap would be necessary to protect the bridge abutments from scour during high flows. Nine oak trees (2”-12”dbh) and 1 grey pine (15” dbh) would need to be removed.

Figure 6: Alternative 2 Bridge Site upstream

Figure 7: Alternative 2 Bridge Site at Bacon Homestead

Alternative 3:

Reconstruct the bridge meeting design criteria provided in Appendix B at a location near the visitor center area. A bridge span of 75 feet would be necessary. Construct a new unpaved road 12 feet wide and about 830 feet long on the opposite side of Sandy Creek from the bridge to the historic ranch structures. The new access road would be on the Ben Bacon Ranch pasture side of the creek. As in the other action alternatives, access to the bridge from the highway would be via the existing visitor center road. Four day use sites would be permanently closed to visitors in this alternative, all campsites would remain open. Rationale for Alternative 3: seeks to place the bridge conveniently close to the visitor center and eliminate the visibility of the new access road from the highway. Please see general construction activities, above, which outlines the procedures that would be used to implement this alternative. Riprap would be necessary to protect the bridge abutments from scour during high flows. This alternative also includes the removal of poison oak and willow shrubs in the areas of the new abutments and road, involving approximately 1,600 square feet of mixed age, species and size of shrubs.

Figure 8: Alternative 3 Bridge Site, located near the visitor center, and the day use sites that would be removed.

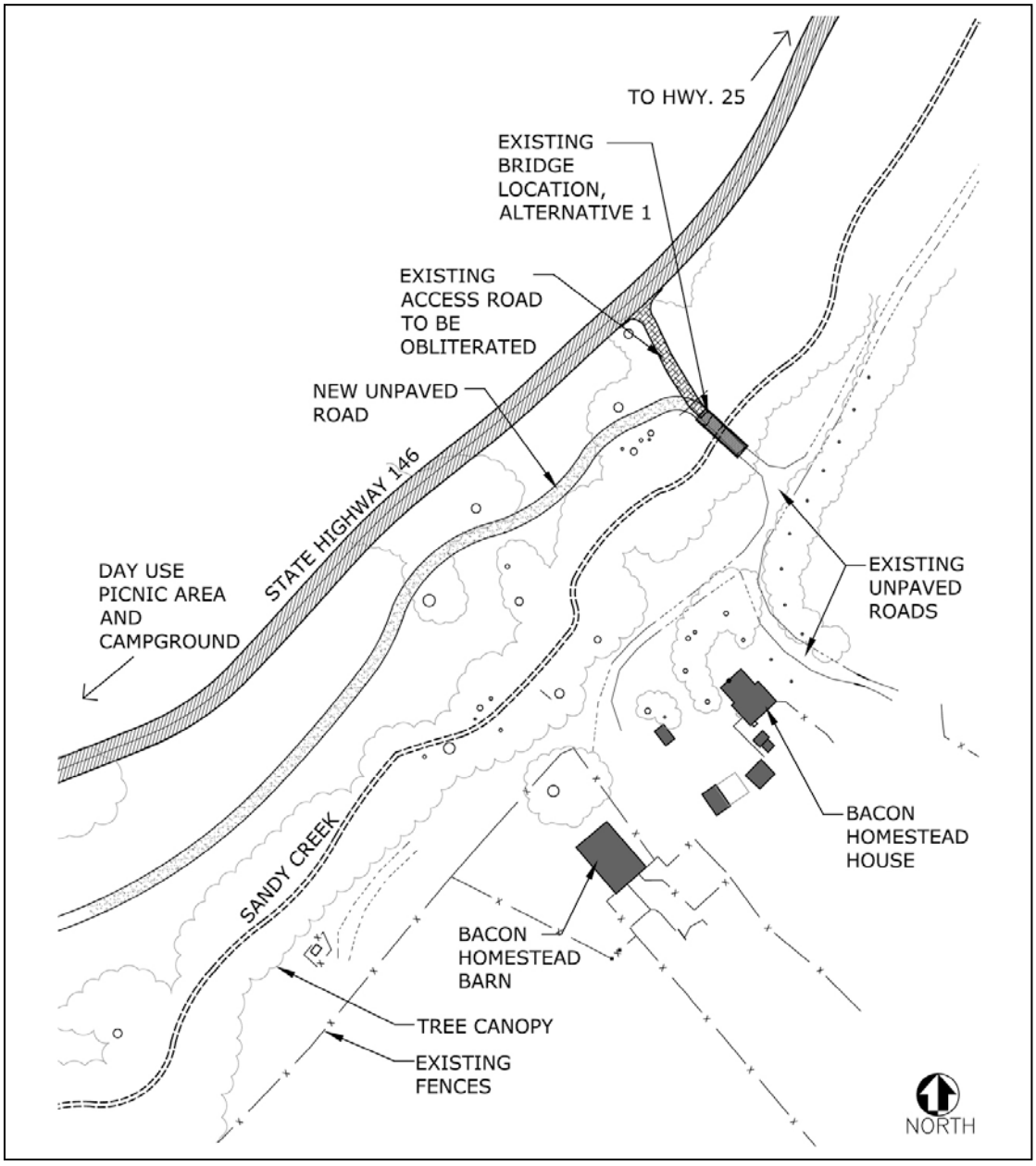
Alternative 4: Remedial Hazard Abatement

In this alternative, the bridge would not be reconstructed in any location and the existing damaged bridge structure and associated concrete walls, footings and structures would be removed from Sandy Creek. All access to the Ben Bacon Homestead area would be via the unpaved access road from Highway 25. It should be noted that this alternative would not meet the purpose and need for action as described above. All action alternatives should meet the purpose and need. Please see general construction activities, above, which outlines the procedures that would be used to remove the old bridge. The unpaved access road would need to be reinforced with additional aggregate base material and graded frequently to minimize rutting.

Alternative 5: No Action

In an environmental assessment a "No Action" alternative must always be evaluated. In this alternative, "No Action" would consist of no bridge reconstruction and no removal of the existing damaged bridge structure and associated concrete walls, footings and structures. All access to the Ben Bacon Homestead area would be via the unpaved access road from Highway 25. The existing bridge would eventually fully collapse into the creek as the soil behind the abutments and beneath the girders would continue to erode. It should be noted that the "No Action" alternative would not meet the purpose and need for action as described above. All action alternatives should meet the purpose and need. The unpaved access road from Highway 25 would need to be reinforced with road stabilized with additional aggregate base material and graded frequently to minimize rutting.

Figure 9: Alternative 1 Location Plan and Bridge Cross-section



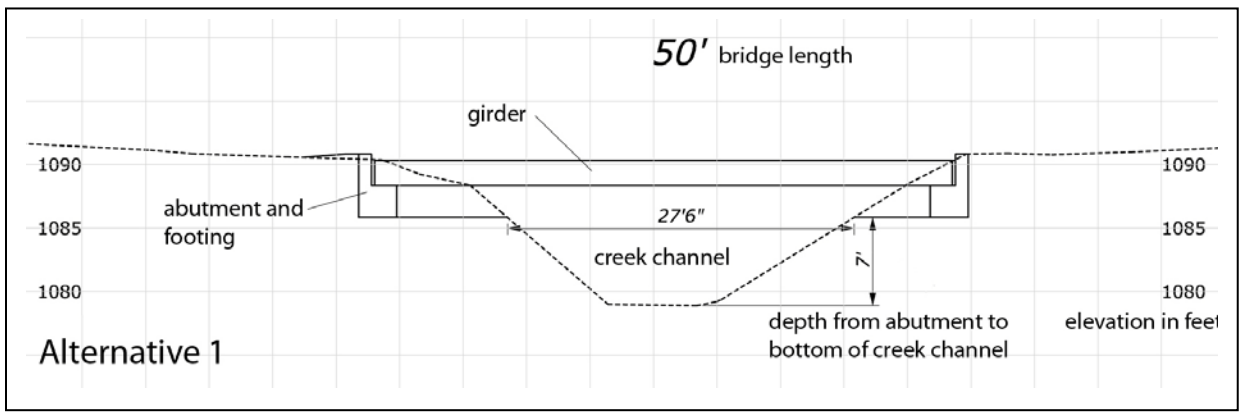
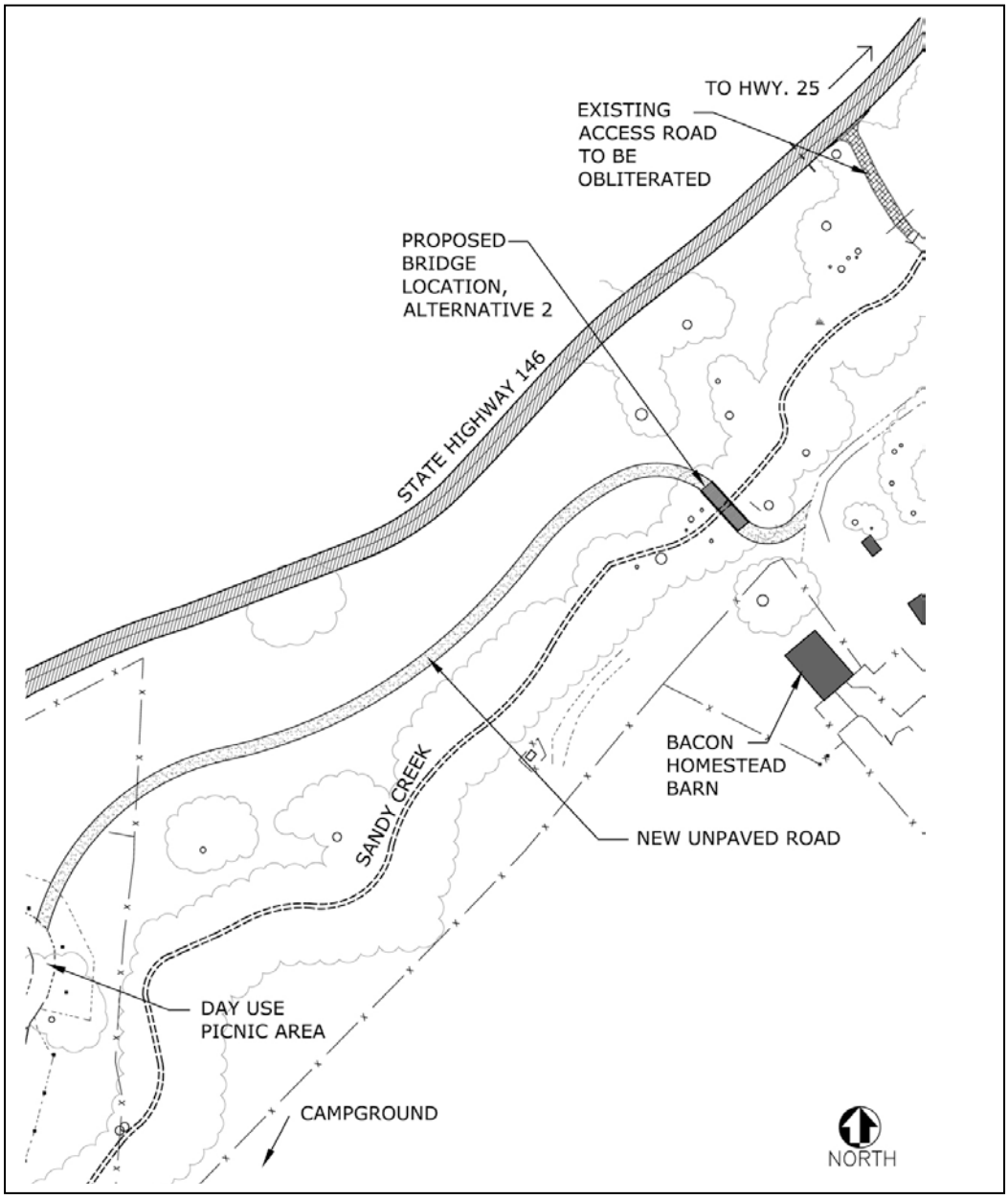


Figure 10: Alternative 2 *(Preferred Alternative)* Location Plan and Bridge Cross-section



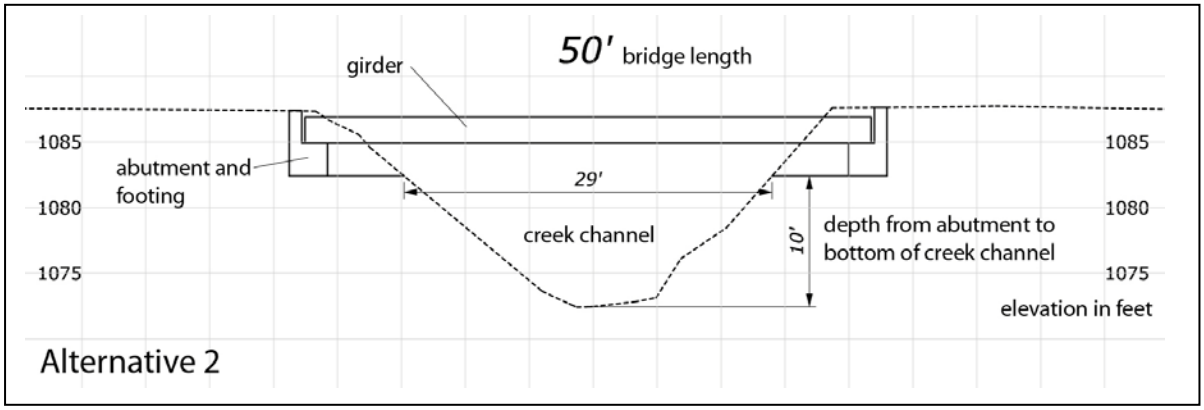
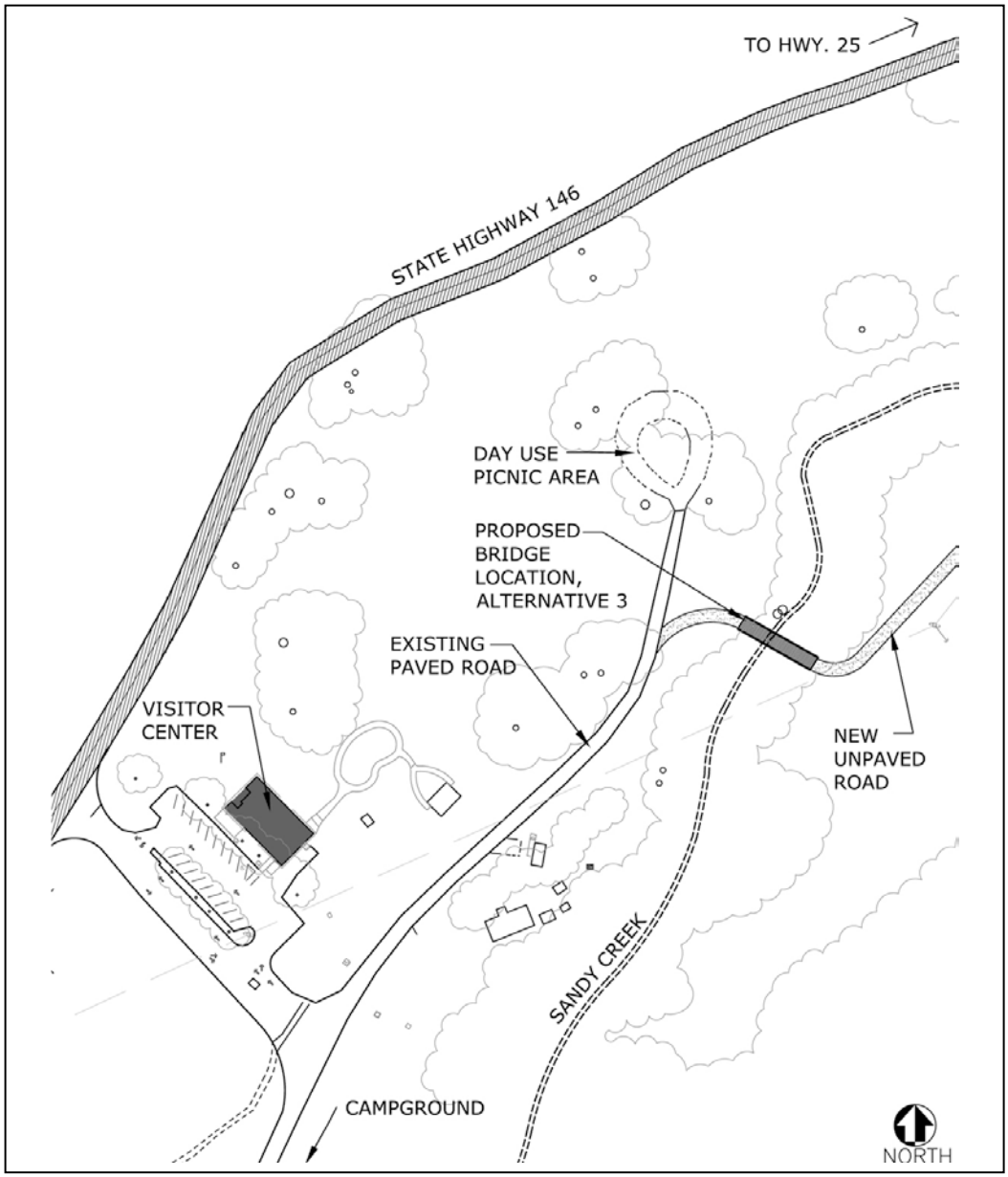


Figure 11: Alternative 3 Location Plan and Bridge Cross-section



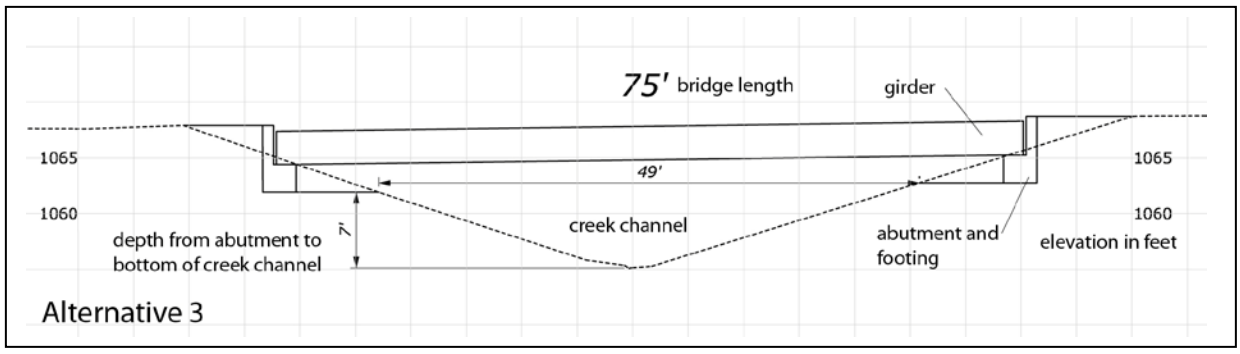


Figure 12: Damaged bridge and old abutments to be removed.

Alternatives Considered but Dismissed from Further Analysis

An alternative similar to Alternative 1 was considered, with the highway access to the reconstructed bridge remaining at its current location and no new secondary unpaved road construction. This would maintain the existing junction with Highway 146, which does not meet current standards for such an intersection. Sight distance for the turnoff is inadequate per Caltrans standards due to vertical and horizontal curvature in light of existing highway speeds and traffic volume.

Several crossing options were considered preliminarily in the vicinity of that described in Alternative 2. The resultant location was arrived at by considering minimal disturbance of California red-legged frog habitat, hydrologic stability of the stream channel, visitor and staff circulation routes, and bridge expense. So the preliminary options were dismissed in favor of the Alternative 2 location in order to minimize these concerns.

Finally, an alternative bridge type that would accommodate only pedestrian traffic was considered, as opposed to one that would also allow vehicular use. This possible alternative was dismissed because it does not meet the purpose and need for action. It was determined that management of the historic district, as well as the multiplicity of resources beyond, does require the use of vehicles (please see the purpose and need section). It is evident that park management, especially in the areas of facility maintenance, resource management, and law enforcement, requires the use of vehicle access routes at this location.

Comparison of the Alternatives and Their Consequences

The following table provides a comparison of alternative features and environmental effects, by impact topic. This is merely a summary and the reader should review topics of concern in the comprehensive analysis set out in Section V (Environmental Consequences).

Table 1: Summary Comparison of Alternatives and Their Effects

Impact Topic / Alternative		**Alternative 1** Reconstruct the bridge at its current location	**Alternative 2** ***(Preferred Alternative)*** Reconstruct the bridge 300 feet downstream	**Alternative 3** Reconstruct the bridge near the visitor center	**Alternative 4** No new bridge, remove existing bridge	**Alternative 5** No Action
.Physical Resources	Air Resources	Short-term, negligible to minor and long-term negligible adverse impacts due to construction equipment fuel combustion and fugitive dust	Same as Alternative 1	Same as Alternative 1	Short term Impacts would be significantly less than in Alternatives 1-3. There would be no long-term impacts within the project area. There would be ongoing impacts from vehicular use outside the project area due to continued use of the alternate access route via Hwy 25. There would be negligible to minor impacts from vehicle emissions and dust production	There would be no short-term or long-term impacts within the project area. There would be ongoing impacts from vehicular use outside the project area due to continued use of the alternate access route via Hwy 25. There would be negligible to minor impacts from vehicle emissions and dust production
	Soil Resources	Adverse, long term and minor, relative to the current condition due to the permanent soil disturbance of one third acre. This alternative would mitigate the ongoing offsite impacts of using the alternative access route	Same as Alternative 1	Same as Alternative 1	The total cumulative impact for Alternative 4 would be a net minor beneficial impact, long term. Offsite minor, long term impacts from use of the alternative access route would continue	There would be a minor adverse impact, long term. Also offsite minor, long term impacts from use of the alternative access route would continue.

Impact Topic / Alternative		Alternative 1 Reconstruct the bridge at its current location	Alternative 2 ***(Preferred Alternative)*** Reconstruct the bridge 300 feet downstream	Alternative 3 Reconstruct the bridge near the visitor center	Alternative 4 No new bridge, remove existing bridge	Alternative 5 No Action
	Water Resources Wetlands and Floodplains	The hydrology of the area would not be affected. The proposed bridge is longer than the existing bridge, so it would be expected to reduce the risks of downcutting and bank erosion compared with existing conditions. No change to the Zone A floodplain extent is anticipated. Rip-rap stabilization could cause minor long term adverse impacts to the riparian ecosystem adjacent to the bridge, though no water quality impacts would be expected. New bridge and access roads would have direct but negligible effects on the upper stream banks. Impacts on wetlands would be negligible adverse.	Same as Alternative 1, except that the long-term adverse impacts of rip-rap stabilization would be negligible. Impacts on wetlands would be negligible adverse.	Same as Alternative 1, except that the long-term adverse impacts to wetlands would be minor.	There would be no impact on the hydrologic system. Relative to the other alternatives, the natural hydrologic system and channel morphology face no risk due to new construction or stabilization activities.	There would be moderate adverse impact to the hydrologic system and wetlands due to the unstable eroding creek banks and changes in stream morphology caused by the failed abutments and collapsed bridge.
	Natural Soundscapes	Short term adverse, moderate to major impacts during two to three weeks of actual construction. Long term impact negligible	Same as Alternative 1	Same as Alternative 1	Less than Alternatives 1-3 since no construction would take place. Negligible to minor impacts due to deconstruction of the old bridge	Less than Alternatives 1-4 since no construction or bridge removal activities would take place
Biological Resources	Vegetation	The effects in general would be negligible. Valley Oak woodland is a State listed sensitive resource, scarce within the area. Any impact on it may be significant. This alternative would affect individuals of the valley oak species, a moderate long term impact.	Same as Alternative 1.	The effects on vegetation in general would be negligible. Alternatives 3 does not affect the Valley Oak association.	The lack of access over Sandy Creek would impact vegetation off-site to a negligible to minor degree. Over time with unanticipated increases in vehicular use, and lacking mitigation, this impact could become greater.	The lack of access over Sandy Creek would impact vegetation off-site to a negligible to minor degree. Erosion of the creek banks and creek instability would cause minor to moderate long-term adverse impacts.

Alternative / Impact Topic		Alternative 1 Reconstruct the bridge at its current location	Alternative 2 ***(Preferred Alternative)*** Reconstruct the bridge 300 feet downstream	Alternative 3 Reconstruct the bridge near the visitor center	Alternative 4 No new bridge, remove existing bridge	Alternative 5 No Action
	Fish and Wildlife	No long-term impacts. If no nesting raptors are present near site or raptors are present and mitigations followed, negligible short-term adverse.	No long-term impacts. If no nesting raptors are present near site or raptors are present and mitigations followed, negligible short-term adverse.	No long-term impacts. If no nesting raptors are present near site or raptors are present and mitigations followed, negligible short-term adverse.	No long-term impacts. If no nesting raptors are present or raptors are present and mitigations followed, negligible short-term adverse.	No short-term or long-term impacts
	Special Status Species	Short-term negligible to minor adverse. Major long-term beneficial due to removal of failed bridge and abutments. Long term beneficial to negligible adverse from new bridge and structures.	Short-term negligible to minor adverse. Major long-term beneficial due to removal of failed bridge and abutments. Long term beneficial to negligible adverse from new bridge and structures..	Short-term negligible to minor adverse. Major long-term beneficial due to removal of failed bridge and abutments. Long term beneficial to negligible adverse from new bridge and structures.	Short-term: negligible to minor adverse. Long-term: major beneficial due to removal of failed bridge and abutments.	Short-term: minor to moderate adverse. Long-term: minor to moderate adverse.
Cultural and Historic Resources		Would have the least direct impact on cultural resources. Does not provide the most effective access to the Ben Bacon ranch for operational and visitor use purposes, potentially having indirect, long-term adverse effects.	Moderate direct impacts to the cultural resources. Potential adverse effects would be the most easy to effectively mitigate. Provides effective access to the Ben Bacon ranch for operational and visitor use purposes, potentially having long-term beneficial effects to the cultural resources.	Moderate direct impacts to the cultural landscape because the new road location would reverse the historic use patterns on the ranch. No long-term indirect adverse effects.	Moderate long-term indirect adverse effects by removing the bridge from the cultural landscape as well as direct adverse effects.	Moderate long-term indirect adverse effects by removing the bridge from the cultural landscape as well as direct adverse effects.
Visitor Use and Experience		Minor to moderate adverse impact, short term, due to visual and audible intrusions. Moderate long-term impact on scenic quality due to new access road. Moderate beneficial impact on visitor use and experience by expanding recreation opportunities	Same as Alternative 1	Minor to moderate short term impacts; negligible to minor long term impact on visual quality because the new access road would be screened from view. Short term loss of camping opportunities. Moderate beneficial impact on visitor use and experience by expanding recreation opportunities and locating bridge within day use area.	Negligible to minor short term impact on visitor use and experience due to the deconstruction of the old bridge. In this alternative, new potential recreation opportunities would be forgone	Minor adverse long-term affect due to visual and safety concerns with deteriorating bridge structure left in creek.

The Environmentally Preferred Alternative and Consistency with NEPA

The environmentally preferred alternative is, by NPS policy that which best meets the mandate set out in the National Environmental Policy Act (NEPA) Section 101(b). Six criteria are set out in this section, most of which clearly apply most to major federal actions, or actions fairly large in scope. NPS direction[5] summarizes this consideration as "selecting the alternative which best protects, preserves, and enhances historic, cultural, and natural resources." In practice, impacts on the human environment must also be factored in as part of the NEPA criteria.

The consideration of the environmentally preferred alternative must be viewed on two levels, with respect to this proposed action. First, it is evident on the surface that Alternative 4, Remedial Hazard Abatement, would involve the least amount of impact from construction activities. It would eliminate the potential for local impacts due to construction on the California red-legged frog, soil, vegetation, wetlands and floodplains, soundscape, and other resources and values in the immediate project area along Sandy Creek. From that standpoint, it would be the environmentally preferred alternative. However, considering the ramifications associated with the lack of management access to the historic district structures and beyond, from this site, it is clear that another perspective is necessary. Without bridge reconstruction, environmental damage is occurring elsewhere. If local impacts from bridge reconstruction are compared to non-point, dispersed impacts along 1.7 miles of unpaved, administrative park access road from CSH 25, the determination is not so evident.

If further consideration of the human environment is factored in, the determination begins to favor one of the bridge construction alternatives. The Section 101 criteria include consideration of a safe environment. They also include consideration of beneficial uses, preservation of important historic and cultural resources, and creating a balance between population and resource use to permit a "sharing of life's amenities." In the final analysis, bridge reconstruction to provide safe visitor and management access across Sandy Creek would appear to best meet the criteria. Alternative 2 would have the least environmental impact locally, while mitigating the offsite impacts (alternative access road) that are presently occurring, and providing for safe beneficial use of the historic district and beyond by the visiting public.

With reference to the environmental impacts described in this document, each alternative meets the criteria set forth in NEPA Section 101. The criteria may be met to a greater or lesser degree by alternative, but considering the local scope of the action, these differences are viewed as insignificant in light of the broadly defined criteria. Again, considering the disclosed environmental effects of each alternative and with reference to Section V in this EA, there are no inconsistencies between the alternatives and other environmental laws and policies.

[5] DO 12 Handbook Section 2.7 D.

Chapter 3 - Affected Environment

This section presents the environment of the area that is potentially affected by the alternatives being considered. The topics presented are those that have been determined to be worthy of study relative to the proposed action. Discussion for each topic describes a baseline for analysis. Data presented are commensurate with the relative importance of the impact. It is intended, per the CEQ regulations, that these discussions be succinct and no longer than necessary to understand the effects of the alternatives.

Air Resources

Air and air quality related values are national park resources managed under the authorities of the NPS Organic Act, the Clean Air Act, a variety of NPS regulations, and Management Policy 4.7 (Air Resource Management). NPS will seek to perpetuate the best possible air quality in parks to (1) preserve natural resources and systems; (2) preserve cultural resources; and (3) sustain visitor enjoyment, human health, and scenic vistas.

Pinnacles N.M. qualifies as Class I air quality under the Clean Air Act of 1977. All national parks exceeding 6,000 acres and all national wilderness areas exceeding 500 acres (Pinnacles N.M has 16,000 acres of Wilderness) are mandatory Class I Federal Lands. NPS is mandated to "preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic, or historic value" per Chapter 42 of the U.S. Code Section7470. Per the PNS Management Policies, Pinnacles N.M has a responsibility to provide the best possible air quality, and preserve air integrity as a natural resource.[6]

Local air quality is excellent. As an area of historically rural character, there are no sources of pollution locally that would affect visibility or contribute to degradation of air quality. Ambient air quality is marginally affected by passing traffic on the highway and by vehicular use by park employees on unpaved roads. These sources produce a mix of hydrocarbon emissions and particulates, including dust. Under certain conditions, ambient air quality may be reduced by the transport of pollutants in the upper air from urban areas to the west.

The reader should note that most, if not all, of the resources presented here are to be managed not only for their own intrinsic value, but also because they are enjoyed by people. High quality air is one of these, being an important component of an enjoyable experience for visitors.

Soil Resources and Geology

Soil resources and geology are park resources managed under the authorities of the NPS Organic Act and Management Policy 4.8 (Geologic Resource Management).

There are no unique or outstanding geological resources, surface or subsurface, within the project area. Geologic resources are considered only to the extent that they are fundamental precursors to the soil types and soil characteristics described below. Characteristics of soils in the affected environment are of most

[6] NPS Management Policies 2006, MP 4.7.

interest in how they respond to potential disturbances, and how they recover in light of local climatic factors. The following soil unit descriptions were interpreted from the Custom Soil Resource Report for Pinnacles N.M.. [7] Two closely related soil units dominate the project area: Elder gravelly sandy loam, and the Still-Riverwash complex. Relevant descriptors for these soil types follow.

Elder gravelly sandy loam: These soils form a floodplain setting and are composed of alluvial materials derived from conglomerate rocks. They are found on zero to 1 percent slopes, and are well-drained for more than 80 inches into the soil profile. The soils are more than 80 inches above the water table, and not subject to flooding. They are non-saline in nature. The typical profile of this soil is a mix of sandy, gravelly loam to a depth of 33 inches. Below that is a small layer of loam, supported by a strata composed heavily of coarse sand and gravel in a loamy matrix. At 43 inches there is a shallow layer of clay loam covering another lens of gravelly, loamy coarse sand to 61 inches deep. Fifteen percent of this map unit contains an inclusion of soil types characteristic of stream terraces (Still), and four percent are composed of associated channel bed materials (Riverwash). Due to the slopes involved and the drainage characteristics of this soil type, it is not highly susceptible to erosion or compaction and it supports vegetation well. Should they occur along a slope break, they would be somewhat friable and easily broken off.

Still-Riverwash complex: Still and similar soils make up 70 percent of this map unit, while Riverwash is a significant component at 20 percent. Other minor components total 10 percent of the area. Still soils are found on stream terrace landforms of zero to 2 percent, and composed of alluvial materials derived from volcanic and sedimentary rocks. Their properties and qualities are similar to that of map unit 117 soils, except that their available water capacity is considerably higher and they are better drained throughout the entire profile. These soils typically have a shallow organic layer, subtended by a mix of coarse sand, sand, and gravel set in a loamy matrix to a depth of 38 inches. From there to a depth of 65 inches is a mix of clay loam and silty clay loam. The Riverwash component is characterized by stream channel landforms set in alluvial materials derived from the same parent materials as Still soils. As stream channels, they are subject to flooding and are generally at the level of the water table. Due to the slopes involved and the drainage characteristics of this soil type, it is not highly susceptible to erosion or compaction and it supports vegetation well.

Water Resources, Wetlands and Floodplains

Water resources, riparian and aquatic related values, are park resources managed under the authorities of the NPS Organic Act, the Clean Water Act, Executive Orders 11990 (Protection of Wetlands) and 11988 (Floodplain Management), Director's Orders 77-1 and 77-2, et al, and Management Policy 4.6 (Water Resource Management).

Annual precipitation in the project vicinity averages about 14 inches. Most of the rainfall occurs during the winter months; thunderstorms of short duration infrequently occur during the summer months (Meyer, 1995). An average of local rainfall measurements and the NOAA Atlas 2 (Miller, et al., 1973) regional values results in a 5.5 inch 100-yr, 24-hour rainfall (Meyer, 1995).

[7] Natural Resources Conservation Service, February 11, 2010

The project area varies depending on the alternative, but all alternatives occur within approximately 1300 feet along the stream course of Sandy Creek. About 60% of Sandy Creek's 15,750 acre (24.6 square miles) watershed lies outside of Pinnacles N.M.'s northern and eastern boundaries in Bickford Canyon. (See Figure 16) Within the monument Sandy Creek flows from the northeast to the southwest. Downstream of the project vicinity, Sandy Creek flows into Chalone Creek, which continues to flow to the south eventually joining the Salinas River and emptying into Monterey Bay.

Before it flows into Chalone Creek, Sandy Creek passes through three 6 foot diameter culverts located in the campground road crossing embankment. These structures restrict the passage of flood flows until the structures are overtopped. 1.5 miles upstream of the project vicinity, as Sandy Creek passes under a bridge at Highway 25, sections of riprap exist on the right bank of Sandy Creek to prevent lateral migration of the creek. Additional armoring exists along the right bank of Sandy Creek in two other locations between the Highway 25 bridge and the project site.

Owing to the abundance of vegetation and surface cover on the channel sideslopes, Sandy Creek appears to be relatively stable within its channel under current flow conditions. But the stream's flashy flows and sandy substrate composition create a dynamic system in which deeper pools may form and re-fill with sediment on a frequent basis. These pools and other channel features such as fallen trees and exposed tree roots provide important wildlife habitat. Artificial modifications of the channel may alter hydrology, disrupting these natural processes.

There are two sections of Sandy Creek in the vicinity of the proposed alternative bridge sites that show recent migration of the main channel during large flood events. One of them, just upstream of the site for Alternative 1, appears to be eroding its channel laterally toward the south, threatening an adjacent single lane unpaved road. A hydrologist recently evaluated this situation, noting that the bank is eroding only under very high flow conditions. Since the road is not a significant or essential access route, the reasonable approach would be to leave the stream to its natural hydrologic processes and if the road becomes compromised, re-build it farther to the south.[8] This would preserve the function of natural stream processes.

Consideration of water quality in Sandy Creek, as it may be affected by the proposed action, is primarily an issue of stream sediment. As noted in the California red-legged frog survey, a reach of stream identified in the past as quality habitat has recently become silted in. This could be a product of under-average flushing flows recently, or it could result from excessive non-point source routing of sediment into the stream channel above. Other possible effects on water quality include the introduction into the stream of foreign substances such as wet concrete or hydraulic fluid.

The banks and bed of Sandy Creek in the project vicinity are naturally stabilized with extensive vegetation in most areas. However, unvegetated areas are vulnerable to erosion. Some downcutting and bank erosion exists. Stormwater runoff, along with bed and bank erosion, contribute sediment to the creek which is transported through the project vicinity with localized deposition and resuspension as the creek evolves. (For example, as noted in the California red legged frog survey, a reach of stream identified in the past as quality habitat has recently become silted in.)

[8] Mike Martin, hydrologist, NPS Water Resources Division, pers. com.

The following photos present typical views of Sandy Creek in the project area, showing the incised stream channel, slightly meandering, with woody vegetation subtending the upper banks and the abundant riparian growth.

Figure 13: Typical Views of the Sandy Creek Stream Channel

Floodplain

Sandy Creek is mapped as a Zone A by FEMA (2009).[9] A 100-yr floodplain is indicated in the mapping as inundating large areas of the adjoining floodplain along the length of the Sandy Creek drainage, but no detailed analysis was conducted or base flood elevations established. In 1995 USGS conducted a detailed flood study including both Sandy and Chalone Creeks and utilized unit hydrograph techniques to estimate the magnitude of the 100 year flood and predicted flood depths using a standard step-backwater model.[10] The magnitude of the 100 year flood along Sandy Creek was estimated to be 3,800 cubic feet per second (cfs). The step-backwater analysis indicated a flood of this magnitude will achieve a stage that varies between about four and nine feet above the channel. In 2010 a floodplain assessment was conducted by the NPS Water Resources Division for the purpose of the Pinnacles N.M. General Management Plan development. This analysis of the flood plain determined that "if the difference between the bottom of the channel and the site of interest is substantially greater than nine feet (the maximum estimated stage from the model for Sandy Creek) then the site may be considered outside of the 100 year floodplain." Sandy Creek has a clearly defined channel within a larger flat valley floor which constitutes the floodplain. This valley floor has minimal development or forest to influence floodwater flow.

[9] FEMA, San Benito County map numbers 06069C0675D and 06069C0500D

[10] M. Martin, NPS WRD, May 4, 2010

Wetlands

In February 2011, NPS staff conducted field surveys of the project area (approx.. 9.1 acres) of Sandy Creek and mapped Cowardin wetlands and Corps wetlands. Within this surveyed area, 0.79 acres are Cowardin wetlands and of these, 0.63 acres are Riverine lower perennial unconsolidated bottom wetland and 0.16 acres are Palustrine emergent wetland.[11]

NPS staff collected detailed wetland delineation data at four points within the surveyed area to evaluate the presence or absence of the three parameters required to qualify a habitat as a potentially-jurisdictional wetland under section 404 of the federal Clean Water Act. 0.16 acres of these Cowardin wetlands are also potentially-jurisdictional Corps wetlands.

An additional 1.27 acres of the surveyed area is non-wetland riparian habitat. 0.63 acres of the Cowardin wetlands in the surveyed area are "Waters of the US" - that is, a stream channel with a bed and banks that is potentially subject to Army Corps of Engineers jurisdiction under sections 401 and 404 of the federal Clean Water Act *(Figure 15).*

The Cowardin Wetland map *(Figures 14)* for the Project Area delineates two types of Cowardin wetlands: Riverine Lower Perennial Wetlands and Palustrine Emergent Wetlands These are described below:

- *Palustrine Wetlands* non-tidal typically dominated by trees, shrubs, or persistent herbaceous vegetation, commonly known as marshes or swamps. These areas generally exhibit high-year round surface or groundwater and hydric soils.
- *Palustrine Emergent Wetlands* are areas with high year-round ground or surface water that support herbaceous vascular plants at 30% or greater cover in most years, with a tree and shrub cover of less than 30%.
- *Riverine Lower Perennial Wetlands* are shallow, less than 2 meters (6.5 feet) deep at low water, fresh water systems in channels with relatively flat gradients and year-round flow.

The National Park Service requires completion of a Statement of Findings for Wetlands for projects with the potential to impact Cowardin wetland resources. However, some activities are excepted from this policy in order to achieve the objectives of E.O. 11990 while reducing delay and paperwork. Actions proposed by all alternatives for the Sandy Creek Bridge Replacement Project meet the criteria of the exception for minor stream crossings using bridges or other structures that completely span the channel and associated wetland habitat described in Section 4.2.1 d) of NPS Procedural Manual 77-1: Wetland Protection (NPS 2008).

[11] Denn, Wetlands Delineation Report, NPS 2011

Figure 14: Cowardin Wetlands within the surveyed area

Figure 15: Potentially Jurisdictional Wetlands within the surveyed area

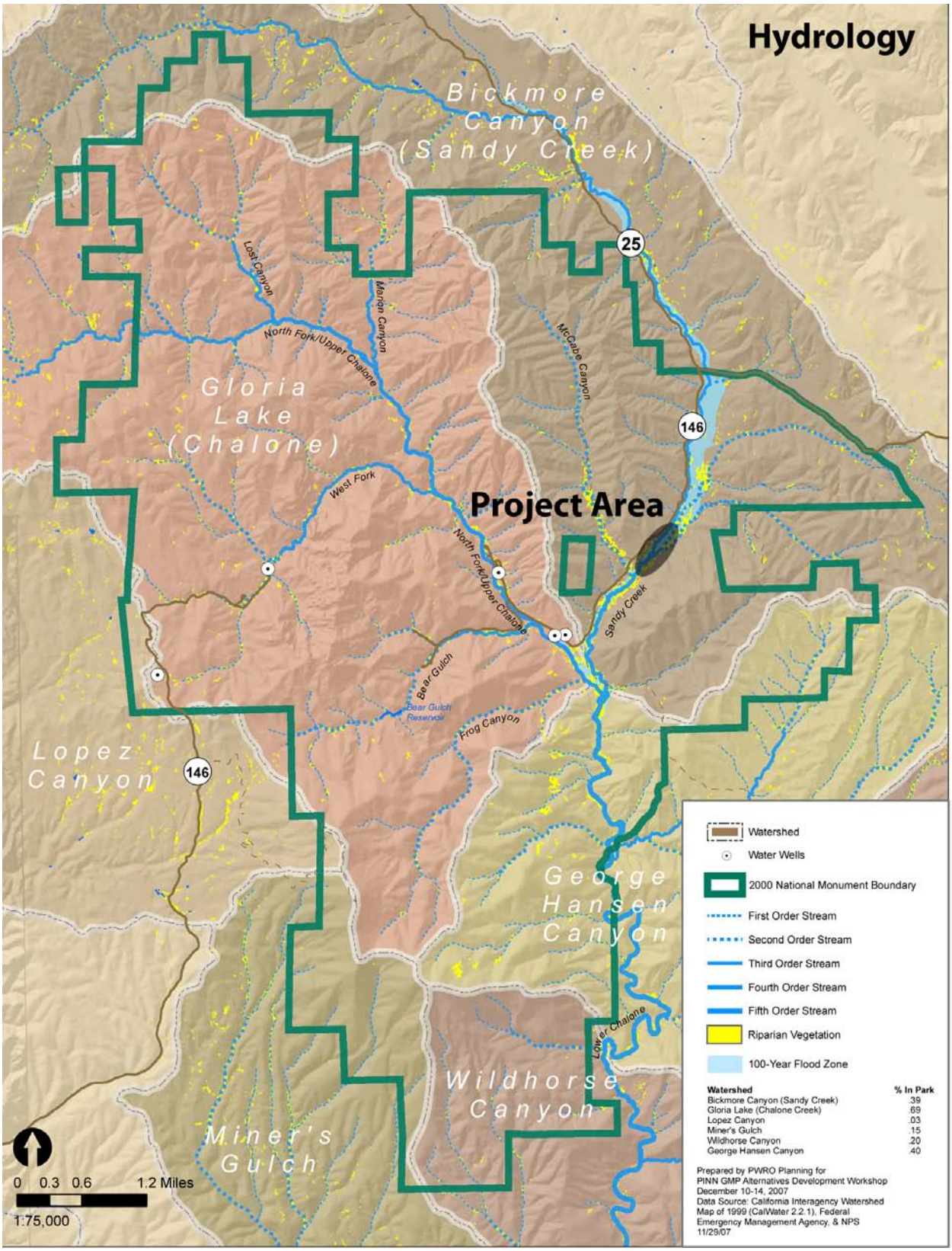


Figure 16: Hydrology and watersheds of Pinnacles N.M.

Natural Soundscapes

Natural soundscapes are park resources managed under the authorities of the NPS Organic Act and Management Policy 4.9 (Soundscape Management). The National Park Service strives to preserve and restore natural soundscapes, which exist in the absence of human-caused sound.[12] Values that are connected to soundscapes include visitor experience and habitat values for a variety of species dependent on that condition for procreation, cover, and foraging.

The area affected by the proposed action can be characterized as an ambient soundscape fairly free of human-caused sound except for that of occasional passing vehicles and overflights. The activities of other visitors can be heard, but over a high percentage of the time, particularly at night, the soundscape is natural. That is, birds can be heard, wind through the trees is audible, and a visitor would find it to be quiet. The reader should note that most, if not all, of the resources presented here are to be managed not only for their own intrinsic value, but also because they are enjoyed by people. Natural soundscapes is one of these, being an important component of an enjoyable experience for visitors

Biological Resources

NPS biological resource management is broadly covered under Management Policy 4.4. Biological resources are managed under the authorities of the NPS Organic Act and a variety of mandates including the Endangered Species Act. In conforming to the latter, NPS works closely with the US Fish and Wildlife Service and consults with that agency formally or informally as circumstances dictate.

Vegetation

The project area is composed of two major landtypes and vegetation complexes: a stream course that can be described as a steep-sided, incised perennial stream channel; and an old alluvial plain (Sandy Creek valley floor) perched above and adjacent to the small stream valley. Much of the latter has been affected historically by human occupancy mostly for ranching and pre-irrigation agricultural purposes. The steep channel sides contain a fairly abundant matrix of riparian vegetation, including large woody species. The valley floor is dominated by grass and shrub lands, with inclusions of large valley oak trees. The grassland is dominated by exotic annual grasses and forbs. Yellow star-thistle (*Centaurea solstitialis*), a highly invasive species throughout California, is abundant on both sides of the creek in the grassland areas. Pinnacles N.M. currently controls this invasive species throughout the monument and within the project area. Valley oak woodland is considered a sensitive plant association by the state of California. Also, it is notable that the oak trees provide habitat for numerous birds, including raptors, as well as a terrestrial microclimate of shade that lends a modicum of vegetative diversity to the area. The vegetation described here is also noted as an adjunct to the Ben Bacon Ranch Historic District, in that it provides substantial context and conveys the historic character of the landscape during the period of significance for the ranch (please see the Cultural Resource section).

[12] NPS,2011. Natural Sounds Program. National Park Service Nature and Science: http://www.nature.nps.gov/naturalsounds/

Figure 17: Valley Oak Vegetation Association

Figure 18: Vegetation Characteristic of the Historical Landscape District

The vegetation at the project site is dominated by riparian woodland. The woodland has a dense tree canopy of Coast live oaks (*Quercus agrifolia*), willow species (*Salix* spp.) and Valley oaks (*Quercus lobata*). The understory within the stream corridor is dominated by dense perennial species in some stream reaches, with only sparse vegetation in others. Adjacent to the riparian area on both sides of the creek corridor is valley oak savannah. This vegetation type is characterized by scattered mature Valley oaks. There are scattered shrubs of Coyote brush (*Baccharis pilularis*). The understory is dominated by annual species. A vast majority of these species are non-native grasses.

An infestation of exotic invasive periwinkle (*Vinca major*) has taken hold along the northwest abutment of the existing bridge. This plant is difficult to eradicate and is known to spread from pieces that break off and later become rooted. The occurrence of this species where ground disturbing activity, including the removal of the existing bridge and abutments, will occur along a flowing stream poses a risk of spreading the plant further downstream within the Monument. This can be mitigated by careful attention to picking up any pieces of the plant that break off, and by active control and removal treatments, including application of herbicide. Details and impacts of this activity will be addressed in the impact assessment for Vegetation and for Special Status Species.

Fish and Wildlife

Vegetation in the project area provides habitat for a variety of ground-dwelling wildlife species, songbirds and raptors. Sensitive species habitat in the vicinity includes nesting habitat for Long-eared owl (*Asio otus*) and Cooper's hawk (*Accipiter cooperii*)(both California State Species of Special Concern) in the dense riparian woodland. No sensitive raptor nesting habitat is known within the project area, but raptors have regularly nested near the current bridge site. Sandy Creek is a perennially flowing stream. The riparian habitat thus afforded is of greater density providing suitable cover and forage for a greater diversity of wildlife species than on the adjacent valley floor.

The stream itself is habitat for the federally threatened California red-legged frog (see below) and a small population of Three-spined sticklebacks (*Gasterosteus aculeatus*), which is not considered a sensitive species. There are a variety of barriers downstream sufficient to disallow habitat for anadramous fish in this reach of Sandy Creek. Western pond turtles (*Clemmys marmorata*), a California State Species of Special Concern, are rarely observed in this section of Sandy Creek. Habitat for known sensitive aquatic invertebrate species endemic to the Monument is not found in Sandy Creek.

Threatened or Endangered Species

Of the three federally listed endangered species in the Monument, the California condor, the California tiger salamander (CTS) and the California red-legged frog (CRLF), the only listed species likely to be affected by the proposed action is the California red-legged frog. California condors fly in the area but do not roost or nest in the Sandy Creek valley area. Their nesting habitat is the surrounding hills and they have not been affected by construction projects or been seen in Pinnacles construction sites in the past.

The California tiger salamander habitat tends to be stock ponds surrounded by woodlands or grasslands of which none are located within 0.75 miles of Sandy Creek. Pinnacles N.M. falls outside of the critical habitat designation and Sandy Creek is not known or potential breeding habitat. It is possible that a tiger salamander would travel through the disturbed grassland areas adjacent to Sandy Creek, but none have been seen in the area. Road surveys on rainy nights along Hwy 146 have never shown any salamanders on the Sandy Creek side of the valley.

The California red-legged frog (CRLF) is found primarily in wetlands and streams in coastal drainages of central California (USFWS 1994) but non-breeding habitat for the CRLF includes nearly any area within 1-2 miles of a breeding site that stays moist through the summer (Fellers 2005). Sheltering habitat for this threatened amphibian is potentially all aquatic, riparian, and upland areas within the range of the species and includes any landscape features that provide cover, agricultural features, or incised stream channels with portions narrower and depths greater than 18 inches. (USFWS 2001). Pinnacles N.M. has been designated critical habitat unit SNB-3 by the Department of the Interior Fish and Wildlife Service as of March 2010.

Red-legged frogs typically breed from late December to early April or after the majority of heavy winter rain events have occurred. In colder areas, they may hibernate in burrows during the winter. They remain active during the summer if provided with access to permanent water. Some frogs remain at or close to their breeding sites year round, while others disperse to non-breeding habitat. Females can lay egg masses of between 2,000 to 5,000 eggs (USFWS 2001). These eggs are attached to emergent vegetation like bulrushes or cattails. Eggs hatch after 6 to 14 days, and the resulting tadpoles take about 3.5 to 7 months to develop into frogs and 2-4 years to begin breeding. The tadpole life stage experiences the highest rate of mortality with less than 1% of tadpoles reaching adulthood. Males may live for about 8 years while females may live around 10 years. The most common prey of the red-legged frog is insects, although they will also eat California mice and tree frogs. Their predators include bullfrogs, fish, herons and other birds, garter snakes, skunks, opossums, and raccoons.

Habitat for this threatened frog occurs in Sandy Creek within the project area. CRLF has specific habitat requirements for each life stage, resulting in different life stags often inhabiting different areas. The life-cycle time frames described below are averages over the period of record that the frog has been studied. Actual times of breeding, transformation and movement can vary from year to year depending on the incidence of

rain events. [13] In Sandy Creek, the frogs tend to migrate toward the stream in early spring, usually breeding in March and April. During the breeding period, frogs are susceptible to noise, vibration, and visual disturbances near their instream breeding sites. In Sandy Creek it appears that spring breeding habitat coincides with summer habitat, so the mature frogs may not move much from the stream environs into upland areas during the period of May through mid-October. The frogs may occasionally venture from the stream in order to forage. Also during this period, tadpoles are developing.

In the shady habitat of Sandy Creek, from mid-September through November tadpoles transform and newly metamorphosed frogs begin to disperse. With the onset of rains and wet conditions, young and adult frogs begin to move along the stream corridor and away from the stream itself. Therefore, during this time, the frog is most susceptible to ground-disturbing impacts such as those that might occur within the project area. Generally, during the rainy winter season between mid-October and mid-March adult frogs may be found outside the stream and its immediate vicinity as they leave the streams and are in ponds, springs, or buried under large objects or leaf litter, possibly in the higher reaches of stream channels. During this time, they are likely to be moving around in upland areas, mostly at night during and after rains when the ground is wet.

The highest quality CRLF stream habitat is slow, deep pools and runs. Stream hydrology often acts upon large woody debris and exposed tree roots to create these habitat features. Other large, hard objects in the stream such as culverts and rip rap may play a similar role in creating habitat. However, alterations to stream hydrology may disrupt the formation and sustenance of these features.

CRLF regularly breeds in Sandy Creek at a location a few hundred meters downstream of the project site, and has been known to breed within the project site in at least two locations in the last decade, including in 2010. Habitat quality varies within the project area, and is characterized by low to medium quality stream runs dotted with medium to high quality pools. There is one remaining high quality stream run, as another has become silted in over the past several years. Habitat shifts with winter storms and can change between seasons and storm events.

[13] Personal communication from Paul G. Johnson, Wildlife Biologist, Pinnacles National Monument

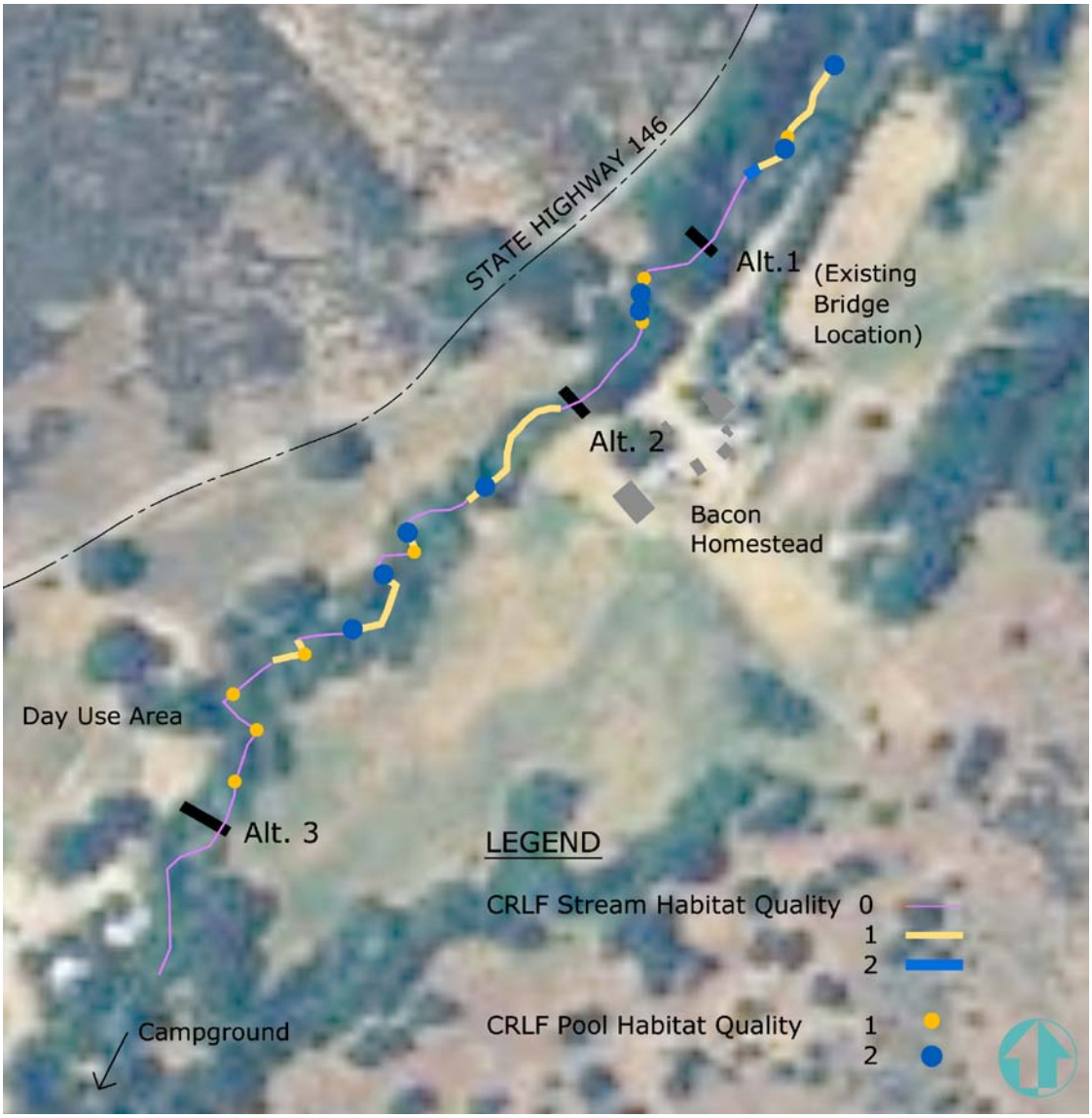


Figure 19: California Red Legged Frog Habitat

0 = poor quality habitat; 1 = minimal habitat; 2 = good habitat

Cultural and Historic Resources

Cultural and historic resources are managed primarily under the authority of the NPS Organic Act, the National Historic Preservation Act, as amended (NHPA), and the Archeological Resources Protection Act (ARPA). Further direction is found in the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation* and *Director's Order 28: Cultural Resource Guideline*. A large body of direction is presented in Management Policy 5. The cultural landscape inventory study supporting the designation of a historic district technically falls within the NPS policy area relating to archeological resources (Management Policy 5.3.5.1).

The Sandy Creek Bridge lies within the boundaries of the Ben Bacon Ranch Historic District, providing access to the Ben Bacon Ranch core along one of several historic road alignments. The bridge itself was a relatively recent construction and did not contribute to the significance of the district, but it was located on or very near the site of an older bridge constructed during the historic period. Because the modern bridge occupied the same or similar location and alignment as the historic structure, it preserved the original spatial organization and circulation of the historic district. A cultural landscape inventory (CLI) identified both of these landscape characteristics as contributing to the significance of the district and determined the Ben Bacon Ranch Historic District as eligible for listing o

n the National Register of Historic Places. The same CLI also noted that the modern bridge, though not a contributing feature, was compatible with the character of the historic district on account of its simplicity and rustic materials.

Under procedures mandated by NHPA, the Ben Bacon Ranch Historic District has been determined eligible for listing on the National Register of Historic Places. The vehicle whereby this determination occurred was the cultural landscape inventory approved in 2009, with the requisite concurrence of the State Historic Preservation Office. The area represented as the district has historically been accessible by the bridge over Sandy Creek. The district and its management are clearly within the scope of analysis, although the bridge itself is not a historic property. The following information is excerpted from the 2009 CLI.[14]

Figure 20: Ben Bacon Ranch Homestead

Figure 21: Ben Bacon Ranch Barn

The Ben Bacon Ranch Historic District includes the northern portion of the Sandy Creek Valley floor, where two historic homesteads and their associated agricultural features are located. The Bacon Homestead Cluster, located at the south end of the Historic District adjacent to the bridge project area, is the main developed area and includes the home of Ben Bacon, associated outbuildings, structures, features, and vegetation.

The Ben Bacon Ranch Historic District is locally significant for its association with early subsistence and small-scale commercial agriculture in California. The period of significance starts in 1865, when the first homesteaders settled along Sandy Creek, and ends in 1941, when the last of the original homesteading generation died and their way of life ended. After the period of significance, the local agricultural economy (including the Ben Bacon Ranch) stagnated, isolating Bear Valley from the larger patterns of development which characterized agricultural communities throughout most of the rest of California. The Historic District retains its integrity as a pre-irrigation homestead in the San Benito County area. The Historic District retains its landscape characteristics associated with agriculture prior to the development and widespread use of irrigation systems for intensive agricultural production, including hand dug ditches and natural water source.

The Historic District is associated with local settlers Ben Bacon, and others. Ben Bacon acquired all of the land within the Historic District during the period of significance and used the valley to cultivate crops. The buildings and features retained at the Bacon and Butterfield clusters convey the historical significance of the pre-irrigation agricultural developments in the region through the design of these core homestead clusters. Also evident is the relationship of the homesteads to the surrounding landscape, as defined by existing historic road alignments, fence lines and vegetation. Much of the historic road system is retained and conveys the historic relationships between the homesteads, croplands and pasture, other homesteads, and the larger region. The existing grasslands that dominate the setting and reflect the broad open pasture and cropland character established during the historic period. These grasslands are punctuated by Valley oak stands and riparian vegetation that have retained their historic locations. Overall, the character of the vegetation, particularly the open grasslands, riparian corridors, oak stands, and planted trees around the homesteads dominate the landscape and convey the historic character established during the period of significance by a combination of cultivation and grazing. The historic buildings and structures that remain still convey a strong feeling of the historic character of this agricultural landscape. The landscape appears today much as it did during the period of significance, as evidenced by historic photographs.

Overall, modern additions represent a relatively small area of the Ben Bacon Ranch Historic District. Modern modifications and additions are often compatible with historic fabric and are limited in area and are reversible. A mobile home was added by Stu Kingman just north of the Bacon homestead after the period of significance. These structures and vegetation associated with Kingman mobile home site are small in area and are removable from the Historic District. The principal use of the land since the historic period has been livestock grazing which continued until 2007. This land use has not changed the character of the landscape, and is compatible with historic usage because significant portions of the Ben Bacon Ranch were used for pasture during the historic period.

While the Historic District's buildings, structures, and planted trees have been neglected since the period of significance, this has not affected the historical integrity of the district. The overall landscape is in fair condition with stabilization needed for historic structures.

Archeological resources are present within the project site as determined by archival research and an intensive archaeological survey of about 2 acres on the project site.[15] The survey effort identified several depositions of items including pieces of agricultural equipment (a harrow, fencing wire, tool parts, etc.) located along the southeast bank of Sandy Creek, and a scattered deposit of miscellaneous personal and domestic artifacts (dish fragments, cans, bottles, etc.) located in the southeast bank of Sandy Creek. The artifacts located within the bank have been subject to disturbances related to the active creek and its effects on the bank, mainly slumping. Because of these actions, some of the artifacts were either partially or wholly buried. It is also likely that over time artifacts have been swept downstream during periods of increased water flow. Both of these finds are likely associated with the Ben Bacon homestead located just meters away. The exact age of these resources has not been determined, however, the farming implements and the artifacts in the drainage cut of Sandy Creek appear to be over fifty years old, but not to be from the period of significance. The resources identified by this study have been evaluated and are not deemed to be at risk from the proposed action.

Visitor Use and Experience

Under the NPS Organic Act, park resources and values are to be conserved and managed for the enjoyment of present and future generations. The park service makes general reference to 'visitors' in this context. In practice, the nature of visitors and visitation is highly variable and it also includes people who care about and appreciate national park units even if they do not physically 'visit' them. Visitor use is managed under a variety of regulations in addition to Management Policy 8.2. Visitation is not only about recreation, but it also refers to research and data collection, education, religious practice, cultural studies, and exploration, among a number of other possible uses.

For purposes of this assessment, visitor use consists almost entirely of recreation. Visitor use within the project area is limited mostly to day use and camping in designated areas near the visitor center between Sandy Creek and Highway 146. There are limited data on day use visitors since there is no fee station and anyone can drive in and out of the area without formal monitoring. Average annual visitation is estimated to be 175,000 visitors per year. Camping at Pinnacles Campground (tents, RVs, and groups) data for 2010 are as follows, by month: January - 600 people in campground; February - 890; March - 3,550; April - 5,330; May - 5,690; June - 5,030; July - 4,570; August - 2,370; September and October - 4,230; November -560; and December - 510.

Recreation activities that are afforded these visitors include hiking, rock climbing, exploration, observing nature, and relaxation. Some visitors may venture to the Historic District, although currently there is no easy access across Sandy Creek due to the impassibility of the old bridge structure. Historically, there has been no access to those lands for recreation other than that allowed by the private landowner. Therefore, the current use, in terms of type and amount, is nearly the same as it has always been.

With the recreation activities thus defined, a reasonably good quality experience is provided. Though the area (with the exception of the historic district) is not remarkably different or exceptionally scenic as compared to other areas in the park, a natural, relaxing environment for visitors is evident. Clean, pollution-

[15] NPS, 2010. Sandy Creek Bridge Project , Section 106 Archeological Survey Report, Pinnacles N.M.. Paul Engel, Archeological Technician.

free air is an important component of this experience. At night, visitors can be free of urban noise and unnatural light to enjoy the night skies. Natural sounds of insects, small animals, birds, water, and wind prevail to complete the natural experience.

Figure 22: Picnic and Day use site, illustrating a setting that many visitors enjoy.

During the summer this region is hot and dry. The presence of the charismatic oak trees lends a cooling presence, breaking up the expanse of semi-arid grass and shrub lands. The shade of these trees draws visitors and allows them to obtain relief from the sun. The Valley oak is an important component of visitor experience here, complementing the visual and sound quality of the environment.

Those who drive along Highway 146 are in a position to enjoy park resources from a distance. This may be particularly true of people in the local community. As reflected in some public comments, people are concerned about visual quality from this vantage point. The present visual quality, as seen from the highway, is heavily dependent upon the lack of built structures, the presence of the Valley oaks, and the visual diversity provided by other trees and natural vegetation in the foreground view zone.

Chapter 4 - Environmental Consequences

This section of the EA forms the "scientific and analytical base for comparing effects of alternatives." [16] The topics in this section correspond with the topics presented in the Affected Environment. Each topic should include a description of the **direct**, **indirect**, and **cumulative** impacts of each alternative. Both adverse and beneficial impacts are characterized.

General Methodology for Assessing Impacts

Potential impacts (direct, indirect and cumulative) are described in terms of type (are the effects beneficial or adverse), context (are the effects site-specific, local, or regional), duration (are the effects short-term or long-term), and intensity (is the degree or severity of the effects negligible, minor, moderate, or major). Because definitions of intensity vary by topic, intensity definitions are provided separately for each impact topic analyzed in the EA. Also, methods of analysis are specific to each resource and are covered by individual topic.

Cumulative Effects

CEQ regulations require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts are considered for all alternatives, including the No Action alternative.

Cumulative impacts are determined by combining the impacts of the alternatives with other past, present, and reasonably foreseeable future actions. Therefore, it is necessary to identify other ongoing or reasonably foreseeable future projects at Pinnacles N.M., if applicable, the surrounding region. Cumulative impact analysis is also resource -- or impact topic – specific, since it is necessary to group like impact sources that could affect an identified receptor.

Impairment of National Park Resources

In addition to determining the environmental consequences of implementing the preferred and other alternatives, NPS *Management Policies 2006* (section 1.4) requires analysis of potential effects to determine whether or not proposed actions would impair a park's resources and values.

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the National Park Service the management discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the

[16] Refer especially to 40 CFR 1502.16, 1508.7, 1508.8, and 1508.27. DO 12 Handbook pages 72-73 provide the necessary content of impact discussions.

purposes of the park. That discretion is limited by the statutory requirement that the National Park Service must leave resources and values unimpaired unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values (NPS *Management Policies 2006*). Whether an impact meets this definition depends on the particular resources that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.

An impact on any park resource or value may, but does not necessarily, constitute impairment. An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or
- identified in the park's general management plan or other relevant NPS planning documents as being of significance.

An impact would be less likely to constitute an impairment if it is an unavoidable result of an action necessary to preserve or restore the integrity of park resources or values and it cannot be further mitigated.

Impairment may result from visitor activities; NPS administrative activities; or activities undertaken by concessioners, contractors, and others operating in the park. Impairment may also result from sources or activities outside the park.

Impairment findings are not necessary for visitor experience, socioeconomics, public health and safety, environmental justice, land use, and park operations, etc., because impairment findings relate back to park resources and values. The determination of impairment for the preferred alternative is found in Appendix D.

AIR RESOURCES

Methods and Assumptions

The following definitions will be used to assess the intensity of potential air quality impacts:

• **Negligible:** The effects to air quality would be below or at the lower levels of detection with only a small amount of greenhouse gases and particulates released into the environment.

• **Minor:** An action's effects on air quality would be detectable with a minor increase in greenhouse gases and particulates. The effects would be localized and short-term. Measurable or anticipated degree of change would have a slight effect, causing a slightly noticeable change of approximately less than 20 percent compared to existing conditions. If mitigations were needed to offset adverse effects ,they would be relatively simple to implement and would likely be successful.

• **Moderate:** An action would result in a change or alteration of the air quality. Measurable or anticipated degree of change is readily apparent and appreciable and would be noticed by most people, with a change likely to be between 21 and 50 percent compared to existing conditions. The effects can be localized or widespread.

Mitigation measures would probably be necessary to offset adverse effects and would likely be successful. The project would create greater than minor amounts of greenhouse gases and particulates.

• **Major:** An action would result in a change in air quality over a relatively large area. Measurable or anticipated degree of change would be substantial, causing a highly noticeable change of approximately greater than 50 percent compared to existing conditions. Key ecological processes would be altered and landscape-level changes would be expected. Mitigation measures to offset adverse effects would be necessary, extensive, and may not be successful. The project would create more than moderate amounts of greenhouse gases and particulates that could affect the local atmosphere.

• **Duration:**

- Short-term – Effects last only for the duration of project implementation.
- Long-term – Effects last beyond the period of project implementation.

Alternatives 1-3:

Direct and Indirect Impacts

The use of heavy equipment and other gas combustion engines to implement this project would occur over the space of two to three weeks during a six week period in the summer. The motorized equipment would vent a variety of greenhouse gas pollutants, notably carbon dioxide, methane and nitrous oxide, into the air. A truck-mounted, diesel powered drill rig would be used for geophysical investigation prior to actual construction; a large flatbed would be used to transport heavy equipment; a bull dozer would be used to clear and grade a new, natural surface access road; and cranes will emplace the bridge structure. Vehicles transporting the workforce on a daily basis would add to the greenhouse gas emissions produced by the construction activities. Vehicles and equipment travelling around the work site would generate fugitive dust.

Greenhouse gas emissions for construction can be estimated by calculating the number and types of equipment that may be used on a project. Referring to the emissions calculation for a similar project at Mount Rainier National Park (MORA),[17] an upper bound for emissions on the Sandy Creek project can be inferred. Over a construction period of 800 hours, using trucks, excavators, loaders and rollers, and tractor trailers, the estimated total fuel consumption was estimated at 9600 gallons for the MORA project. Greenhouse gas emissions from this activity were calculated for carbon dioxide at 99.6 metric tons,[18] methane at 0.1 metric tons and nitrous oxide at 0.8. Compared to baseline levels, the Mount Rainier project would increase greenhouse gas levels by less than 1 percent. Using the same impact criteria as that given above, Mt. Rainier concluded that the increase in greenhouse gas would generate negligible to minor, short term adverse impacts.

Dust would also be generated by ground disturbing activities during construction, contributing to the adverse effect on air quality. This would result largely from the clearing and grading of new access road. Mitigation to avoid or minimize the potential for construction impacts to air quality, including dust, are found in the standard operating measure listed in Appendix C.

[17] Stevens Canyon Road Rehabilitation Environmental Assessment, Mount Rainier National Park, March 2010

[18] Units of Metric Tons of Carbon Dioxide Equivalent.

Comparing Alternatives 1-3 to the project cited for Mount Rainier, similar types of equipment would be used. However, the vehicles used would be far fewer and for a considerably shorter construction period than at Mt. Rainier: fewer than 10 vehicles compared to 44, and 100 to 200 construction hours compared to 800. Given the scale of operations, differences in climatic factors between the two would make little difference. Since it was concluded in the Stevens Canyon Road Rehabilitation project that impacts on air quality would be negligible to minor, the impacts of Alternatives 1-3 (being nearly the same in terms of activities) would be even less. The creation of a new natural surface road, mitigated somewhat by the rehabilitation of the old access, would provide a new source of airborne dust under windy conditions. At some point, the surface would become compacted and less a source of fugitive dust. However, the summers are hot and dry, so that there will always be some dust generated by the use of vehicles. The construction of a bridge across Sandy Creek, accessed through the campground, would enable park staff to use the park's small electric maintenance vehicles (golf-cart like) for routine errands and projects with hand tools, instead of a diesel powered pick-up.

Cumulative Effects

The area of concern for air quality is limited to the project area and its immediate environment wherefrom greenhouse gases and dust may be generated. However, ambient air quality would also be a function of pollutants transported in from urban areas to the west.

Because gaseous products generated from construction equipment are relatively short-lived, only present and reasonably foreseeable impacts of the same type during the construction period need be considered. Other pollutants generated through this time frame would include those of passing vehicles of all types (on Highway 146) and those who drive into the visitor center or day use area. NPS judges that these pollution sources would not be sufficient to affect the overall ambient air quality in a measurable way. The impact to air quality from these sources, when combined with the impacts from Alternatives 1-4 for the construction period of two to three weeks would be insignificant compared to any annual pollution load from traffic on Highway 146. Therefore, there would be negligible cumulative impacts to air quality.

Conclusions

There would be short-term, negligible to minor and long-term negligible adverse impacts to air quality resulting from construction activities in Alternatives 1-3. Cumulative effects would be short- and long-term negligible and adverse.

Alternative 4 – Remedial Hazard Abatement:

Direct and Indirect Effects

Compared to Alternatives 1-3, Alternative 4 would involve fewer polluting activities for less time within the project area. A new road would not be cleared and graded. Production of greenhouse gases and fugitive dust from this alternative would be negligible at the project site and limited to the short construction time required to remove the old bridge and obliterate the asphalt driveway. However, since this alternative would necessitate continuing to use the alternative access route from Highway 25, air pollution over the long term would result from vehicles not being able to access the Bacon homestead area from the campground area. Vehicles would instead need to drive all the way out to Hwy 25 and then all the way back using dirt roads and increasing the generation of fugitive dust over the long term. Park staff would need to use a diesel powered

pick-up to negotiate the 4 miles of highway and unpaved road for all errands to the Bottomlands and Bacon Homestead area. This would involve extra driving of about 12-40 miles per day, or 1560 to 5200 additional miles per year adding to the total carbon footprint for administering the area.

Cumulative Effects

The area of concern for air quality is limited to the project area, and its immediate environment wherefrom greenhouse gases and dust may be generated. However, ambient air quality would also be a function of pollutants transported in from urban areas to the west.

Conclusions

Alternative 4 would have less short-term impact as compared to Alternatives 1-3 within the project area, but a greater (minor)long-term impact overall due to offsite impacts of vehicles that must use a different route to access the district and park lands east of Sandy Creek.

Alternative 5 – No Action:

Direct and Indirect Effects

Compared to the action alternatives, Alternative 5 would involve fewer polluting activities for less time within the project area. A new road would not be cleared and graded. Production of greenhouse gases and fugitive dust from this alternative would be negligible at the project site. However, since this alternative would necessitate continuing to use the alternative access route from Highway 25, potential impacts are not limited to this site alone. Air pollution over the long term would result from vehicles not being able to access the Bacon homestead area from the campground but would instead need to drive all the way out to Hwy 25 and then all the way back using dirt roads and increasing the generation of fugitive dust over the long term. As described in Alternative 4, Park staff would need to use a diesel powered pick-up to negotiate the 4 miles of highway and unpaved road for all errands to the Bottomlands and Bacon Homestead area. This would involve extra driving of about 12-40 miles per day, or 1560 to 5200 additional miles per year adding to the total carbon footprint for administering the area.

Cumulative Effects

The area of concern for air quality is limited to the project area, and its immediate environment wherefrom greenhouse gases and dust may be generated. However, ambient air quality would also be a function of pollutants transported in from urban areas to the west.

Conclusions

Alternative 5, *No Action,* would have negligible short-term impact as compared to the action alternatives within the project area, but a greater (minor)long-term impact overall due to offsite impacts of vehicles that must use a different route to access the district and park lands east of Sandy Creek.

SOIL RESOURCES

Methods and Assumptions

The following definitions will be used to assess the intensity of potential soil impacts:

• **Negligible:** The effects to soils would be below or at the lower levels of detection. Any effects on productivity or erosion potential would be slight.

• **Minor:** An action's effects on soils would be detectable. It would change a soil's profile in a relatively small area, but it would not appreciably increase the potential for erosion of additional soil. If mitigation were needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.

• **Moderate:** An action would result in a change in quantity or alteration of the topsoil, overall biological productivity, or the potential for erosion to remove small quantities of additional soil. Changes to localized ecological processes would be of limited extent. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.

• **Major:** An action would result in a change in the potential for erosion to remove large quantities of additional soil or in alterations to topsoil and overall biological productivity in a relatively large area. Key ecological processes would be altered, and landscape-level changes would be expected. Mitigation measures to offset adverse effects would be necessary, extensive, and their success could not be guaranteed.

• **Duration:**

- Short-term – Following completion of the project, recovery would take less than one year.
- Long-term – Following completion of the project, recovery would take more than one year.

Alternative 1:

Direct and Indirect Impacts

The soil resource is impacted by construction equipment directly by excavating and blading to remove vegetation. Construction of an unpaved road would involve the permanent removal of vegetation and the leveling and grading of the surface. Long-term, the natural surface would be subject to climatic factors such as rain, wind, freeze/thaw, and passage of vehicles during inopportune conditions. These factors could serve to keep the surface materials available for transport by wind and water. Should the road become rutted, drivers tend to avoid the ruts and drive around, thereby widening the road and creating a larger surface devoid of vegetation. In extreme cases, parallel rutting can expand to two to three times the initial width of the road. The new unpaved road will be graded 4" below adjacent soil surface, filled with aggregate base material and compacted to flush with adjacent grade. The material of the new road will be sourced from a quarry which produces brown/tan aggregate to blend with the natural soil. The new unpaved road will have 1%-3% cross slope for drainage.

The soil/vegetation complex would be altered on both sides of Sandy Creek by the preparation of the bridge foundations. As indicated in the design, the foundations would be placed on the upper third of the stream channel slope, with placement of rip-rap to alleviate downslope movement of soil materials and eventual erosion into the channel.

The soil resource can be impacted by the passage of vehicles over a vegetated area. Tire or track treads will damage vegetation cover and compact the upper strata of the soil profile. The net effect is to make the damaged area less permeable and more susceptible to puddling and subsequent erosion. This type of impact

could occur during all phases of work (in Alternatives 1 and 2, and for the deconstruction of the old bridge) up until the time the new access road is established. However, if the equipment travels over the same route as that intended for the new road, or over the existing access from Highway 146, this potential impact can be discounted. Therefore, the new road will be built first and the existing access driveway obliterated last, so all equipment should be confined to previously disturbed areas.

Use of heavy equipment for this proposed action (dozers, graders, cranes, and flatbed trucks) has the potential to damage soils both by direct disturbance and by compaction. However, application of the standard operating measures in Appendix C would mitigate the latter impacts sufficiently, especially in the short term during construction.

Construction of the access road (vegetation removal and grading) would affect an area of 1,065 linear feet, 14 feet wide. The total area permanently disturbed would be 14,910 square feet or 0.34 acres. Clearly, this would be a long-term impact. Due to the slopes involved and the drainage characteristics of the Elder gravelly loam soil type, it is not highly susceptible to erosion or compaction and it supports vegetation well. Because of this, the long term impact of the road would be adverse and minor as long as construction equipment is kept sufficiently away from the stream channel upper slope break. Soils in the Still-Riverwash complex would not be affected since all construction activities are to be kept out of the stream channel and its valley. Also, in this alternative three of the established grey pines located outside the stream channel would be removed. The loss of root strength and the loss of perennial shade could alter the soil microclimate and its local stability to a degree. This could be a concern if the tree rooting structures currently contribute to the integrity of the stream channel upper banks (or valley sides). The rooting structure will be replaced by the abutment structures.

Cumulative Effects

The area of concern for cumulative impacts on soil is essentially limited to the project area (see project area map). Other similar impacts would include the use of vehicles for recreation (day use, camping) purposes outside of present roadways, compacted areas, or parking zones. If such use is prohibited, then the total cumulative effect would consist of the actions posed in each alternative. The total cumulative impact with Alternatives 1 would be adverse, long term and minor, relative to the current condition.

Conclusions

The total cumulative impact for Alternative 1 would be adverse, long term and minor, relative to the current condition.

Alternative 2: Preferred Alternative

Direct and Indirect Effects

This alternative would engender the same types of effects as those shown for Alternative 1, except that less surface area would be permanently disturbed by the access road. The total conversion of the soil/vegetation matrix by a 770 foot long road would be 14,000 square feet or 0.25 acres. Nine small oak trees and one grey pine would also be removed from the stream channel in this alternative, potentially affecting the soil microclimate and its local stability.

Though outside the project area, soil resource impacts are presently occurring along the alternate access route to the other side of Sandy Creek. These would be mitigated by the reconstruction of the Sandy Creek Bridge crossing in this alternative.

Cumulative Effects

Same as Alternative 1.

Conclusions

The total cumulative impact would be adverse, long term and minor, relative to the current condition.

Alternative 3:

Direct and Indirect Effects

This alternative would engender the same types of effects as those shown for Alternative 1, except that less surface area would be permanently disturbed by the access road. The total conversion of the soil/vegetation matrix by an 830 foot long road would be 11,620 square feet or 0.27 acres. In this alternative, while some Poison oak (*Toxicodendron diversiloba*) and willow shrubs would be removed there would be no need to remove trees hence there would be minimal impact on soil microclimate or local stability.

Cumulative Effects

Same as Alternative 1.

Conclusions

The total cumulative impact would be adverse, long term and minor, relative to the current condition.

Alternative 4: Remedial Hazard Abatement

Direct and Indirect Effects

Since this alternative does not involve the construction of a new road and a new bridge, all impacts associated with these actions would not occur. The deconstruction of the old bridge could be accomplished using the existing access from Highway 146. All disturbed areas would be rehabilitated, such that a net beneficial impact on the soil and vegetation matrix would be the result.

Though outside the project area, soil resource impacts are presently occurring along the alternate access route to the other side of Sandy Creek. These impacts would continue, and be exacerbated over time as road damage and parallel tracking begins to occur. Up to 10 trips a day for NPS administrative, maintenance, and natural resource projects occur in the area, in addition to use by private inholding of up to 4 trips per day. Photos below illustrate existing damage on the road, consisting of rutting and parallel tracks that expand the disturbed area over time.

Cumulative Effects

The total cumulative impact for Alternative 4 would be a net minor beneficial impact, long term, within the environs of the project area. If, however, the offsite impacts of using the alternative access route are

considered, the total cumulative effect would have to be considered greater than the total cumulative impacts engendered by the action alternatives.

Conclusions

The total cumulative impact for Alternative 4 would be a net minor beneficial impact, long term. If, however, the ongoing offsite impacts of using the alternative access route are considered, the soil resource associated with it would be affected to a greater degree than in Alternatives 1-3.

Alternative 5: No Action

Direct and Indirect Effects

Since the No Action alternative does not involve the construction of a new road and a new bridge, all impacts associated with the bridge removal and reconstruction would not occur. When the bridge abutments eventually collapse into the creek they will leave areas of unvegetated, exposed dirt creek bank which will continue to erode releasing sediment into the creek. Depending on how the bridge structure collapses, the creek could begin to migrate laterally making currently stable banks less stable.

Outside the project area, soil resource impacts would continue to occur along the alternate access route from Highway 25 to the Bacon Homestead and be exacerbated over time as road damage and parallel tracking begins to occur. Up to 10 trips a day for NPS administrative, maintenance, and natural resource projects occur in the area, in addition to use by private inholding of up to 4 trips per day. Photos below (Figure 23) illustrate existing damage on the road, consisting of rutting and parallel tracks that expand the disturbed area over time.

Cumulative Effects

The total cumulative impact for Alternative 5 would be a minor adverse impact, long term, within the environs of the project area. If the offsite impacts of using the alternative access route are considered, the total cumulative impact would have to be considered greater than the total cumulative impacts engendered by the action alternatives.

Conclusions

The total cumulative impact for Alternative 5 would be a minor adverse impact, long term. If, however, the ongoing offsite impacts of using the alternative access route are considered, the soil resource associated with the No Action alternative would be greater than the action alternatives.

Other Mitigation if not already part of the Alternatives

- Minimize vegetation removal. Where trees that support or are near the streambank must be removed, leave a flush cut stump and the root structure intact to support the local soil stability.
- Minimize the use of heavy equipment within 20 feet of the stream channel upper slope break.
- Limit heavy equipment and vehicular access to the new access road, or to existing established roads and parking surfaces.
- Perform a road system survey of the alternative route from Highway 25, and investigate ways to mitigate damage that is occurring there.

Figure 23: Access to the Historic District from Highway 25. Soil and vegetation damage is evident in the development of ruts and parallel tracks that occurs during wet conditions. When not wet, this is a source of airborne dust.

WATER RESOURCES, WETLANDS AND FLOODPLAINS

Methods and Assumptions

The following definitions will be used to assess the intensity of potential water resource and wetlands impacts:

Methods and Assumptions

The following definitions will be used to assess the intensity of potential water resources, wetlands, and floodplains impacts:

• **Negligible:** An action would have no measurable or detectable effects on water quality or the timing or intensity of stream flows. No measurable or perceptible changes in wetland size, integrity or continuity would occur.

• **Minor:** An action would have measurable effects on water quality or the timing or intensity of stream flows. Water quality effects could include increased or decreased loads of sediment, debris, chemical or toxic substances, or pathogenic organisms. Impacts would be measurable or perceptible but slight. A small change in wetland size, integrity or continuity could occur due to short-term indirect effects such as construction related runoff. However, the overall viability of the resource would not be affected.

• **Moderate:** An 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. Alternatively, an impact would be visible to visitors. Any impact would be sufficient to cause a measurable change in wetland size, integrity or continuity or would result in a small, but permanent loss or gain in wetland acreage.

• **Major:** An action would have substantial effects on water quality or the timing or intensity of flows and potentially would affect organisms or natural ecological processes. Alternatively, an impact would be easily visible

to visitors. The action would result in a measurable change in all three wetland parameters (size, integrity and continuity) or a permanent loss of large wetland areas. The impact would be substantial and highly noticeable.

• **Duration:**

- Short-term – Following completion of the project, recovery would take less than one year.
- Long-term – Following completion of the project, recovery would take more than one year.

Alternative 1:

Direct and Indirect Impacts

The three alternatives which include bridge construction (Alternatives 1-3) all include bridge configurations that increase the flow conveyance under the bridge compared with the conveyance under the existing bridge prior to its failure. However, when flow reaches the bottom of the bridge structure, or in higher flows overtops the bridge structure, shear stresses on the bed and banks will increase compared with the stresses that would occur in the channel in the absence of any bridge. Based on preliminary engineering analyses of the alternatives, limited use of riprap may be required to protect the bridge foundations and to prevent bank degradation for larger discharges (50- to 100-yr). The visual appearance of the riprap may be mitigated by burying the riprap under a layer of soil and planting vegetation. In Alternatives 1-3, the potential for riprap or other bank stabilization techniques is limited to the area under the bridge and immediately adjacent to the bridge.

Sandy Creek is a dynamic system whose structure is modified with each flood, with the greatest changes generally occurring during the greatest floods. Energy in the water is dissipated through the interaction with the soil, rocks, and vegetation covering the bed and banks of the creek as it flows past. Placing buried riprap over such limited areas will have a negligible effect on energy dissipation. The riprap is intended as a "hard point" to prevent channel migration and protect the bridge abutments. This will have a negligible effect on the sediment transport processes in the creek. The bridge elevations in Alternatives 1-3 are intended to maximize flow under the bridge. However, for some larger flows (50- to 100-yr), the bridge will block flow and increase the water surface elevation compared to what would have occurred without a bridge. With the wide gently-sloped floodplain adjacent to the creek, the increase in water surface elevations would be negligible.

All three of the bridge construction alternatives would tend to restrict the movement of some woody debris downstream during very high water flows as the existing bridge has done.

Removal of the existing failed bridge would have major long-term positive impacts on water resources and wetlands, since the bridge and abutments, if left in place, would eventually fall into the creek and cause a major alteration of streamflow and disruption of natural stream processes.

Construction of a bridge at the same location of the failed bridge would likely include lining the adjacent stream banks with (buried) riprap. This has the potential to cause minor long-term adverse effects on water resources locally. The new bridge and access roads may also have direct adverse short-term and long-term effects of weakening the upper stream banks of Sandy Creek at the immediate site of the new construction.

Alternative 1 could cause negligible adverse impacts to wetlands. Impacts would be limited to minor sediment movement during construction and immediately following construction before reestablishment of

riparian vegetation. At the proposed bridge site for Alternative 1, the new bridge would span Sandy Creek at an elevation of 10 feet above the channel bed, and cause very minor increased shading of approximately 0.009 acres of Lower Perennial Riverine Unconsolidated Bottom Wetlands; however this effect is not expected to create measureable or noticeable impacts to any wetland values.

Cumulative Effects

Potential for cumulative impacts is limited. Past, present and reasonably foreseeable projects may include repaving campground roads, installing a new well in the campground vicinity, ecological restoration/revegetation projects, and invasive exotics control projects. None of these projects, in combination with the proposed project, are expected to result in cumulative water resources effects because these projects do not alter stormwater runoff beyond negligible levels. Ecological restoration and revegetation projects have the potential for cumulative benefits.

Cumulative impacts are also limited by the upstream presence of the bridge at Highway 25 and the downstream presence of the culverts at the campground access road. These hydrological constraints and stream hard points constrain the migration of water resource effects.

Conclusions

The hydrology of the area will be unaffected by Alternative 1. Since the replacement bridge configuration is longer than the existing bridge, it would reduce the risks of downcutting and bank erosion compared with existing conditions or the No Action alternative where the existing bridge is not removed. No change to the Zone A floodplain extent is anticipated because the new bridge is expected to allow more flow underneath the bridge and because the floodplain is wide compared to the bridge at all potential locations. For Alternative 1 the riprap stabilization has the potential for minor impacts to the riparian ecosystem adjacent to the bridge, though no water quality impacts would be expected.

The new bridge and access roads may have direct effects on the upper stream banks of Sandy Creek at the immediate site of the new construction. With standard mitigation applied, the risk of such impacts is negligible.

Alternative 2: Preferred Alternative

Direct and Indirect Impacts

Please see the general discussion of impacts in Alternative 1, above, as it applies to all bridge construction alternatives (Alternatives 1-3).

Removal of the existing failed bridge would have major long-term positive impacts on water resources and wetlands, since the bridge and abutments, if left in place, would eventual fall into the creek and cause a major alteration of stream flow and disruption of natural stream processes.

Construction of a bridge approximately 300 ft. downstream of the location of the failed bridge would likely include lining the adjacent stream banks with (buried) riprap. This has the potential to cause negligible long-term adverse effects on water resources because greater conveyance is available at this location compared with the locations in alternatives 1 and 3. The new bridge and access roads may also have direct adverse

short-term and long-term effects of weakening the upper stream banks of Sandy Creek at the immediate site of the new construction.

No change to the Zone A floodplain extent is anticipated because the new bridge is expected to allow more flow underneath the bridge and because the floodplain is wide compared to the bridge at all potential locations. Per the floodplain assessment prepared for the Pinnacles GMP in 2010 which states "… it is of value to note that even if the channel capacity were exceeded by a greater magnitude flood, the non-confining nature of the terrace level would not allow overbank flows to easily achieve any substantial depth or reach destructive velocities."[19] *No Statement of Findings for Floodplain will be prepared for this project.*

Alternative 2 **could cause negligible adverse impacts to wetlands.** Impacts would be limited to minor sediment movement during construction and immediately following construction before reestablishment of riparian vegetation. At the proposed bridge site for Alternative 2, the new bridge would span Sandy Creek at an elevation of 13 feet above the channel bed, and cause very minor increased shading of approximately 0.006 acres of Lower Perennial Riverine Unconsolidated Bottom Wetlands; however this effect is not expected to create measureable or noticeable impacts to any wetland values.

Cumulative Effects

Same as in Alternative 1.

Conclusions

The hydrology of the area will be unaffected by Alternative 2. Since all the replacement bridge configurations are longer than the existing bridge, they would reduce the risks of downcutting and bank erosion compared with existing conditions and with the No Action alternative where the existing bridge is not removed. No change to the Zone A floodplain extent is anticipated because the new bridge is expected to allow more flow underneath the bridge and because the floodplain is wide compared to the bridge at all potential locations. For Alternative 2, the potential for impact from channel rip-rap is negligible.

The new bridge and access roads may have direct effects on the upper stream banks of Sandy Creek at the immediate site of the new construction. With standard mitigation applied, the risk of such impacts is negligible.

Alternative 3:

Direct and Indirect Impacts

Please see the general discussion of impacts in Alternative 1, above, as it applies to all bridge construction alternatives (Alternatives 1-3).

Removal of the existing failed bridge would have major long-term positive impacts on water resources and wetlands, since the bridge and abutments falling into the creek will cause a major alteration of stream flow and disruption of natural stream processes.

[19] M. Martin, NPS-WRD

Construction of a bridge approximately 1000 ft. downstream of the location of the failed bridge would likely include lining the adjacent stream banks with (buried) riprap. This has the potential to cause minor long-term adverse effects on water resources and wetlands locally.

The new bridge and access roads may also have direct adverse short-term and long-term effects of weakening the upper stream banks of Sandy Creek at the immediate site of the new construction.

***Alternative 3* could cause minor adverse impacts to wetlands.** Impacts would be limited to minor sediment movement during construction and immediately following construction before reestablishment of riparian vegetation. At the proposed bridge site for Alternative 3, the new bridge would span Sandy Creek at an elevation of 10 feet above the channel bed, and cause very minor increased shading of approximately 0.007 acres of Lower Perennial Riverine Unconsolidated Bottom Wetlands and 0.002 acres of Palustrine Emergent Wetlands ; however this effect is not expected to create measureable or noticeable impacts to any wetland values.

Cumulative Effects

Same as Alternative 1.

Conclusions

Same as Alternative 1.

Alternative 4: Remedial Hazard Abatement

Direct and Indirect Impacts

Removal of the existing failed bridge would have major long-term positive impacts on water resources and wetlands due to its deteriorated condition restricting stream flow. Since there would be no new access constructed in this alternative, there would be no additional impacts on the local hydrologic system.

This alternative, which includes removal of the failed existing bridge structure, increases the potential for large woody debris to reach the campground road crossing culverts downstream of the project vicinity. Since these culverts already restrict creek flow during flood events, the potential for debris clogging the culverts is increased. Clogged culverts would increase the hydraulic forces on the embankment, possibly resulting in failure of the embankment and downstream flooding.

***Alternative 4* could cause negligible impacts to wetlands.** By removing the damaged bridge structure, the exposed creek banks can be managed and stabilized through erosion control measures and revegetation to minimize sediment movement into the creek. Alternative 4 has a beneficial effect over the No Action alternative due to the process of controlling sediment from the newly exposed banks instead of allowing the sudden sediment dump that would result from the bridge abutments collapsing.

Cumulative Effects

Potential for cumulative impacts is limited. Of the alternatives, removing the existing bridge and not constructing a new bridge and access route would have the least potential to add to the cumulative total of any past, present or reasonably foreseeable impacts.

Conclusions

The hydrology of the area would be least affected by Alternative 4, either by adverse direct and indirect impact or cumulatively with other ongoing impacts. The net total impact of this alternative would be beneficial.

Alternative 5: No Action

Direct and Indirect Impacts

The existing conditions are characterized by a partially collapsed bridge. The concrete block foundations have been undermined by scour and have partially fallen into the creek. This condition leaves the remaining support of the bridge more vulnerable to future storms and flow around the blocks in the stream will cause erosion. Eventually, the bridge deck will collapse causing further blockage, capture of woody debris and erosion at the site. Potential consequences may include significant vertical profile adjustments that could affect the stream morphology both upstream and downstream of the site or lateral movement of the stream depending on the manner in which the bridge deck lodges in the stream channel when it falls.

The bridge and abutments falling into the creek will cause a sudden major alteration of stream flow and disruption of natural stream processes. The exposed banks will continue to erode, depositing sediment and woody debris into the creek channel. The collapsed bridge structure and this new sediment load could be considered "fill" as related to the Clean Water Act and potential obstructing a Water of the United States

The No Action alternative increases the potential for large woody debris and fragments of the existing bridge to reach the campground road crossing culverts downstream of the project vicinity. Since these culverts already restrict creek flow during flood events, the potential for debris clogging the culverts is increased with the No Action alternative. Clogged culverts would increase the hydraulic forces on the embankment, possibly resulting in failure of the embankment and downstream flooding.

Cumulative Effects

Leaving the bridge to collapse and modify the stream morphology could lead to changes further downstream which may impact the campground area. Of all the alternatives, doing nothing would have moderate potential to add to the cumulative total of any past, present or reasonably foreseeable impacts.

Conclusions

***Alternative 5* could cause minor adverse impacts to wetlands.** No wetlands are present at the existing bridge location to be impacted by the bridge itself falling into the creek, however the newly exposed and eroding banks will produce a sediment load discharged into the creek in a sudden and potentially long term manner which will impact wetlands downstream

The hydrology of the area would be most affected by the No Action alternative by adverse direct and indirect impacts, potentially for miles downstream of the project site. The net total impact of this alternative would be moderate adverse.

NATURAL SOUNDSCAPES

Methods and Assumptions

Context, time, and intensity together determine the level of impact for an activity. For example, noise for a certain period and intensity would be a greater impact in a highly sensitive context, and a given intensity would be a greater impact if it occurred more often, or for longer duration. It is usually necessary to evaluate all three factors together to determine the level of noise impact. In some cases an analysis of one or more factors may indicate one impact level, while an analysis of another factor may indicate a different impact level, according to the criteria below. In such cases, best professional judgment based on a documented rationale must be used to determine which impact level best applies to the situation being evaluated.

Park Service regulations include a number of provisions that relate to noise or noise abatement. General regulations, those that apply in all park units, may be found in 36 CFR Parts 1-6. Park-specific regulations are located in Part 7. The regulations give a perspective as to noise levels that are considered an upper limit for acceptable impact, beyond which the impact is prohibitive to park enjoyment. Perhaps the most applicable regulations in this instance are §2.10 (camping and food storage) and §2.12 (audio disturbances). The former prohibits creating or sustaining unreasonable noise between the hours of 10:00 p.m. and 6:00 a.m. considering the purpose for which the area was established, the impact on park users, and other factors that would govern the conduct of a reasonably prudent person under the circumstances. This regulation prohibits operating motorized equipment , including vehicles, generators, radios, etc. in a manner that: 1) exceeds 60 decibels (A-weighted or dba) at 50 feet from the source; or 2) if below that level, the sound nevertheless makes noise which is unreasonable, considering the nature and purpose of the noise-maker's conduct, location, and the time of day or night.

Actual sound impact is a function not only of decibels, but also of sound frequency, and as noted above, the duration and temporal frequency of the sound, and the natural ambient sound level. Impacts of noise on wildlife and visitors would also incorporate the variables of ambient sound, visitor expectations (regarding the search for peace and quiet), and time of the day or night. Noise can occur at relatively low levels, but the sound frequency (high) or its lengthy duration, or its occurrence during the night, can be a relatively large impact. Alternately, a fairly loud noise (such as a low overflight by a helicopter) can occur a single time during the day and have but a negligible impact on visitor experience. Higher frequency noise (e.g. chainsaws, snowmobiles) is attenuated by distance, topography, vegetation (particularly thick forest stands) and climatic factors. Lower frequency sound (buses, bulldozers) tends to travel further, being less scattered by intervening surface character.

Audibility of noise, in general, depends upon local ambient soundscape factors including wind, rivers, waterfalls, and the like.[20]

• **Negligible:** Natural sounds would prevail; (activity) noise would be very infrequent or absent and mostly immeasurable.

[20] Miller, Nicholas P., 2008. US National Parks and management of park soundscapes: A review. Published in Applied Acoustics, 69 (2008) pages 77-92.

• **Minor:** Natural sounds would predominate in areas where management objectives call for natural processes to predominate, with (activity) noise infrequent at low levels. In areas where (activity) noise is consistent with park purpose and objectives, natural sounds could be heard occasionally.
• **Moderate:** In areas where management objectives call for natural processes to predominate, natural sounds would predominate, but (activity) noise could occasionally be present at low to moderate levels. In areas where (activity) noise is consistent with park purposes, (activity) noise would predominate during daylight hours and would not be overly disruptive to noise-sensitive visitor activities in the area. Natural sounds could still be heard occasionally.
• **Major:** In areas where management objectives call for natural processes to predominate, natural sounds would be impacted by (activity) noise sources frequently or for extended periods of time. In areas where (activity) noise is not consistent with park purposes and zoning, the natural landscape would be impacted most of the day; (activity) noise would disrupt conversation for long periods of time, and make enjoyment of other activities difficult; natural sounds would rarely be heard during the day or night.
• **Duration:**

- Short-term – Following completion of the project, recovery would take less than one year.
- Long-term – Following completion of the project, recovery would take more than one year.

Alternatives 1-3

Direct and Indirect Impacts

General impacts under all bridge construction alternatives (Alternatives 1-3) would include the use of heavy equipment to construct the access road and the bridge foundation. There would be two days of geotechnical boring investigation work which will produce some noise for a few hours. The sound of a diesel engine would be highly audible but would be used only for 2 days or 8 hours per day and would be turned off when not in use. Some construction noise would result from cranes and concrete work. The total construction time would be about 2-3 weeks over a period of 6 weeks. Heavy equipment will also be necessary to place the bridge on its foundation. While operating, the equipment can be expected to produce noise exceeding 60 dba at 50 feet. Per regulation, this noise level is defined as a nuisance threshold. The duration of the reconstruction is expected not to exceed two to three weeks during a six week period. The source of noise will be during the daylight hours only. Depending on the operating schedule, the periodic engine noise could be frequent and of long duration, dominating the natural sound environment for most of the day. Deconstruction and removal of the old bridge, which occurs in every alternative, is expected to cause mechanical noise over a period of 3-5 days. Saws and hammer drills will be used to break up the old structure, including its abutments, and a crane will be used to remove the pieces.

While this area of Pinnacles N.M. has yet to be zoned for management[21], it can be anticipated that outside the developed areas of visitor center and campground, there would be a high expectation for the natural soundscape to be evident much of the day and all of the night. Even in the historic district, it is likely that maintenance of the rural character of the area would call for similar soundscape objectives.

Given the above, the impacts on the soundscape are likely to be similar among the bridge construction alternatives. Applying the impact level criteria, above, the impacts would be adverse, and moderate to major

[21] The area would be designated as Front Country in all proposed GMP alternatives.

during the construction activities. Since the inclusive construction period is not likely to exceed six weeks, its impact would be short term, ceasing immediately upon completion. Considering the duration of the impact, its overall severity is judged to be negligible.

Cumulative Effects

The cumulative effect area of concern would have the project area at its core. It would extend outward to the extent of sound source locations that would be audible within the project area. The chief sound source would be associated with Highway 146 in the near vicinity of the Pinnacles Campground Visitor Center. Because of the surrounding terrain, the area of influence would be limited. There is no apparent concern for sound receptors outside the Monument that would be affected by the project activities.

Because sounds are short-lived, only present and reasonably foreseeable impacts of the same type during the construction period need be considered. Human-caused sound sources generated or audible within the area of concern include passing vehicles of all types (on Highway 146), aircraft over flights, and local visitor use. NPS judges that these sound sources would not be sufficient to inhibit the natural soundscape for significant portions of the day and night, on the average. No other human sound sources are foreseeable for the duration of the project. During the two to three weeks of bridge and road construction in Alternatives 1-3, the total cumulative impact on soundscape would be mostly attributable to this project. Alternatives 4 and 5 would add less impact, cumulatively, and for less time.

Conclusions

Impacts of Alternatives 1-3 would be adverse, and moderate to major during two to three weeks of actual construction activities. Since the inclusive construction period is not likely to exceed six weeks total, the impact would be short term, ceasing immediately upon project completion. Considering the duration of the impact, its overall severity is judged to be negligible. Sound impacts due to construction would add significantly to the total cumulative soundscape environment but only during a two to three week period.

Alternative 4: Remedial Hazard Abatement

Since there would be no bridge reconstruction in this alternative, there would be no impacts on the soundscape from geotechnical surveys or construction equipment. However, the deconstruction and removal of the old bridge would create noise over several days, a negligible short term impact.

Cumulative Effects

The additive effect of this alternative to the total ambient soundscape would be negligible.

Conclusions

The direct, indirect and cumulative impact associated with Alternative 4 would be negligible.

Alternative 5: No Action

Since there would be no bridge reconstruction or removal of the existing bridge in this alternative, there would be no impacts on the soundscape from geotechnical surveys or construction equipment.

Cumulative Effects

The additive effect of this alternative to the total ambient soundscape would be negligible.

Conclusions

The direct, indirect and cumulative impact associated with this No Action alternative would be negligible.

Other Mitigation if not already part of the Alternatives

In addition to standard measures listed in Appendix C, the use of a quiet generator (less than 60 db at 50 feet) is recommended. Several makes are commercially available.

VEGETATION

Methods and Assumptions

• **Negligible:** There would be no measurable or perceptible changes in the geographic extent of any native vegetative plant community, its continuity, integrity or species richness. No detectable changes to sensitive plant communities would occur and no individuals of any rare or unique plant species would be affected. Key environmental conditions influencing plant communities (such as soils and water quality) would not be affected.

• **Minor:** Measurable changes in the geographic extent of a native vegetative plant community, its continuity, integrity or species richness may occur, but its viability would be unaffected. Slight changes to sensitive plant communities occur, with one or a few individuals of rare or unique plant species affected. Changes in environmental conditions influencing plant communities (such as soils and water quality) would be at the lower levels of detection. The potential for changes in the abundance of nonnative species would be detectable but minimal.

• **Moderate:** Noticeable changes in the geographic extent of a native vegetative plant community, its continuity, integrity or species richness may occur, but its viability would remain. The impact would remain localized. Detectable changes to sensitive plant communities may occur, with some individuals of rare or unique plant species affected. Changes in environmental conditions influencing plant communities (such as soils and water quality) would be measurable. The potential for changes in the abundance of nonnative species would be noticeable.

• **Major:** Impacts to the continuity and integrity of native plant communities would be substantial, highly noticeable, and permanent. Substantial changes in the geographic extent of a native vegetative community, its continuity, integrity or species richness may occur. Although the communities would remain viable regionally, small populations may be eradicated. Noticeable changes to sensitive plant communities may occur, with small populations of rare or unique species affected. Changes in environmental conditions influencing plant communities (such as soils and water quality) would be obvious. The potential changes in abundance of nonnative species would be substantial.

• **Duration:**

Short-term – Following completion of the project, recovery would take less than one year.

Long-term – Following completion of the project, recovery would take more than one year.

Alternative 1:

Direct and Indirect Impacts

All alternatives have the potential to both directly and indirectly affect vegetation. Direct impacts can occur from the removal or damage of desired vegetation both within the riparian corridor as well as away from the stream in the grassland and oak savannah. Indirect impacts could also occur due to the introduction of non-native species that easily establish in recently disturbed sites and locations where vegetation and soil has been disturbed or removed.

Please refer to the more extensive assessment of impacts on soil resources and water resources. These assessments represent a necessary and suitable context for describing impacts on vegetation. Valley oak woodland is a sensitive plant association that is not broadly represented in Pinnacles N.M.. Observations of the project area indicate that the Valley oak woodland is found only on the north side of Sandy Creek, between the bridge sites for Alternative 1 and 2. Potential impacts on this association are not limited to tree or tree limb removal, but also of roads or the use of equipment near the trees. This can result in soil compaction, which alters water availability, may cause soil loss, and root exposure and damage. Riparian vegetation within the stream channel is also of concern. The potential for alteration of the hydrologic regime in the stream channel by applying rip rap can directly affect riparian vegetation. The use of rip rap, though intended to protect the stream channel in places, has the capability to alter patterns of water flow during runoff events. Please see the water resource discussion for more information on this dynamic. If the hydrologic regime is altered significantly, the stream banks can erode (below rip rapped sections) and undermine both riparian vegetation as well as vegetation located higher on the steep channel sides. In extreme events, whole valley sides can fail and cause bankside trees to fall into the channel.

Invasive, non-native plant species can be introduced to the site on equipment and tools that contain invasive plant seeds within the soil. Invasive species can also be introduced when fill material is brought into the construction site from an outside location. Tree diseases can also be introduced with tools that have not been sterilized. However, many of the risks associated with the indirect impacts of invasive plant and tree disease introduction can be reduced through mitigation measures such as sterilizing tools used for cutting tree limbs, cleaning heavy equipment before entering the park, and ensuring that fill material does not have invasive plant seeds. The establishment and spread of invasive species can also be mitigated by vegetation with native plants in sites where soil and vegetation was removed or disturbed as a result of the project.

In order to prevent the spread of exotic invasive periwinkle from the old bridge site, we would treat and remove this population. This species can be difficult to eradicate using mechanical methods and may require the use of herbicide. Herbicide application would involve using a power trimmer, scythe, or equivalent to mechanically abrade the leaves, followed by spot treatment directly to the leaves with a glyphosate based herbicide such as Round-up (3%-5% concentration), or equivalent. This application technique would maximize the absorption of herbicide through the leaves while minimizing the amount of herbicide contacting non-plant surfaces. It would also prevent the herbicide from entering the stream. Mechanical treatment of periwinkle may be conducted as well, and mechanical removal of above ground portions of the plant may need to be repeated in subsequent years in order to completely eradicate this population. Rip-rap would not be removed or moved for either herbicide or mechanical treatments. As a safeguard, both herbicide application and mechanical treatments would be conducted from November – February when

California red-legged frogs and tadpoles are least likely to be in contact with the water and least likely to be where the periwinkle is growing, on the banks near the water's edge.

Alternative 1 would potentially impact two mature Valley oaks by putting an access road within the drip line of the two trees. Valley oaks are a desirable and ecologically important species in Pinnacles. The sensitive status of Valley oak woodlands, the stately nature of the trees, what they add to the visual landscape character, and how they are valued as habitat and shade throughout the year are all important values adding to the character of the area. These trees can be very old (up to 500 years), and would not feasible to replace if removed or damaged due to construction activities. This alternative would also require the removal of 3-6 Gray pines (*Pinus sabiniana*) for construction staging, crane placement and maneuverability of the bridge into place.

This alternative also would involve constructing 1065 feet of a 14 foot wide unpaved road to access the bridge. This would involve the permanent removal of grassland vegetation of 14,910 square feet and the disturbance of vegetation adjacent to the new construction due to construction activities.

The removal and restoration of the existing bridge would benefit the riparian vegetation and potentially stabilize the stream bank.

Indirect risks of invasive plant and tree pathogen introduction can be reduced through mitigation measures. This alternative would have an adverse, long-term but minor impact on vegetation since no critical or specially designated species habitats would be affected.

Cumulative Effects

Recent similar impacts within the Pinnacles campground included the removal of vegetation for realignment of campsites, the installation of a gravel parking area, a solar panel array, and split rail fencing in the vicinity and the construction of a well pump house. These activities all involved the removal of vegetation. None required the removal of mature and desirable trees or shrubs such as Valley oaks or elderberry. The disturbance that resulted from each of these activities does increase the risk of new introduction of invasive species as well as the spread of non-native plants that are already present in the area. The additive effect of Alternative 1 impacts on vegetation would be minor.

Conclusions

The effects on vegetation for this alternative would be minor. The primary concern is for the state sensitive vegetation association, Valley Oak woodland. Alternatives 1 and 2 affect individuals of the Valley oak species, which may be considered a moderate impact. Alternatives 3 and 4 do not affect this association. However, the lack of access over Sandy Creek in Alternative 4 would impact vegetation off-site to a negligible to minor degree. Over time, and lacking mitigation, this impact could become greater with continued administrative vehicular use.

Alternative 2: Preferred Alternative

Direct and Indirect Impacts

Please see the general discussion of impacts on vegetation in Alternative 1, as they apply to all bridge construction alternatives (Alternatives 1-3).

Alternative 2would require the removal one 15” dba Grey Pine, three 6” Coast Live Oaks (*Quercus agrifolia*), three 2” Coast Live Oaks, one 12” Coast Live Oak, one 4” Valley Oak, and two Coast Live and Valley Oaks lightly trimmed of crossing branches over the creek. This alternative also would involve constructing 770 feet of a 14 foot wide unpaved road to access the bridge. This would involve the permanent removal of grassland vegetation (heavily populated with exotic weeds) within 10,780 square feet as well as ground disturbance within the construction site due to bridge and road construction activities. The removal and restoration of the existing bridge would benefit the riparian vegetation and potentially stabilize the stream bank.

Indirect risks of invasive plant and tree pathogen introduction can be reduced through mitigation measures. This alternative would have an adverse, long-term minor impact on vegetation.

Cumulative Effects

See Alternative 1.

Conclusions

See Alternative 1.

Alternative 3:

Direct and Indirect Impacts

Please see the general discussion of impacts on vegetation in Alternative 1, as they apply to all bridge construction alternatives (Alternatives 1-3).

Alternative 3 would not cause the removal of any trees, but would require heavy thinning and trimming of shrubs such as willow and Poison oak. No oaks or other mature trees would be removed under this alternative. This alternative would involve constructing 830 feet of a 14 foot wide unpaved road to access the bridge. This would require the permanent removal of grassland vegetation within 11,620 square feet as well as ground disturbance within the construction site due to bridge and road construction activities. As in other alternatives, the removal of the existing bridge and restoration of the creek banks at that location would benefit the riparian vegetation and potentially stabilize the stream bank.

Indirect risks of the unintentional invasive plant and tree pathogen introduction can be reduced through mitigation measures. This alternative would have an adverse, long-term negligible impact on vegetation.

Cumulative Effects

See Alternative 1.

Conclusions

Alternatives 1 and 2 affect individuals of the Valley oak species which, though not sensitive or critical habitat, are nonetheless important to the character of area and its use. Alternative 3 does not affect this association, so the overall impact must be deemed to be lower in a relative sense, or negligible.

Alternative 4: Remedial Hazard Abatement

Direct and Indirect Impacts

Alternative 4 would not disturb any vegetation in the project area, other than the Live oaks which may be disturbed (limbed) by removal of the old bridge. However, the lack of access over Sandy Creek would necessitate continued administrative use to the district via the Highway 25 access. Meadow-type vegetation adjacent to the Highway 25 access road will continue to be affected by passing vehicles and widening or parallel tracks. As part of the bridge removal process the creek banks would be graded to a stable slope and revegetated with native riparian vegetation.

Cumulative Effects

There would be no additive effect on vegetation from this alternative, other than the ongoing impact of additional vehicular use outside the project area.

Conclusions

There would be no long term impact on vegetation in this alternative.

Alternative 5: No Action

Direct and Indirect Impacts

This No Action alternative would not disturb any vegetation in the project area due to construction or demolition, however when the existing bridge and abutments eventually fall into the creek the banks of exposed soil will continue to erode. These banks have been artificially steepened by the existing abutments and will likely slump and erode quickly before reaching an angle of repose. This erosion could impact trees and shrubs at the top of the existing banks as they are undermined and fall into the creek. The accumulation of bridge debris in the creek will dam the creek until it subsequently fails due to the stream migrating or flooding. This will affect vegetation in the creek channel for years in the future until the stream stabilizes and vegetation can reestabilsh.

The lack of access over Sandy Creek would necessitate continued administrative use to the district via the Highway 25 access. Meadow-type vegetation adjacent to the Highway 25 access road will continue to be affected by passing vehicles and widening or parallel tracks.

Cumulative Effects

There would be no additive effect on vegetation from this alternative, other than the ongoing impact of additional vehicular use outside the project area.

Conclusions

There would be minor short-term and minor to moderate adverse long term impact on vegetation in this alternative.

Other Mitigation if not already part of the Alternatives

- If soil, gravel or fill material is brought in from outside the park, park staff will inspect the source site to assess the risk of introduction of non-native plants and animals to the park.
- During construction activities, an effort will be made to keep all construction and heavy equipment activities outside of the drip line of mature Valley oaks.
- Revegetation using native plants will be conducted in areas where existing vegetation has been removed or damaged. This does not include directly on unpaved roads where vegetation was removed.
- All equipment and vehicles must be power washed before being entering the park and will be inspected
- All tools used to cut tree limbs or roots must be sterilized with 10% bleach solution before starting work at the construction site. Tools do not need to be cleaned between trees. If tools are used off site, then they must be sterilized before using again on site.
- Tree roots cut during construction should be cut cleanly with hand tools such as a sharp axe or hand tools. If roots are ripped or torn, cut behind rip with hand tools to ensure a clean cut.

FISH AND WILDLIFE

Methods and Assumptions

The following definitions will be used to assess the intensity of potential fish, wildlife and special status fish and wildlife species impacts:

• **Negligible:** The action could result in a change to a population or individuals of a species or designated critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence and would be well within natural variability

• **Minor:** The action could result in a change to a population or individuals of a species or designated critical habitat. The change would be measurable, but small and localized and not outside the range of natural variability. Mitigation measures, if needed to offset the adverse effects, would be simple and successful.

• **Moderate:** Impacts on special-status species, their habitats, or the natural processes sustaining them would be detectable and occur over a large area. Breeding animals of concern are present; animals are present during particularly vulnerable life-stages such as migration or juvenile stages; mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the park unit. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.

• **Major:** The action would result in a noticeable effect to viability of a population or individuals of a species or resource or designated critical habitat. Impacts on a special-status species, critical habitat, or the natural processes sustaining them would be detectable, both in and out of the park. Loss of habitat might affect the viability of at least some special-status species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

Alternative 1:

Direct and Indirect Impacts

All of the alternatives have the potential to both directly and indirectly affect fish and wildlife. Direct effects may arise from construction of the new bridge and removal of the old one. Indirect effects primarily result from the alteration of hydrology which has long-term effects on stream and riparian habitat both within and

downstream of the site. The area of Valley oak woodland understory affected by the project is so small and the vegetation so overtaken by invasive exotic plants that there is no concern about affects to wildlife species there.

For a discussion of impacts to fisheries, stream habitat, and riparian habitat, please refer to the impact assessment for water resources. In general, impacts to hydrology and stream features have associated impacts to fish and other stream species as well as terrestrial species dependent on riparian vegetation. Habitat for sensitive aquatic invertebrate species endemic to the Monument is not found in Sandy Creek, though numerous other aquatic invertebrates exist there.

Cooper's hawks and long-eared owls (both California State Species of Special Concern) have regularly nested in riparian woodland habitat in the vicinity of the current bridge site. While effects of this project on their habitat are addressed elsewhere, impacts specific to their breeding activities will be discussed here.

Raptors, like many wildlife species, are especially vulnerable to human disturbance during their breeding season. Unusual levels of human presence, activity, or noise may disrupt breeding behavior, potentially resulting in failure of reproductive efforts for the year.

If an active raptor nest is present in the vicinity of the old bridge, removing the bridge and abutments and constructing the new bridge would likely result in nest abandonment. This impact could be avoided entirely by conducting the removal from September 1 – January 15. If it is necessary to conduct the work before then, starting it after July 15th would be preferable, with a later start date being better. Impacts could potentially be minimized by choosing quieter equipment and using other methods to reduce sources of disturbance. Constructing the new bridge at the existing site would greatly increase the likelihood of disturbing raptors nesting nearby. If a raptor nest is present near the site and the work is conducted from January 15-July 15, a short-term major adverse impact on the species is expected.

Cumulative Effects

Because most developments and activities at Pinnacles are located in or around riparian habitat, the potential for disturbance to nesting raptors is high. These species may choose nesting habitat according to where there is the least human activity, rather than where natural habitat features are best. They often choose to nest in the same areas year after year. By introducing new disruptive activities during the breeding season, this project could temporarily eliminate one of the few remaining suitable nesting locations in the Monument.

Conclusions

All of the alternatives have the potential to cause major short-term adverse impacts to riparian nesting raptor species due to removal of the old bridge. Alternative 1 has a much higher potential to disturb nesting at the known site upstream of the old bridge because it also involves constructing a new bridge at the same site. The other alternatives involve no new bridge construction or construction at a downstream site where raptor nesting has not been documented. So Alternative 1 has the highest potential to cause major short-term adverse impacts to breeding raptors, and the other alternatives less so. These impacts could be avoided entirely by conducting the removal from September 1 – January 15 or minimized by starting after July 15. They could also potentially be minimized by choosing quieter equipment and using other methods to reduce sources of disturbance.

Alternative 2: Preferred Alternative

Direct and Indirect Impacts

Please see the general discussion of impacts in Alternative 1, as they apply to all bridge construction alternatives (Alternatives 1-3).

If an active raptor nest is present in the vicinity of the old bridge, removing the bridge and abutments could result in a major short-term impact to the species. This impact could be avoided entirely by conducting the removal from September 1 – January 15, and minimized by starting after July 15. It could also potentially be minimized by choosing quieter equipment and using other methods to reduce sources of disturbance.

Constructing the new bridge farther downstream from the existing location would greatly decrease the likelihood of disturbing raptors nesting at the known site upstream of the old bridge. No other historic raptor nest sites are known in the area. New bridge construction would therefore be expected to have no effect on these species.

Cumulative Effects

Same as Alternative 1.

Conclusions

Same as Alternative 1.

Alternative 3:

Direct and Indirect Impacts

Please see the general discussion of impacts in Alternative 1, as they apply to all bridge construction alternatives (Alternatives 1-3).

If an active raptor nest is present in the vicinity of the old bridge, removing the bridge and abutments would likely result in a major short-term impact to the species. This impact could be avoided entirely by conducting the removal from September 1 – January 15, and minimized by starting after July 15. It could also potentially be minimized by choosing quieter equipment and using other methods to reduce sources of disturbance.

Constructing the new bridge farther downstream would greatly decrease the likelihood of disturbing raptors nesting at the known site upstream of the old bridge. No other historic raptor nest sites are known in the area. New bridge construction would therefore be expected to have no effect on these species.

Cumulative Effects

Same as Alternative 1.

Conclusions

Same as Alternative 1.

Alternative 4: Remedial Hazard Abatement

Direct and Indirect Impacts

If an active raptor nest is present in the vicinity of the old bridge, removing the bridge and abutments would likely result in a major short-term impact to the species. This impact could be avoided entirely by conducting the removal from September 1 – January 15, and minimized by starting after July 15. It could also potentially be minimized by choosing quieter equipment and using other methods to reduce sources of disturbance.

Since no new bridge would be constructed, there would be no additional short-term effects on raptor nesting activity from this alternative.

Cumulative Effects

Same as Alternative 1.

Conclusions

Same as Alternative 1.

Alternative 5: No Action

Direct and Indirect Impacts

Since no new bridge would be constructed and no removal activities of the existing bridge, there would be no short-term effects on raptor nesting activity from this alternative.

Cumulative Effects

No effect.

Conclusions

No effect.

Other Mitigation if not already part of the Alternatives

- Conduct any activities involving excessive noise (above 70 decibels) or activity levels during September 1 – January 15 (or after July 15th if that is not possible). If followed, no other mitigation measures are necessary.
- Survey for riparian raptor nests. If no nests are located during the breeding season, no other mitigation measures are necessary.
- Minimize noise (see mitigations for Natural Soundscapes) and activities that might disturb raptors. For example, work quickly and with visually less obtrusive equipment.

SPECIAL STATUS SPECIES

Methods and Assumptions

The following definitions will be used to assess the intensity of potential fish, wildlife and special status fish and wildlife species impacts:

• **Negligible:** The action could result in a change to a population or individuals of a species or designated critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence and would be well within natural variability. This impact intensity equates to a U.S. Fish and Wildlife Service *no effect* determination.
• **Minor:** The action could result in a change to a population or individuals of a species or designated critical habitat. The change would be measurable, but small and localized and not outside the range of natural variability. Mitigation measures, if needed to offset the adverse effects, would be simple and successful. This impact intensity equates to a U.S. Fish and Wildlife Service *may affect, not likely to adversely affect* determination.
• **Moderate:** Impacts on special-status species, their habitats, or the natural processes sustaining them would be detectable and occur over a large area. Breeding animals of concern are present; animals are present during particularly vulnerable life-stages such as migration or juvenile stages; mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the park unit. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful. This impact intensity equates to a U.S. Fish and Wildlife Service *may affect, not likely to adversely affect* or *may affect, likely to adversely affect* determination.
• **Major:** The action would result in a noticeable effect to viability of a population or individuals of a species or resource or designated critical habitat. Impacts on a special-status species, critical habitat, or the natural processes sustaining them would be detectable, both in and out of the park. Loss of habitat might affect the viability of at least some special-status species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed. This impact intensity equates to a U.S. Fish and Wildlife Service *may affect, likely to jeopardize the continued existence of a species or adversely modify critical habitat for a species* determination.

Alternative 1:

Direct and Indirect Impacts

Regarding the California condor, project activities are not dissimilar in any relevant manner to those that regularly occur in the adjacent public campground. No conditions will be created that are expected to attract condors to the project area. If a condor does enter the work site, construction staff will halt activity and contact a qualified NPS biologist. We therefore consider this alternative Not Likely to Adversely Affect California condors.

The 2008 Pinnacles Bottomlands Restoration EA addressed CTS in this area and the effects of ground disturbance and construction activities similar to those that will occur with the Sandy Creek Bridge Relocation Project. All restrictions on such activities were within a 2200 ft. buffer around known or potential breeding sites. Because all construction activities related to this project will occur well outside that buffer, this alternative is deemed Not Likely to Adversely Affect CTS.

California red-legged frogs have been found in Sandy Creek. Since non-breeding habitat for the frog includes nearly any area within 1-2 miles of a breeding site that stays moist through the summer, there is the potential for adverse impacts to the species as a result of construction.

Amphibians are especially sensitive to both air and water-borne toxic materials, since they can be absorbed through their skin. Introduction of toxic materials such as oils and gasoline from equipment used for bridge and road construction could directly affect California red-legged frogs utilizing upland habitat near the Sandy

Creek bridge project. Species that are a food source for red-legged frogs, such as insects and tree frogs, could be affected by introduced toxic materials. Red-legged frogs that could be present in or near the work site may be temporarily impacted from short-term disturbance to existing riparian, grassland, and woodland vegetation. In addition, mitigation measures to remove and relocate frogs from the work area to nearby adjacent habitats would constitute a behavioral disturbance.

All alternatives have the potential to cause direct and indirect impacts to federally threatened California red-legged frogs. Long-term impacts are primarily indirect and related to habitat alteration, as discussed in the impact assessments for water resources and vegetation. Stream habitat for this species consists primarily of relatively deep, slow pools. These are created and maintained by hydrologic processes acting on stream features such as large downed logs and tree roots embedded in the stream banks. The abundance, distribution, and quality of these pools change with changing stream flow, especially flood events. Other important habitat features include large exposed roots, undercut banks, and dense understory vegetation such as Poison oak and blackberry. All features are influenced by stream flow.

Modifications to the stream channel and floodplain tend to affect stream flow, resulting in impacts to red-legged frog habitat downstream. Due to the complexity of stream hydrologic processes, the degree of severity of such impacts is very difficult to judge. However, effects of artificial structures such as rip rap generally decrease with distance from the structure, so they pose the greatest risk to the nearest downstream red-legged frog habitat features. The culverts at the campground road crossing would tend to isolate areas downstream of that structure from many of these effects.

Potential short-term impacts to red-legged frogs from this project are both direct and indirect, involving noise and visual disturbance as well as injury due to construction activities. Red-legged frog habitat use and activity patterns vary significantly through the year, and this can be used to minimize impacts to the species. The potential for direct impacts due to disturbance of frogs in the stream are greatest during the breeding season, which is February 1 - April 15 at Pinnacles. In general, the greatest potential for encountering a frog during upland activities or having a frog move into a previously frog-free area within the stream channel are from September 15 - May 1. This is the season when newly transformed frogs are dispersing, when cool wet weather allows frogs to move through normally dry habitat, and when adults are moving to and from breeding habitat. The safest season to conduct activities in stream channels and adjacent uplands is from the end of the breeding season through the beginning of tadpole transformation, or May through mid-September. That is when frogs are most likely to stay put in the immediate stream area. Because this reach of Sandy Creek contains isolated high quality stream pools, frogs are likely to find a good pool at the start of the season and stay there through the summer. None of the proposed bridge sites are within good frog habitat, so activities related to placement of rip rap in the stream channel are not expected to involve direct contact with any frogs. By timing construction during this period and choosing a bridge site away from high quality CRLF habitat (so that the activity would not be near frogs summering in the stream), negative impacts to CRLF due to bridge construction would be highly unlikely.

Because this species seeks shelter in dense riparian understory vegetation and under large objects such as rocks, removal of such vegetation and old bridge abutments may adversely impact the species either directly during the removal process or indirectly by causing a frog to flee and potentially come into harm's way when it would have otherwise remained sheltered. Red-legged frogs may seek shelter under the old bridge abutments during any time of the year but because the abutments are high up on the banks, they may be

more likely to be occupied during the rainy season and when newly transformed frogs are dispersing. The best time for removing the old abutments is therefore the same as for other construction activities, May through mid-September. In order to minimize the likelihood of injuring a frog during this time window, a biologist would be on site to ensure that pieces of the abutments are removed by picking them straight up off the ground to the extent possible. Any frogs found in the site during the removal process would be relocated by a qualified biologist to another site in Sandy Creek with suitable habitat, but away from the construction site in order to decrease the possibility of the frog returning to the site before completion of removal activities.

Even during the summer season, frogs may move around in the stream corridor. They are most likely to stop at stream pools that provide slow, deep water. The likelihood of a frog remaining within the construction site can be minimized by ensuring that no construction activities create artificial ponding in the stream channel. Since tadpoles also tend to prefer slow-flowing habitat, this also minimizes the likelihood of harming tadpoles.

Tadpoles, and to a lesser extent frogs, may be affected by alterations to water quality by siltation due to runoff from the construction project or by contaminants entering the stream. Because all alternatives call for installation of a pre-constructed bridge and the only concrete pouring activity in the stream vicinity would be for the abutments at the upper edge of the stream channel, there is little likelihood of wet concrete entering the stream. Working with hydraulic equipment near a stream always entails a small possibility that a hydraulic line could break and hydraulic fluid would enter the stream. Spill kits would be kept on all hydraulic equipment, and personnel would be trained regarding the importance of keeping spills out of the stream. If conducted from May 1 – September 15 and no artificial ponding occurs within the site, construction of the new bridge is expected to have a negligible short-term effect on frogs in the stream because this site is not near any good in-stream frog habitat. With mitigations in place to prevent substances such as concrete and hydraulic fluid from entering the stream, short-term effects in and downstream of the site are expected to be negligible.

Removal of the old bridge abutments would have the potential to cause harm to frogs that may be taking refuge beneath the abutments. There may not be any frogs there, but this cannot be determined until the abutments are removed. Risk can be minimized by conducting activity from May 1 - September 15, by lifting objects upward rather than dragging them up the bank, and by having a biologist present to check for frogs after each object is removed and to relocate any frogs out of harm's way. With these mitigations in place, this action would likely have a local negligible to minor short-term adverse effect on red-legged frogs.

Removal of the old bridge and abutments would prevent these objects from falling into the stream and severely altering hydrology, resulting in a major long-term beneficial impact to red-legged frogs in Sandy and Chalone Creeks.

As discussed in the Vegetation section above, the population of exotic invasive periwinkle at the old bridge site would be treated and removed by the NPS by mechanical means and may require the use of herbicide. Removal of exotic invasive periwinkle with mechanical abrasion followed by sponge-dabbing of herbicide would be done in such a way and in such a season as to bring to near zero the likelihood of the herbicide coming in contact with frogs or the stream. Mechanical methods would be done so that any frogs taking shelter in the rip rap below the plants are not harmed. As a safeguard, both herbicide application and

mechanical treatments would be conducted from November – February when tadpoles and frogs are least likely to be in contact with the water and least likely to be where the periwinkle is growing, on the banks near the water's edge. This activity is therefore expected to have a negligible short-term impact on red-legged frogs.

The proposed bridge site in Alternative 1 is not adjacent to existing good stream or pool habitat, but is located upstream from good pool habitat. Long-term effects from altered hydrology due to structures in the stream channel are somewhat unpredictable. However, the design of the bridge, abutments, and vegetated rip rap for this project are intended to have minimal negative impacts on stream hydrology. And the rip rap and associated vegetation may provide CRLF habitat. Resulting impacts to CRLF are expected to be long-term and minor beneficial to negligible adverse.

Because the banks below the proposed bridge site lack any dense understory vegetation, there would be negligible short-term indirect impacts from vegetation removal due to bridge construction.

Cumulative Effects

The population of California red-legged frogs at Pinnacles appears to be isolated, as no other populations are known in the area surrounding the Monument. This makes protection of frogs and their habitat within Pinnacles critical. Furthermore, habitat at Pinnacles is limited to a few miles of stream, Bear Gulch Reservoir, and possibly some stock ponds. Stream habitat is prone to alteration by floods, and modifications to hydrology can alter the effects of flooding on habitat. As discussed in the impact assessment for water resources, Sandy Creek already has multiple modifications which affect its hydrology.

Other factors affecting red-legged frogs at Pinnacles include development and human activity along stream channels (camping, driving, light pollution, noise pollution, etc.) and occasional infiltration of park streams by predatory exotic aquatic species such as bullfrogs and green sunfish from outside the Monument.

Any adverse effects from this project may affect the already stressed frog population in unpredictable ways.

Conclusions

This conclusion is made with the assumption that all bridge removal and construction activity will take place from May 1 – September 15. If work must continue past September 15th and/or tadpoles have begun transforming and/or it has rained appreciably, surveys should be conducted along the entire perennially-flowing section of Sandy Creek. If no tadpoles are transforming and it has not rained appreciably, expected impacts are as stated below. If tadpoles are transforming and/or it has rained appreciably, potential short-term adverse impacts are expected to range from minor to major. In this case a biologist will need to survey the site each day before work begins. The USFWS ultimately issues a final Biological Opinion on whether the project would affect the federally listed species.

Removal of the old bridge and abutments is an action common to Alternatives 1-4. It is expected to have a negligible to minor short-term adverse impact but a major long-term beneficial impact on California red-legged frogs at Pinnacles.

The design of the bridge, abutments, and vegetated rip rap for this project are intended to have minimal negative impacts on stream hydrology. The rip rap and associated vegetation may provide CRLF habitat.

Overall, long-term impacts to CRLF for Alternatives 1 is expected to be long-term and minor beneficial to negligible adverse.

The alternative may affect, and is likely to adversely affect California red-legged frogs. This determination is based on expected short-term, minor affects to the species, including direct effects (e.g., harassment, injury or mortality) and indirect effects (e.g., temporary loss of habitat).

Alternative 2: Preferred Alternative

Direct and Indirect Impacts

Please see the general discussion of impacts under for Alternative 1, as they also apply to each of the action alternatives.

Regarding the California condor, project activities are not dissimilar in any relevant manner to those that regularly occur in the adjacent public campground. No conditions will be created that are expected to attract condors to the project area. If a condor does enter the work site, construction staff will halt activity and contact a qualified NPS biologist. This alternative is considered Not Likely to Adversely Affect California condors.

The 2008 Pinnacles Bottomlands Restoration EA addressed CTS in this area and the effects of ground disturbance and construction activities similar to those that will occur with the Sandy Creek Bridge Relocation Project. All restrictions on such activities were within a 2200 ft. buffer around known or potential breeding sites. Because all construction activities related to this project will occur well outside that buffer, this alternative is considered Not Likely to Adversely Affect CTS.

Removal of the old bridge abutments would have the potential to cause harm to frogs that may be taking refuge beneath the abutments. There may not be any frogs there, but this cannot be determined until the abutments are removed. Risk can be minimized by conducting activity from May 1 - September 15, by lifting objects upward rather than dragging them up the bank, and by having a biologist present to check for frogs after each object is removed and to relocate any frogs out of harm's way. With these mitigations in place, this action would likely have a local negligible to minor short-term adverse effect on red-legged frogs.

Removal of the old bridge and abutments would prevent these objects from falling into the stream and severely altering hydrology, resulting in a major long-term beneficial impact to red-legged frogs in Sandy and Chalone Creeks.

Removal of exotic invasive periwinkle with mechanical abrasion followed by sponge-dabbing of herbicide would be done in such a way and in such a season as to bring to near zero the likelihood of the herbicide coming in contact with frogs or the stream. Mechanical methods would be done so that any frogs taking shelter in the rip rap below the plants are not harmed. This activity is therefore expected to have a negligible short-term impact on red-legged frogs.

If conducted from May 1 – September 15 and no artificial ponding occurs within the site, construction of the new bridge is expected to have a negligible short-term effect on frogs in the stream because this site is not near any good in-stream frog habitat. With mitigations in place to prevent substances such as concrete and

hydraulic fluid from entering the stream, short-term effects in and downstream of the site are expected to be negligible.

The proposed bridge site in Alternative 2 is not adjacent to existing good stream or pool habitat, but is located upstream from good pool habitat. Long-term effects from altered hydrology due to structures in the stream channel are somewhat unpredictable. However, the design of the bridge, abutments, and vegetated rip rap for this project are intended to have minimal negative impacts on stream hydrology. Because the banks below the proposed bridge site lack any dense understory vegetation, there would be only negligible short-term indirect impacts from vegetation removal due to bridge construction. The rip rap and associated revegetation may provide CRLF habitat. Resulting impacts to CRLF are expected to be long-term and minor beneficial to negligible adverse.

Cumulative Effects

See Alternative 1.

Conclusions

See Alternative 1.

The alternative may affect, and is likely to adversely affect California red-legged frogs. This determination is based on expected short-term, minor affects to the species, including direct effects (e.g., harassment, injury or mortality) and indirect effects (e.g., temporary loss of habitat).

Alternative 3:

Direct and Indirect Impacts

Please see the general discussion of impacts under for Alternative 1, as they also apply to each of the bridge construction alternatives.

Regarding the California condor, project activities are not dissimilar in any relevant manner to those that regularly occur in the adjacent public campground. No conditions will be created that are expected to attract condors to the project area. If a condor does enter the work site, construction staff will halt activity and contact a qualified NPS biologist. Therefore this alternative is considered Not Likely to Adversely Affect California condors.

The 2008 Pinnacles Bottomlands Restoration EA addressed CTS in this area and the effects of ground disturbance and construction activities similar to those that will occur with the Sandy Creek Bridge Relocation Project. All restrictions on such activities were within a 2,200 ft. buffer around known or potential breeding sites. Because all construction activities related to this project will occur well outside that buffer, this alternative is considered Not Likely to Adversely Affect CTS.

Removal of the old bridge abutments would have the potential to cause harm to frogs that may be taking refuge beneath the abutments. There may not be any frogs there, but this cannot be determined until the abutments are removed. Risk can be minimized by conducting activity from May 1 - September 15, by lifting objects upward rather than dragging them up the bank, and by having a biologist present to check for frogs

after each object is removed and to relocate any frogs out of harm's way. With these mitigations in place, this action would likely have a local negligible to minor short-term adverse effect on red-legged frogs.

Removal of the old bridge and abutments would prevent these objects from falling into the stream and severely altering hydrology, resulting in a major long-term beneficial impact to red-legged frogs in Sandy and Chalone Creeks.

Removal of exotic invasive periwinkle with mechanical abrasion followed by sponge-dabbing of herbicide would be done in such a way and in such a season as to bring to near zero the likelihood of the herbicide coming in contact with frogs or the stream. Mechanical methods would be done so that any frogs taking shelter in the rip rap below the plants are not harmed. This activity is therefore expected to have a negligible short-term impact on red-legged frogs.

If conducted from May 1 – September 15 and no artificial ponding occurs within the site, construction of the new bridge is expected to have a negligible short-term adverse effect on frogs in the stream because this site is not near any good in-stream frog habitat. With mitigations in place to prevent substances such as concrete and hydraulic fluid from entering the stream, short-term effects in and downstream of the site are expected to be negligible.

Unlike the other bridge construction alternatives, the proposed new bridge site for Alternative 3 has stream banks covered in dense riparian understory vegetation. Removing this vegetation could negatively affect any frogs seeking shelter here. By conducting the vegetation removal during the period of May 1 – September 15, the likelihood of any frogs being in the area would be very small. A biologist would survey the area before vegetation removal and monitor for frogs as the vegetation is removed. Any frogs observed would be relocated to suitable habitat in Sandy Creek away from the construction site. With these mitigations, this is expected to have a negligible short-term adverse impact. There is enough understory vegetation in the area that removing this amount would be expected to have only a negligible long-term adverse impact.

Cumulative Effects

See Alternative 1.

Conclusions

See Alternative 1.

The alternative may affect, and is likely to adversely affect California red-legged frogs. This determination is based on expected short-term, minor affects to the species, including direct effects (e.g., harassment, injury or mortality) and indirect effects (e.g., temporary loss of habitat).

Alternative 4: Remedial Hazard Abatement

Direct and Indirect Impacts

Please see the discussion of impacts under for Alternative 1, as they also generally apply to this alternative.Regarding the California condor, project activities are not dissimilar in any relevant manner to those that regularly occur in the adjacent public campground. No conditions will be created that are expected

to attract condors to the project area. This alternative is considered Not Likely to Adversely Affect California condors.

The 2008 Pinnacles Bottomlands Restoration EA addressed CTS in this area and the effects of ground disturbance and construction activities similar to those that will occur with the Sandy Creek Bridge Relocation Project. All restrictions on such activities were within a 2,200 ft. buffer around known or potential breeding sites. Because all construction activities related to this project will occur well outside that buffer, this alternative is considered Not Likely to Adversely Affect CTS.

Removal of the old bridge abutments would have the potential to cause harm to frogs that may be taking refuge beneath the abutments. There may not be any frogs there, but this cannot be determined until the abutments are removed. Risk can be minimized by conducting activity from May 1 - September 15, by lifting objects directly upward, and by having a biologist present to check for frogs after each object is removed and to relocate any frogs out of harm's way. With these mitigations in place, this action would likely have a local negligible to minor short-term adverse effect on red-legged frogs.

Removal of the old bridge and abutments would prevent these objects from falling into the stream and severely altering hydrology, resulting in a major long-term beneficial impact to red-legged frogs in Sandy and Chalone Creeks.

Removal of exotic invasive periwinkle with mechanical abrasion followed by sponge-dabbing of herbicide would be done in such a way and in such a season as to bring to near zero the likelihood of the herbicide coming in contact with frogs or the stream. Mechanical methods would be done so that any frogs taking shelter in the rip rap below the plants are not harmed. This activity is therefore expected to have a negligible short-term impact on red-legged frogs.

There would be no impacts related to new bridge construction since there would be no new bridge in this alternative.

Cumulative Effects

There would be no additive impacts resulting from this alternative.

Conclusions

The conclusion assumes that all bridge removal activity will take place from May 1 – September 15. If work must continue past September 15th, surveys should be conducted along the entire perennially-flowing section of Sandy Creek. If no tadpoles are transforming and it has not rained appreciably, expected impacts are as stated below. If tadpoles are transforming and/or it has rained appreciably, potential short-term adverse impacts are expected to range from minor to moderate. In this case a biologist will need to survey the site each day before work begins.

Removal of the old bridge and abutments is an action common to Alternatives 1-4. It is expected to have a negligible to minor short-term adverse impact but a major long-term beneficial impact on California red-legged frogs at Pinnacles.

Alternative 4 does not include construction of a new bridge, but does include removal of the existing bridge, so it is the best alternative for protection of this species. Overall, the other alternatives are expected to have

roughly similar levels of impacts on red-legged frogs. Short-term impacts are expected to be negligible to minor. **The alternative may affect, but is not likely to adversely affect California red-legged frogs.**

Alternative 5: No Action

Direct and Indirect Impacts

Since there will be no construction or demolition activities to generate noise, any species affected by noise such as California condors will not be adversely affected in this alternative. Please see the discussion of impacts under for Alternative 1, as they also generally to this alternative.

Since there are no construction activities related to this alternative to disturb the upland areas, and any changes in Sandy Creek stream morphology are unlikely to impact CTS, this alternative is considered Not Likely to Adversely Affect CTS.

Without removal of the old bridge and abutments they will eventually collapse into the creek channel and significantly alter the stream channel both in the immediate area of the existing bridge and downstream. The failed structure would partially to fully block the stream creating a new series of pools and falls. This might create temporarily beneficial CRLF habitat, however in the long term unstable and shifting stream flows are likely to continue to alter the stream channel over several seasons. Altering flows, sediment, and unstable pools would negatively impact CRLF habitat in the long-term and may even harm individual frogs if debris shifted after breeding when frogs are in the water or at sites where eggs have been laid.

Downstream at the campground culverts, CRLF habitat has developed over many years in the pools below the culverts. If the debris from the collapsed bridge were to move downstream and block the culverts, the failure of the earthen embankment would be so great as to destroy existing CRLF frogs and habitat with a sudden wall of water and complete alteration of that site and other frog habitat sites downstream.

There would be no direct impacts related to new bridge construction since there would be no new bridge in this alternative.

Cumulative Effects

There would be no additive impacts resulting from this alternative.

Conclusions

Alternative 5 does not include construction of a new bridge, but also does not remove the existing bridge so it is the worst alternative for protection of this species. Short-term and long-term impacts are expected to be minor to moderate. **The alternative may affect, and is likely to adversely affect California red-legged frogs.**

The following measures will be implemented to minimize and/or avoid affecting California red-legged frog during project implementation:

Other Mitigation if not already part of the Alternatives

- Conduct removal of the old bridge and construction of the new bridge (if applicable) during the period of May 1- September 15. If work must continue past September 15th, surveys will be conducted along the entire perennially-flowing section of Sandy Creek. If no tadpoles are

transforming and it has not rained appreciably, work may continue. If tadpoles are transforming and/or it has rained appreciably, a qualified biologist will need to survey the site each day before work begins. Any frogs found in the work site will be relocated.

- During removal of the old abutment, objects will be lifted straight upward and a biologist will monitor activity, relocating any frogs found in the site.
- During removal of any dense understory vegetation, a biologist will survey before and during the activity, relocating any frogs found in the site.
- Artificial ponding within the work site will be prevented, even on an overnight basis.
- A spill kit will be maintained on all hydraulic equipment working near the stream and personnel will be trained on its use and the importance of keeping hydraulic fluid out of the stream.
- Best Management Practices will be followed to prevent erosion of soil and siltation of the stream.
- Treatment of exotic invasive periwinkle near the old bridge abutments will occur from November - February and will be done by spot application directly onto the plants.
- A biologist will ensure that all construction personnel are familiar with the appearance of red-legged frogs and what to do if they encounter one in the site.
- Because dusk and dawn are often the times when the frogs are most actively foraging and dispersing, all construction activities should cease one half hour before sunset and should not begin prior to one half hour before sunrise.
- Prior to and during construction activities, a biological monitor will search all work localities for the presence of red-legged frogs. The search area will encompass a 50-foot radius around the work sites. Vegetation that will be disturbed within the project area will be removed during these surveys to aid in observations of the species. To prevent direct injury to California red-legged frogs, removal of vegetation within suitable frog habitat will be accomplished by a progressive cutting of vegetation from the overstory level to ground level to allow frogs to move out of the work area.
- Should any frogs be observed, activities will cease until the animal is removed and relocated by a Service-approved biologist. Captured frogs shall be relocated to suitable habitat outside of the construction zone, either upstream or downstream of the construction zone.
- Nets or bare hands may be used to capture red-legged frogs. Service-approved biologists will not use soaps, oils, creams, lotions, repellents, or solvents of any sort on their hands within two hours before and during periods when they are capturing and relocating red-legged frogs. To avoid transferring disease or pathogens between aquatic habitats during the course of surveys or handling of red-legged frogs, Service-approved biologists will follow the Declining Amphibian Populations Task Force's "Code of Practice." Service-approved biologists will limit the duration of handling and captivity of red-legged frogs. While in captivity, individuals of these species shall be kept in a cool, moist, aerated environment, such as a bucket containing a damp sponge. Containers used for holding or transporting adults of these species shall not contain any standing water.
- If erosion control materials are applied, use only tightly woven fiber netting or non-binded materials (e.g., rice straw) at the project site to ensure that the red-legged frog does not get trapped. No plastic mono-filament matting shall be used for erosion control.
- Training will be provided to inform construction workers of the presence of CRLF in suitable aquatic and upland habitats, and the necessity for implementing BMPs (Best Management Practices). This training will also identify boundaries of construction zones and identify proper disposal of construction debris and the proper response to fluid spills.

- All equipment will be pressure washed prior to arrival at the park, and arrangements will be made for inspection immediately upon its arrival.
- If dewatering occurs, pump intakes will be screened and water will be pumped downstream. All barriers to stream flow will be removed after activity is completed.
- Natural stream contours will be restored at the end of the project, with the exception of the area immediately at the bridge abutments and riprap bank reinforcement.
- Any revegetation will utilize appropriate native plant species of local origin.
- Herbicide application and mechanical treatments would be conducted from November – February when tadpoles and frogs are least likely to be in contact with the water. Herbicide application would be completed by spot treatment directly to the leaves to prevent the herbicide from entering the stream.

IMPACTS ON CULTURAL AND HISTORIC RESOURCES

Methods and Assumptions

Any proposed reconstruction must take into account the above-noted features: the site of the crossing, the alignment of the bridge with respect to the spatial organization of extant historic structures and circulation patterns within the Ben Bacon Ranch, and the character of the bridge itself, which should be compatible with the materials and designs that might have been used during the historic period. Failure to adequately address these characteristics in the design and construction of a new bridge could result in an adverse effect on the cultural landscape and a permanent loss of historic resource values. As noted at the outset of this document, no archeological resources are at risk with this proposed action.

The following definitions will be used to assess the intensity of potential impacts to cultural resources:
• **Negligible:** Impact(s) is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for Section §106 of the NHPA would be *no adverse effect*.
• **Minor:** Disturbance of a site(s) results in little, if any, loss of integrity. The determination of effect for §106 would be *no adverse effect*.
• **Moderate:** Disturbance of a site(s) results in loss of integrity. The determination of effect for §106 would be *adverse effect*. A memorandum of agreement is executed among the National Park Service and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b). Measures identified in the MOA to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from major to moderate.
• **Major:** Disturbance of a site(s) results in loss of integrity. The determination of effect for §106 would be *adverse effect*. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state or tribal historic preservation officer and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).
• **Duration:** Because archeological resources are essentially non-renewable, any effects on archeological resources would be long-term.

Alternative 1:

Direct and Indirect Impacts

This alternative would effectively restore the circulation pattern which existed during the latter part of the period of significance (from about 1927 to 1941), when principal access to the Ben Bacon ranch was along the present alignment of Highway 146, more-or-less and across Sandy Creek at the approximate location of the present—failed—bridge. Rebuilding at this location would not provide the most ideal access to the Ben Bacon Ranch Historic District from the standpoint of operational and visitor use, and might therefore *indirectly* compromise the cultural resources by affecting the ability of park staff to provide support and protection for these resources and limiting the ability of park visitors to enjoy them. However, there would be no direct impact on the resources.

Cumulative Effects

The replacement bridge construction would have a net cumulative impact no worse than that which existed when the old bridge was operational. From the standpoint of all actions in the area that facilitate public use and understanding of the cultural and historic resource, this alternative would be additive and beneficial. Similarly, it would support the long term care and maintenance of an important cultural resource.

Conclusions

Negligible Impact (for purposes of Section 106 of the NHPA, *No Adverse Effect*). This alternative poses the least direct impact on cultural resources of all the bridge construction alternatives. However, because this alternative does not provide the most effective access to the Ben Bacon ranch for operational and visitor use purposes, it could have indirect minor long-term adverse effects.

Alternative 2: Preferred Alternative

Direct and Indirect Impacts

This bridge location aligns well with the historic circulation pattern, entering the ranch core along the same alignment as an existing road which passes between the hay barn and the main house. This road has sufficient lateral space to allow even large modern equipment to maneuver without intruding on other features or requiring further modification. (Maneuvering room was also needed during the period of significance when cumbersome farm equipment had to negotiate the same barnyard area.) Although the historic bridge did not enter the ranch core at this location, this alternative nevertheless provides an excellent opportunity to introduce modern visitors into the cultural landscape.

Cumulative Effects

Same as Alternative 1.

Conclusions

Minor adverse impact (for purposes of Section 106 of the NHPS, *No Adverse Effect*) associated with the construction. The potential adverse effects suggested by Alternative 2 would be the most easy to effectively mitigate, while at the same time this alternative does not pose any long-term or indirect adverse effects. The

alternative would have a net beneficial impact due to its location and the facilitation of enjoyment and interpretation of the cultural resources at the site.

Alternative 3:

Direct and Indirect Impacts

This location would have an adverse effect on certain character-defining features of the cultural landscape. The road which would enter the Ben Bacon ranch from the southeast side of this bridge would effectively reverse the historic circulation pattern, confusing the visitor's perception of how the space was originally organized. This road would also disturb a historic fence line, potentially destroying the original alignment and the pasture which was defined by it. These impacts might be mitigated by aligning the new road along the inner side of the fence line, thereby making it appear to complement this historic feature, but the effect would be artificial rather than historically accurate.

Cumulative Effects

Same as Alternative 1.

Conclusions

Moderate Impact (for purposes of Section 106 of the NHPA, *Adverse Effect*). Alternative3 poses moderate direct impacts to the cultural landscape because the new road location would reverse the historic use patterns on the ranch. This alternative does not pose any long-term indirect adverse effects.

Alternative 4: Remedial Hazard Abatement

Direct and Indirect Impacts

During the latter part of the historic period of significance as determined by the *Ben Bacon Ranch Historic District Cultural Landscape Inventory* (2009), the principal route of access to the Ben Bacon ranch from the county road in Bear Valley was along the present alignment of Highway 146, more-or-less, and across Sandy Creek at the approximate location of the present bridge. If no action is taken and this bridge is not replaced, this historic circulation pattern will be lost. However, the access which was principally utilized during the early part of the period of significance (from 1865 to the mid-1920s) was from the present Highway 25 through the Butterfield ranch. Since this route will remain, only a portion of the historic circulation pattern will be lost in the No Action alternative.

Far more consequential to the condition and integrity of the historic district would be the indirect and long-term impacts resulting from the loss of efficient access to the Ben Bacon ranch for operational support and visitor enjoyment. The loss of operational access would greatly hinder the park's ability to rehabilitate the ranch structures for administrative purposes—the preferred and probably most effective preservation treatment currently being considered in the park's General Management Plan. It would also restrict the park's ability to provide effective protection of these vulnerable structures from vandalism and fire. The loss of visitor access, on the other hand, would limit opportunities for the interpretation of these cultural features, substantially reducing their ability to convey the significance of the historic district.

Cumulative Effects

Changes in land ownership and use in the general area have an overall tendency to limit the public's opportunities to visit, enjoy and appreciate cultural landscapes and historic properties. This alternative, while not eliminating public use and enjoyment of the historic district, would make it difficult to visit. As such, it would add to the overall loss of these resources in the area to the public for education and recreation.

Conclusions

Moderate Impact (for purposes of Section 106 of the NHPA, *Adverse Effect*). Alternative 4 poses moderate long term direct impacts to the cultural landscape because the lack of operational access would hinder the effective management and maintenance of the historic district. It would also hinder visitor access and prevent effective public understanding and appreciation of the cultural landscape.

Alternative 5: No Action

Direct and Indirect Impacts

If no action is taken and the bridge is not replaced, the historic circulation pattern of the period of significance will be lost. However, the access which was principally utilized during the early part of the period of significance (from 1865 to the mid-1920s) was from the present Highway 25 through the Butterfield ranch. Since this route will remain, only a portion of the historic circulation pattern will be lost in the No Action alternative. Moreover, if the damaged bridge is left to deteriorate in place, evidence of the original circulation pattern will be retained, even though actual circulation will no longer be able to occur along this historic alignment.

Far more consequential to the condition and integrity of the historic district would be the indirect and long-term impacts resulting from the loss of efficient access to the Ben Bacon ranch for operational support and visitor enjoyment. The loss of operational access would greatly hinder the park's ability to rehabilitate the ranch structures for administrative purposes—the preferred and probably most effective preservation treatment currently being considered in the park's General Management Plan. It would also restrict the park's ability to provide effective protection of these vulnerable structures from vandalism and fire. The loss of visitor access, on the other hand, would limit opportunities for the interpretation of these cultural features, substantially reducing their ability to convey the significance of the historic district.

Cumulative Effects

Changes in land ownership and use in the general area have an overall tendency to limit the public's opportunities to visit, enjoy and appreciate cultural landscapes and historic properties. This alternative, while not eliminating public use and enjoyment of the historic district, would make it difficult to visit. As such, it would add to the overall loss of these resources in the area to the public for education and recreation.

Conclusions

Moderate Impact (for purposes of Section 106 of the NHPA, *Adverse Effect*). Alternative 5 poses moderate long term direct impacts to the cultural landscape because the lack of operational access would hinder the effective management and maintenance of the historic district. It would also hinder visitor access and prevent effective public understanding and appreciation of the cultural landscape.

Other Mitigation if not already part of the Alternatives

- Special care should be taken to ensure compatibility of the bridge design with the historic character of the district and its features, as the new bridge would be directly visible from the historic Ben Bacon ranch core.
- Provide for monitoring of construction by a cultural resource specialist (preferably an archeologist), professional documentation of any potentially significant cultural resources discovered during the course of construction, and the accession and proper curation of any artifacts which might be exhumed during construction.

IMPACTS ON VISITOR USE AND EXPERIENCE

Methods and Assumptions

The following definitions will be used to assess the intensity of potential impacts to visitor use and experience:

• **Negligible:** Visitors would not be affected or changes in visitor use and/or experience would be below or at level of detection. Any effects would be short term. The visitor would not likely be aware of the effects associated with the alternative.

• **Minor:** Changes in visitor use and/or experience would be detectable, although the changes would be slight and likely short-term. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.

• **Moderate:** Changes in visitor use and/or experience would be readily apparent and likely long-term. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.

• **Major:** Changes in visitor use and/or experience would be readily apparent, severely adverse or exceptionally beneficial, and have important long-term consequences. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.

• **Duration:**

- Short-term – Effects occur only during project implementation activities.
- Long-term – Effects extend beyond the project implementation activities.

Alternatives 1 and 2:

Direct and Indirect Impacts

Bridge reconstruction would not be allowed during nighttime hours. Also, the staging areas for material and equipment on site would not be fenced and security lighting would not be necessary. Adverse impacts would include the noise of construction equipment for about 2 weeks during a 6 week period (see Natural Soundscapes). Construction during the summer would likely raise dust, and the equipment use would be visible, as well as audible, to campground users and day visitors. These impacts would be short term and reversible. Over the long term, the bridge access road could be visible from Highway 146, and from the visitor facilities at the site. Traffic control will be required on Hwy 146 during equipment and material arrivals and departures. Probably delays of up to 5 minutes during weekdays.

Campsites would remain available during the construction period, so the opportunity to camp at Sandy Creek would remain unaffected. However, with the noise and visibility of bridge and road construction the quality

of the experience would be markedly reduced for both camping and day use during the daylight hours and for large numbers of visitors during the summer. It is not likely that visitation would markedly decrease because of this. In the long term, the new access road would be visible from Highway 146 and from the visitor facilities in the area. Long term, the presence of a pedestrian bridge represents a beneficial impact on the availability of recreation opportunities. It would provide safe access to the far side of Sandy Creek for hiking, nature appreciation, and viewing the historic district structures. This would enhance opportunities beyond the level previously available to visitors.

Cumulative Effects

The area of concern for cumulative impacts on visitor use and experience is limited to the immediate vicinity of the project. Other potential impacts in the area are basically limited to the presence of Highway 146 and travel along it. Similar to the cumulative impact assessment for the soundscape, which is pertinent here, construction activities would contribute to adverse impacts on visitor use and experience. Alternatives 1 and 2 would contribute the largest adverse impact in terms of short term visual and audible intrusions, and the greatest long-term impact on scenic quality. These alternatives would have a long term beneficial impact on visitor use and experience by enhancing available recreation opportunities.

Conclusions

Alternatives 1 and 2 would cause minor to moderate adverse impact in terms of short term visual and audible intrusions, as well as a moderate long-term impact on scenic quality. They would have a moderate beneficial impact on visitor use and experience by expanding recreation opportunities from those currently available.

Alternative 3:

Direct and Indirect Impacts

Bridge reconstruction would not be allowed during nighttime hours. Also, the staging areas for material and equipment on site would not be fenced and security lighting would not be necessary. Adverse impacts would include the noise of construction equipment for about 2 weeks during a 6 week period (see Natural Soundscapes). Construction during the summer would likely raise dust, and the equipment use would be visible, as well as audible, to campground users and day visitors. These impacts would be short term and reversible. Over the long term, the bridge access road could be visible from Highway 146, and from the visitor facilities at the site. Traffic control will be required on Hwy 146 during equipment and material arrivals and departures. Probably delays of up to 5 minutes during weekdays.

Four of the 134 campsites would be permanently closed. To this extent, visitors would lose the opportunity to camp in the area. For the campsites that remain available, the quality of the experience may be somewhat reduced over two week period that the construction operations would be active. Large numbers of visitors would be affected during the summer. It is not likely that visitation would markedly decrease because of this. In the long term, the new access road would be screened from view of the highway and the visitor facilities by distance and the presence of riparian vegetation along Sandy Creek. No tree removal would be necessary, as in Alternatives 1 and 2. Long term, the presence of a pedestrian bridge represents a beneficial impact on the availability of recreation opportunities. It would provide safe access to the far side of Sandy Creek for hiking, nature appreciation, and viewing the historic district structures. This would enhance opportunities beyond the level previously available to visitors.

Cumulative Effects

The area of concern for cumulative impacts on visitor use and experience is limited to the immediate vicinity of the project. Other potential impacts in the area are basically limited to the presence of Highway 146 and travel along it. Similar to the cumulative impact assessment for the soundscape, which is pertinent here, construction activities would contribute to adverse impacts on visitor use and experience. Alternative 3 would have less impact than either 1 or 2 by mitigating the long term visual impact of the access road, and it would have a long term beneficial impact on visitor use and experience by enhancing available recreation opportunities.

Conclusions

Alternative 3 would cause minor to moderate short term impacts, but would have a negligible to minor long term impact on visual quality. It would also have a moderate beneficial impact on visitor use and experience by expanding recreation opportunities from those currently available.

Alternative 4: Remedial Hazard Mitigation

Direct and Indirect Impacts

There would be no adverse effects involving the loss of opportunities to camp. The adverse effects of construction operations would be limited to the removal of the old bridge structure, and those would occur at some distance from visitor facilities (approximately 1100 feet). The effects on the quality of visitor experience (visibility and audibility) would be short term. There would be negligible long term adverse effects on existing visitor access to the Bacon Ranch.

Cumulative Effects

The area of concern for cumulative impacts on visitor use and experience is limited to the immediate vicinity of the project. Other potential impacts in the area are basically limited to the presence of Highway 146 and travel along it. Similar to the cumulative impact assessment for the soundscape, which is pertinent here, construction activities would contribute to adverse impacts on visitor use and experience. Alternative 4 would engender the least adverse impact on existing visitor use and experience, and it would not affect existing recreation opportunities.

Conclusions

Alternative 4 would have a negligible to minor impact on visitor use and experience.

Alternative 5: No Action

Direct and Indirect Impacts

There would be no adverse effects involving the loss of opportunities to camp or visitor access across Sandy Creek. No trees would be removed. No noise of construction or demolition would be present in this alternative. The visual impact of the deteriorating bridge adjacent to the main park entrance road and the Bacon Homestead would be deleterious to the park's aesthetic qualities. The effects on the quality of visitor experience (visibility) would be short term and negligible. There would be negligible long term adverse effects on existing visitor access to the Bacon Ranch.

The presence of the partially collapsed bridge would create a safety hazard for visitors and park staff who do use the bridge for pedestrian access to the Bacon Ranch and who explore the Sandy Creek channel. Currently the bridge appears stable, however that could change rapidly, potentially injuring a visitor or staff member.

Cumulative Effects

The area of concern for cumulative impacts on visitor use and experience is limited to the immediate vicinity of the project. Other potential impacts in the area are basically limited to the presence of Highway 146 and travel along it. Similar to the cumulative impact assessment for the soundscape, which is pertinent here, construction activities would contribute to adverse impacts on visitor use and experience. Alternative 5 would engender the least adverse impact on existing visitor use and experience, and it would not affect existing recreation opportunities.

Conclusions

Alternative 5 would have a minor impact on visitor use and experience by removing the existing access to the Bacon Ranch, limiting future potential to expand recreation opportunities, and creating a safety hazard in the vicinity of the campground.

Chapter 5 - Consultation and Coordination

Scoping

Public scoping efforts were completed in July 2010 and are presented in Chapter 1 of this EA. A list of interested and potentially affected parties who received the scoping notice is located in Appendix A.

This project was identified initially in December 2006 and became a top priority for the park after storms of January 2010 damaged the bridge abutments and the bridge became unusable. Subsequently, in February 2010 a field scoping trip was conducted and documented. The field trip was attended by numerous staff people from Pinnacles N.M., and from the Pacific West Regional Office. Engineering and architectural consultants were also in attendance. A report was produced by the consultants on April 15, 2010, which documented the need for the project, the proceedings of the field trip and various conclusions regarding potential alternatives, costs and benefits, and initial environmental concerns.

Federal and State Agency Coordination

US Fish and Wildlife Service: Beyond scoping and informal consultation, a letter of formal consultation was sent to USFWS along with the draft EA/BA on April 28, 2011. Written concurrence will be obtained prior to a FONSI decision. Consultation to Date: In 2002 informal consultation was initiated regarding the CRLF for a project 5 miles from the current project site and the USFWS concurred with the determination of not likely to adversely affect CRLF. In 2007, a Biological Assessment was prepared for the California red-legged frog and the project to replace a streamside gabion retaining wall on Bear Gulch Creak near the Monument's administration area and the USFWS also concurred with the determination of not likely to adversely affect CRLF.

State Historic Preservation Office: a letter of consultation was sent to the SHPO April 15, 2011 with the final archeological report and this Environmental Assessment document, and written concurrence will be obtained prior to a FONSI decision.

Army Corps of Engineers: the 404 application will be coordinated by the Central Federal Lands Highway Division. The 404 Pre-construction Notification Package was sent to the Army Corps. on May 6, 2011 and an authorization is expected within 60 days. The necessary permits will be obtained before a contract for the construction work is put out to bid.

California Regional Water Quality Control Board: the 401 Water Quality Certification application will be coordinated by the Central Federal Lands Highway Division and submitted on May 18, 2011. A certification issuance is expected in 60-120 days. The necessary permits will be obtained before a contract for the construction work is put out to bid.

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Recipients of the EA

A letter will be sent to all recipients of the previous 2010 public scoping notice as listed in Appendix A. During the 2010 public scoping comments period several individuals requested and will receive printed copies of the EA. Printed copies of the EA will be available at the Hollister Public Library ; the Hollister Chamber of Commerce; the Visitor Centers on the east side of Pinnacles N.M. at the Campground and Bear Gulch; and the west side Visitor Contact Station at Chaparral.

Electronic copies will be posted on the park's websites at http://parkplanning.nps.gov/pinn and www.nps.gov/pinn.

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Appendix A: Scoping Mailing List

National Park Foundation
National Parks Conservation Assn.
The Honorable Dianne Feinstein
Wilderness Watch
The Access Fund
Western National Parks Assoc
Ventura Field Office
City Offices - Coalinga
Sierra Club Santa Lucia Chapter
City Offices - Los Banos
Assemblywomen Anna M. Caballero
City Offices - Salinas
Congressman Sam Farr
County Planning Department - Monterey
KSBW-TV
Public Library of Salinas
The Salinas Californian
The Valley Adviser
Monterey County Board of Supervisors
KCBA FOX 35 Main Office
KPRC La Preciosa
Ventana Wilderness Society
The Carmel Pine Cone
California Native Plant Society
City Offices - King City
KRKC Radio
Public Library of King City
South County Newspapers
AMBAG
California State Parks, Monterey
Dept. of Fish and Game
KLOK, La Consentida
Chalone Vineyards
City Offices - Soledad
Public Library of Soledad
Nat'l Trust/Historic Preservation
San Francisco Chronicle
Environmental Protection Agency
Nature Conservancy
KQED, Inc
The Honorable Barbara Boxer
California Dept. of Parks and Recreation
Sierra Club Loma Prieta Chapter
California Invasive Plant Council
California Dept. of Fish and Game
Gilroy Visitors Bureau
Bureau of Land Management
Cal-BLMX Inc.
City Offices - Hollister
County Planning Department - San Benito
Grace & Albert Attorneys at Law
Hollister Free Lance
Hollister Hills State Vehicular Rec. Area
Public Library of San Benito County
San Benito County Farm Bureau
San Benito County Chamber of Commerce
San Benito County Historical Society
San Benito County, Administration
The Pinnacle
Henry W. Coe State Park
City Offices - San Juan Bautista
Fremont Peak State Park
Public Library of San Juan Bautista
City of San Juan Bautista
San Juan Bautista State Historical Park
Santa Cruz County Parks
Friends of Pinnacles National Monument
KUSP Radio
San Jose Mercury News
Hydrology and Cooperative Extension Programs
CA Indian Basketweavers Association
USGS-BRD-WERC
Los Padres NF Monterey Ranger District
California Dept. of Transportation
Bureau of Reclamation
Mountain Tools
Fort Hunter Liggett
Earth Systems Science and Policy
California Academy of Sciences
Milford W Donaldson, FAIA, SHPO

The Wilderness Society
Ecosystem Sciences Division-ESPM
RIPM Division-ESPM
Dept. of Geography
Gilroy Dispatch
Cattlemen's Association

and 43 interested individuals

Appendix B: Bridge Design Criteria for Preliminary Alternatives

This appendix contains excerpts from two memoranda (November 3 and October 25, 2010) provided by Central Federal Lands Highway Division (a division of the Federal Highway Administration – Department of Transportation) regarding the Sandy Creek Bridge Reconstruction proposal. They discuss design needs and criteria, and assess and draw conclusions about the six preliminary alternative locations for the bridge crossing.

Note: in these memos, FHWA refers to alternatives 1 through 6, but three of the alternatives were dismissed from further analysis in this EA.

- Alternative 1 in these FHWA memos correlates with Alternative 1 in this EA;
- Alternative 3 in these FHWA memo correlates with the EA Alternative 2;
- Alternative 6 in these FHWA memo correlates with the EA Alternative 3.

This information is included in the appendix, because it adds detail to the analysis summarized in the body of the EA. Readers who wish to view the full text should contact Pinnacles National Monument, where it is part of the administrative record for this document. Some of the illustrations from the memos are duplicated in the Alternatives section of the EA.

U.S. Department of Transportation
Federal Highway Administration

Memorandum

Date: November 3, 2010

To: Sarah Raube, Project Manager, NPS Pacific West Region

From: CFLHD Cross Functional Design Team

Subject: Overview of alternative locations for a bridge crossing to the Bacon Homestead on the CA PINN 10(2) Sandy Creek Bridge Project.

This memorandum presents structure alternatives and recommendations for bridge and roadway improvements on the Sandy Creek Bridge Project. The project is located adjacent to State Highway 146 (Pinnacles Highway) within the Pinnacles National Monument and consists of the replacement of the existing bridge at Sandy Creek with a new traffic-rated bridge at one of six possible locations. Direct access from HWY 146 to the existing bridge will be closed. New access from the Visitor Center will be constructed.

The Sandy Creek Bridge is designated as a maintenance access bridge for the Bacon Homestead; it will be designed to the current AASHTO LRFD standards and to meet applicable hydraulic requirements.

SANDY CREEK BRIDGE

The existing Sandy Creek Bridge consists of a 10 ft. wide by 45 ft. long steel girder bridge with a wood plank deck. Access to the bridge is from State Highway 146 via a gravel road. Last Spring, a major flood event scoured around the two abutments of the bridge, causing them to fail and making the bridge unsafe for use. Also, the access road for the bridge encroaches onto CALTRANS right-of-way and does not allow for proper sight distance for traffic entering Hwy 146 from the access road.

Due to the bridge being the only access to the Bacon Homestead for several miles in either direction, the bridge needs to be replaced. The park requested several alternative locations for the bridge be investigated. During an on-site field visit, a total of six possible locations were identified for the new bridge (see attached Alternative Layout).

The bridge will be a pre-fabricated bridge to shorten construction time and to lower costs. Steel beam and steel truss are the two superstructure options being considered for the replacement structure. Either type of structure can be constructed at all locations.

PREFABRICATED STEEL BEAM VEHICLE BRIDGE

The prefabricated steel beam bridge alternative would consist of weathering steel beams and diaphragms with a timber deck designed for a HS-20 (36 ton) vehicle loading. These components are fabricated off-site then delivered and erected on a cast-in-place concrete foundation. This type of structure can span lengths up to approximately 80 feet. Of the alternatives considered, this is the simplest in terms of design, fabrication, and erection. The bridge is typically delivered to site as individual components that are lifted into place by a crane and assembled in their final position. Shorter spans can be accommodated by un-spliced individual beam lines. Longer spans may require each individual beam line to have a splice resulting in more components to be lifted and additional assembly time. Because of the smaller components involved with this

type of structure a smaller crane can be used for erection. It is assumed the components would be lifted by a single crane on the west side of the creek to avoid the overhead power lines on the east side.

Standard bridge railing supplied by the fabricator typically consists of steel posts mounted to the exterior beams with longitudinal rails attached to the posts. The longitudinal railing material can be specified by the owner to obtain a desired aesthetic.

The foundations for the prefabricated steel beam bridge would be relatively small stub type cast-in-place abutments founded on either rock/soil or piles. Cast-in-place wingwalls would be used to retain the approach fill at the structure. Should unsuitable support material be found, deep foundations may be required below the caps. Micropiles are one option that has been utilized for deep foundations in tight construction areas since they may be constructed with smaller equipment than is typically required for pile or drilled shaft construction. This could be particularly important at the east abutment due to the adjacent power lines.

Figure 24: Pre-Fabricated Steel Beam Bridge

PREFABRICATED STEEL TRUSS VEHICLE BRIDGE

The prefabricated steel truss bridge alternative would consist of a weathering steel truss bridge with a timber deck designed for a HS-20 (36 ton) vehicle loading. This bridge is also fabricated off-site then delivered and erected on a cast-in-place concrete foundation. This type of structure can span lengths up to approximately 150 feet. The truss bridge alternative will be more complicated to design, fabricate, and erect. The bridge is typically delivered to site either fully assembled or in modular pieces that are then off loaded by a crane and, if in pieces, assembled prior to lifting the entire truss into the final position. A span of approximately 70 feet or less may be transported to the site without splices in the truss. Because of the larger components involved with this type of structure a larger crane will be required for erection.

Standard bridge railing supplied by the fabricator is typically mounted directly to the truss. The longitudinal railing material can be specified by the owner to obtain a desired aesthetic.

As with the prefabricated steel beam bridge, the foundation will be relatively small stub type cast-in-place abutments founded on either rock/soil or piles. The same wing walls and foundation recommendations as detailed above will also be applicable to the prefabricated steel truss bridge.

Figure 25: Pre-Fabricated Truss Bridge

PREFABRICATED PEDESTRIAN BRIDGE

This alternative allows for the access to be constructed as a pedestrian pathway or trail with the replacement structure designated as a pedestrian bridge. The trail would be less wide than for the vehicular roadway alternatives but still wide enough for occasional vehicle use, if necessary. The pedestrian bridge could be designed as a pure pedestrian structure, where vehicle access is not permitted by permanent feature (bollards or gate). Where access is not prevented, but is still restricted to owner use only, the bridge would be designed for a H10 (10 ton) maintenance vehicle loading. Preliminary research has indicated that normal maintenance vehicles as well as a Type III Additional Duty ambulance (7 tons) would be well within this limit, while a firetruck and other heavy-duty maintenance vehicles would most likely exceed this limit.

This alternative could be either a truss or girder type bridge but would require a more shallow structural depth due to the decreased loading and reduced width requirements. Freeboard capacity would be increased with this shallower structural depth. The foundation would be similar to the vehicular bridge alternatives but at a smaller scale, requiring less excavation and bank disturbance.

This alternative, if found consistent with project objectives, would be easier to construct (smaller cranes and construction equipment) with less site impacts (trees and vegetation). Construction costs would be the most favorable with this alternative, providing potential construction savings of at least 25% over the vehicular alternatives.

SELECTION PROCESS

Several factors will be considered to determine the preferred bridge location. The first is maintaining critical habitat. The California red-legged frog lives in Sandy Creek and has been identified as a threatened species that could be adversely impacted by construction of the new bridge. Due to this, selection of the preferred location should take into account the impact to channel bottom and banks (include scour/riprap as impact).

Also, construction duration should be taken into account to shorten the impact to this threatened species. Second, the overhead power line on the east bank will be a concern during construction. Because of its location, the crane will only be able to set up on the west side of the bridge. Thus, the preferred location should take into account accessibility to the bridge site as well as constructability. The third factor is the removal of vegetation. The park has said that removal of any oak trees will not be approved, but removal of pine trees is acceptable. The preferred location should be chosen to prevent the removal of any oak trees and lessen the impact to the surrounding vegetation. The fourth factor should consider how the location plays into the surrounding historic district. The Bacon Homestead is a historic district, and the preferred superstructure will preserve this appearance. The final factor will be cost of the bridge at the chosen location. A longer bridge will increase the cost of construction and require a larger site clearing to install thus impacting a larger area.

ALTERNATIVE 1 (EXISTING BRIDGE LOCATION)

The first alternative is to replace the bridge at the existing location. The new span will be approximately 50 ft. long and 14 ft. wide. Because of the shorter span, the construction costs would be lower than the other alternatives and a smaller crane could be used.

There are several concerns with this site. First, due to the high amounts of vegetation on both sides of the bridge, there would not be a good location for the crane during construction. Construction would require several trees to be taken to allow for the crane to be set up and install the girders. Also, since the access road from Hwy 146 will be obliterated and the new access road will be coming from the visitor center, several trees will need to be taken to allow for the new access road. Also, this location will require the longest section of new road to be constructed due to it being the farthest from the visitor center.

From the preliminary hydraulic assessment and historic data, this site was given a high risk for scour. This will require riprap to be placed around the abutments to mitigate the risk of scour. Also, there is a moderate risk of not meeting freeboard requirements.

ALTERNATIVE 2

The second alternative is approximately 150 ft. downstream from the existing bridge. The span will be approximately 70 ft. long and 14 ft. wide. At this location, there will be minimal vegetation removed at both the bridge site and the access road construction. The only necessary removal should be to allow construction of the bridge. This site also provides good locations for staging and for the crane, allowing for easier construction.

This location has one of the longest spans of the alternatives. Because of this, it will have a higher construction cost due to the increased span and deeper member. Also, the crane necessary for construction would be larger and require a larger clearing. This location will also require the most embankment construction due to the large elevation difference between the abutments. This location will also require larger amounts of road construction due to its distance from the visitor center.

From the preliminary hydraulic assessment, this site does have a low risk of scour, but has a high risk of not meeting design criteria and fatal flow.

ALTERNATIVE 3

The third alternative is approximately 300 ft. downstream from the existing bridge. The span will be approximately 50 ft. long and 14 ft. wide. This location has the shortest span and is the closest to the historical district. Due to its shorter span, require a smaller crane, and would have lower costs.

This location has several concerns. First, this location will require removal of several trees to place the bridge. Also, this location will have difficulties when placing the foundation on the east abutment due to the close proximity of the overhead power line.

From the preliminary hydraulic assessment, this site has both a moderate risk of scour and lack of freeboard. The freeboard risk could be mitigated in the design height of the bridge if necessary. Riprap would need to be placed to mitigate the scour risk.

ALTERNATIVE 4

The fourth alternative is approximately 450 ft. downstream from the existing bridge. The span will be approximately 65 ft. long and 14 ft. wide. Even though the longer span will require a larger crane, there is significant space on the west bank to allow the crane and to provide a staging yard. Also, there would be minimal impact to the vegetation at this location. It is also close to the historical district and requires the least amount of access road to be constructed.

This location would require a large amount of embankment construction due to the elevation difference between the abutments. Also, because of the longer span, the construction cost would be higher.

From the preliminary hydraulic assessment, the risk of scour is moderate. To mitigate this, riprap would need to be placed around the abutments. There is a low risk of insufficient freeboard.

ALTERNATIVE 5

The fifth alternative is approximately 700 ft. downstream from the existing bridge. The span will be approximately 65 ft. long and 14 ft. wide. Even though the longer span will require a larger crane, there is significant space on the west bank to allow the crane and to provide a staging yard. Also, there will be minimal impact to the vegetation at this location. This location will require less access road to be constructed.

Because of the longer span, the construction costs would be higher. This location is located close to neither the campground nor the historical district.

From the preliminary hydraulic assessment, this location is at high risk for scour. To mitigate this, it will require larger amounts of riprap. There is a low risk of insufficient freeboard.

ALTERNATIVE 6

The sixth alternative is approximately 400 ft. upstream from the visitor center. The span will be approximately 75 ft. long and 14 ft. wide. There is good access to the site from the visitor center, allowing for easier construction and pedestrian access. This location will also have minimal impact to the vegetation. This location is also the closest to the visitor center.

This location has the longest span and would have the highest construction costs. Also, this location would have difficulties when placing the foundation on the east abutment due to the close proximity of the overhead power line. This location is also the furthest from the historical district.

From the preliminary hydraulic assessment, this location is at high risk for scour. To mitigate this, it will require larger amounts of riprap. There is a low risk of insufficient freeboard.

Table 1. Bridge Type Advantages and Disadvantages

Prefabricated Steel Beam Bridge		**Prefabricated Steel Truss Bridge**	
Advantages	**Disadvantages**	**Advantages**	**Disadvantages**
- Most economical for shorter spans	- 80 ft. maximum span capability	- Capable of longer span	- More expensive for smaller spans
- Simpler design, fabrication, and erection	- Potentially deeper superstructure below deck	-Potentially shallower superstructure below deck	- More complicated design, fabrication, and erection
- Less visual impact to surrounding area	- More components to be erected	- Fewer components to be erected	- Greater visual impact to surrounding area
- Smaller crane required for erection			- Larger crane required for erection
- Smaller clear opening needed to erect			- Requires larger clear area to erect
- Lower maintenance and inspection costs			- Higher maintenance and inspection costs

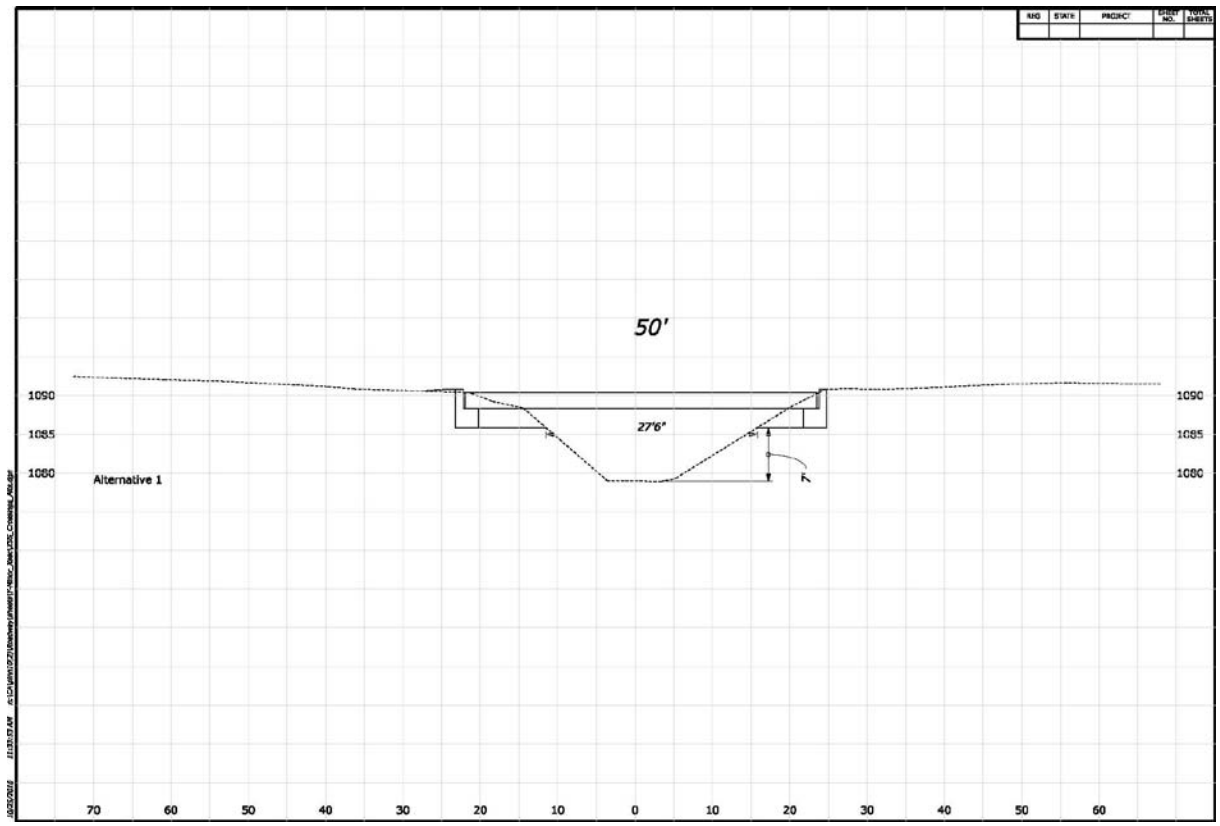

Figure 26: FHWA Alternative 1

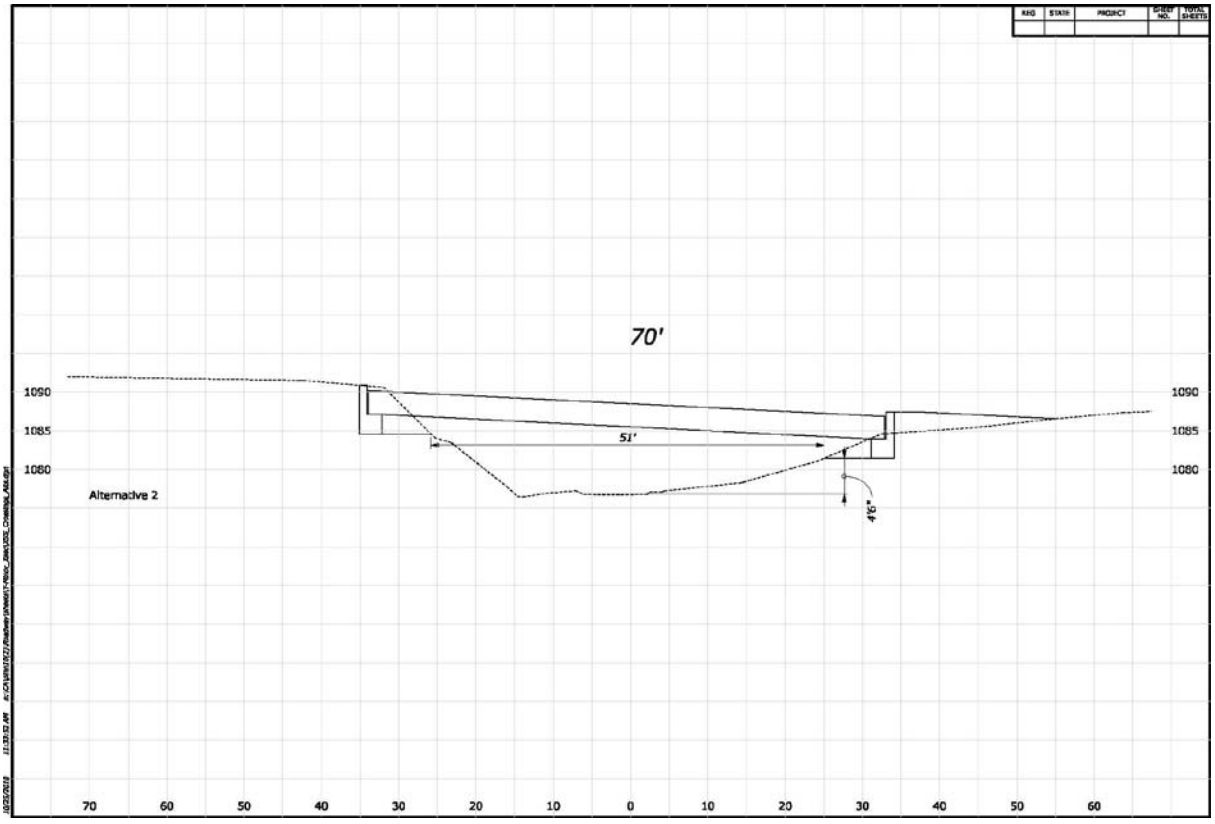

Figure 27: FHWA Alternative 2

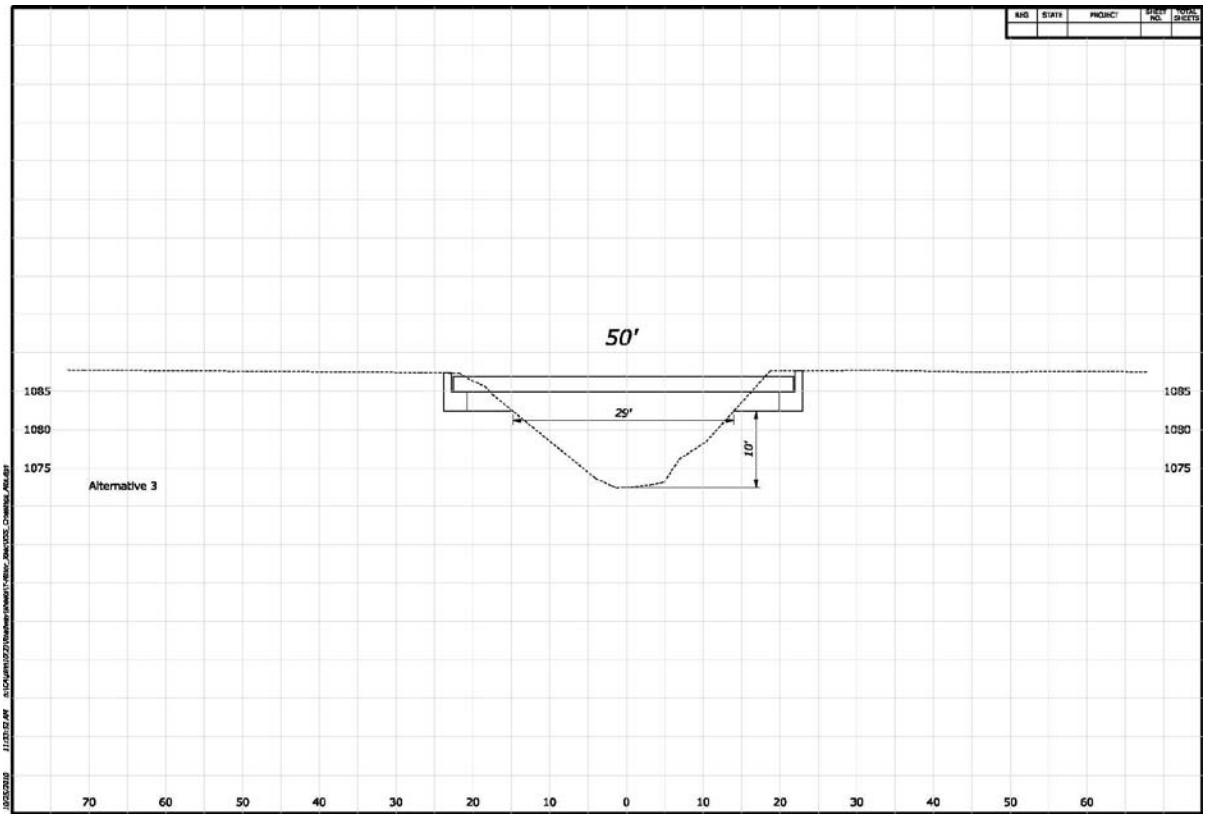

Figure 28: FHWA Alternative 3

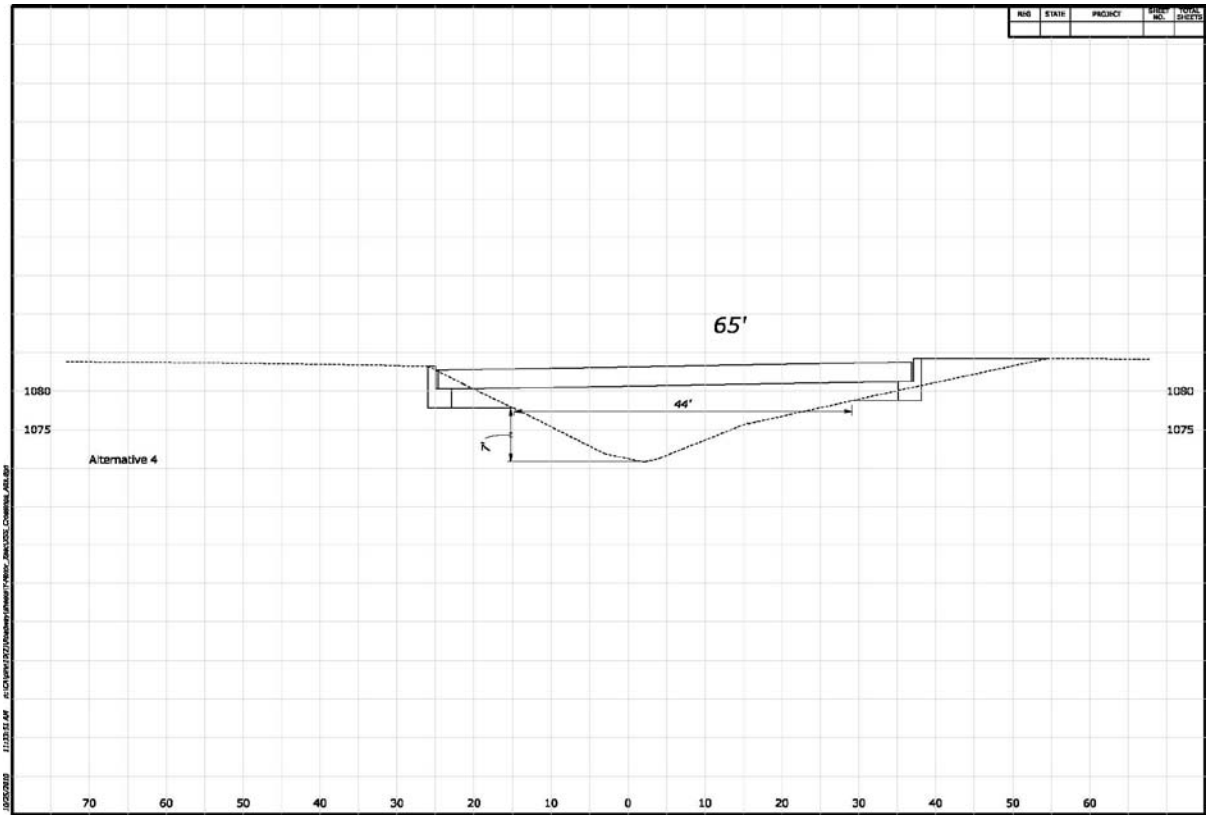

Figure 29: FHWA Alternative 4

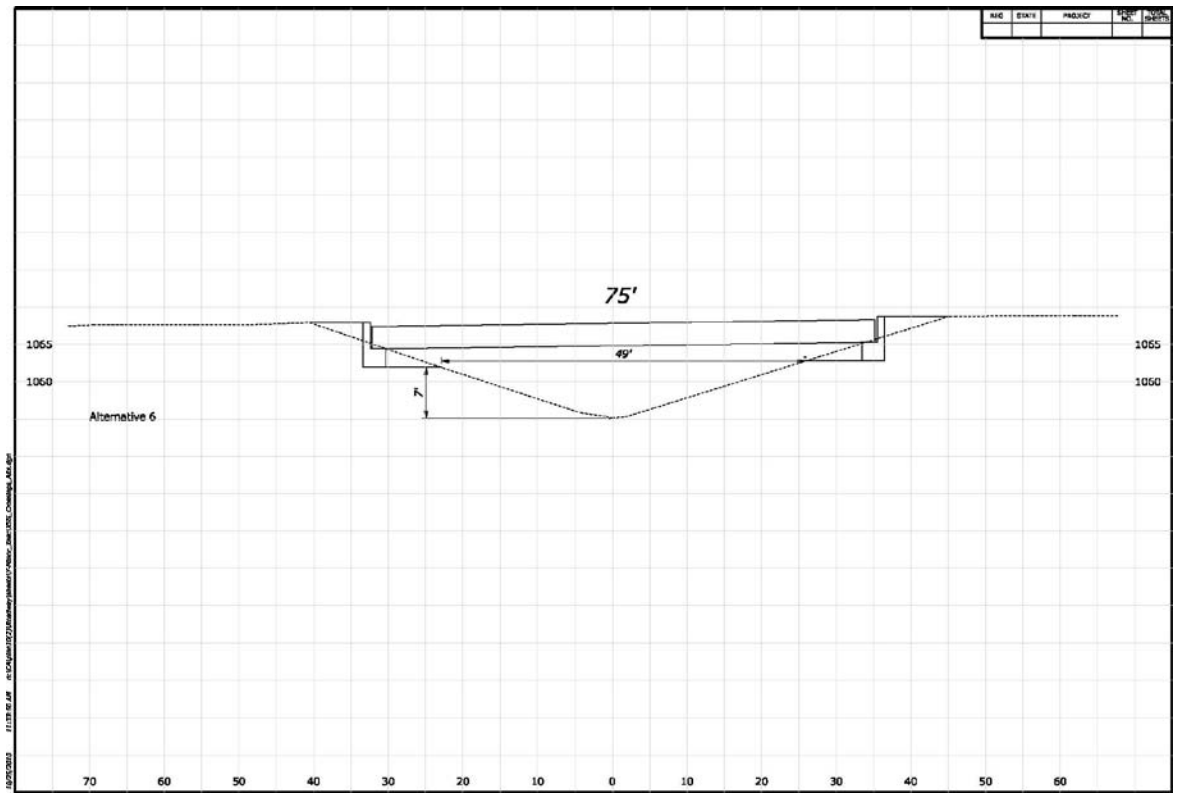

Figure 30: FHWA Alternative 5

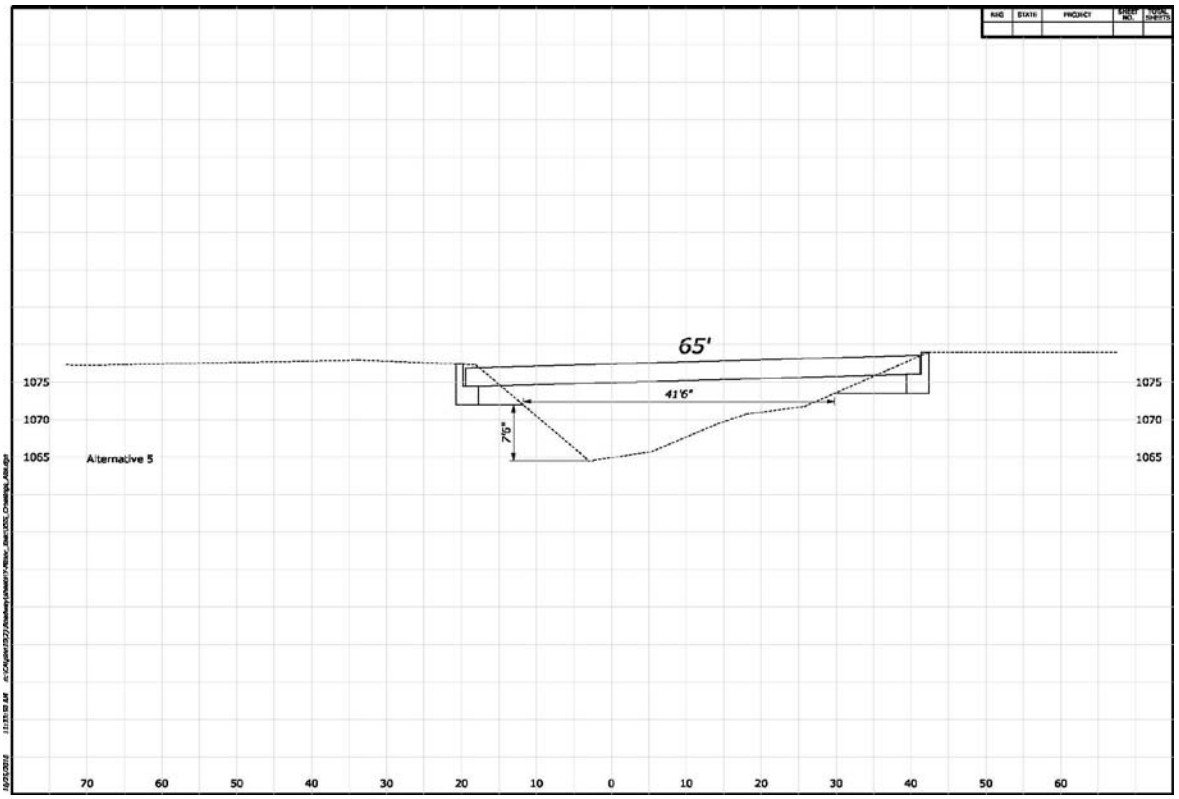

Figure 31: FHWA Alternative 6

U.S. Department of Transportation
Federal Highway Administration

Memorandum

TO: File
FROM: Roger Kilgore
DATE: October 20, 2010
RE: Pinnacles preliminary scour and freeboard assessments.

A preliminary assessment of the six alternative bridge sites was conducted using the 100-yr discharge from Meyer (1995) and a preliminary HEC-RAS setup. The assessment is focused on two measures: 1) the potential for scour and stream degradation as a function of the shear stress in the stream and 2) the potential for acceptable freeboard.

These assessments are intended to support the site selection process. Further analyses are planned including preparation of independent hydrologic estimates and a fully calibrated and tested HEC-RAS setup with the bridges modeled in detail.

The following table summarizes the assessments at each alternative bridge site. Each alternative is given in terms of potential risk at the site of abutment scour/stream migration and insufficient freeboard. (The typical Federal Lands freeboard standard is to pass the 50-yr flood with 2 ft. of freeboard.) The risk assessments are as follows:

- High: The need for mitigating design features is probable.
- Moderate: The need for mitigating design features is possible.
- Low: The need for mitigating design features is unlikely.

Table 1. Risk Assessment Results

Alternative Site	Scour/Stream Migration Risk	Freeboard Risk
1	High	Moderate
2	Low	High
3	Moderate	Moderate
4	Moderate	Low
5	High	Low
6	High	Low

Alternative site 1 is the site for the existing bridge. The above assessment is for the proposed bridge, which is anticipated to have approximately the same soffit elevation and a longer length compared with the existing bridge. Therefore, the scour risk assessment for the existing bridge for scour would be somewhat higher.

A high risk rating should not be interpreted as an indication that the site is unsuitable since the ratings are relative to the other sites as well as being representative of estimated conditions at the site. These ratings are intended to be used in conjunction with other considerations including, but not limited to, vegetative disturbance, constructability, access, and cost.

Reference

Meyer, Robert W., 1995. “Potential Hazards from Flood in Part of the Chalone Creek and Bear Valley Drainage Basins, Pinnacles Nation Monument, California,” Open File Report 95-426, U.S.G.S.

Appendix C: Standard Resource Protection Measures

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

General Measures

• The NPS resource specialist and Contracting Officer's Representative (COR) in cooperation with the FHWA/CFHLD Project Engineer would ensure that the project remains within the construction limits and parameters established in the compliance and contract documents and that mitigation measures are properly implemented.

• Construction limits would be clearly marked with stakes prior to the beginning of ground disturbing activities. No disturbance would occur beyond these limits other than protection measures for erosion/sediment control (these are typically placed just outside the clearing limit stakes). Temporary construction fencing would only be installed where determined necessary by FHWA/CFHLD and NPS resource specialist.

• All protection measures would be clearly stated in the construction contract documents.

• All tools, equipment, barricades, signs, surplus materials, and rubbish would be removed from the project work limits upon project completion. Any asphalt surfaces damaged due to work on the project would be repaired to their original condition. All demolition debris would be removed from the project site, including all visible concrete and metal pieces.

• Contractors would be required to properly maintain construction equipment (i.e. mufflers) to minimize noise from use of the equipment.

• A Hazardous Spill Plan or Spill Prevention, Control and Countermeasures Plan, whichever is determined appropriate, would be in place, stating what actions would be taken in the event of a spill, notification measures, and preventative measures to be implemented, such as the placement of refueling facilities, storage, and handling of hazardous materials, etc. The plan must be submitted at least 2 days before beginning construction work. Other measures related to the spill plan include:

- All equipment on the project would be maintained in a clean and well-functioning state to avoid or minimize contamination from automotive fluids.
- All equipment would be checked daily and any leaks would be immediately repaired upon discovery. Vehicles or equipment leaking oil, gas or antifreeze would not be stored in the Park. Oil, hydraulic fluids, anti-freeze or other chemicals would not be drained to the ground.
- Equipment or vehicles would not be refueled within 100 feet of rivers, streams or identified wetlands. If on-site fuel tanks are used, approved containment devices would be required.
- A supply of acceptable absorbent materials would be kept at the job site in the event of spills. Acceptable absorbent materials are those that are manufactured specifically for the containment and cleanup of hazardous materials. Any spills would be cleaned up immediately.
- In the event of a spill, the Contracting Officer (CO) must be notified immediately.

• Vegetable oil-based hydraulic fluids would be used in all heavy equipment to minimize potential impacts to water quality from spills.

• Materials, including removed stumps, construction materials, and weed-infested soil would be disposed of outside the Park, according to local, county, state, and federal regulations.

• Debris would not be burned or buried in the Park.

• BMPs for drainage and sediment control, as described in 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:

- Disturbed areas would be kept as small as practical to minimize exposed soil and the potential for erosion.
- Waste and excess excavated materials would be located outside of drainages to avoid sedimentation.
- Excavated material to be stockpiled longer than 14 days would be covered with water-repellent, breathable material during storage to prevent erosion/sedimentation.
- Silt fences, sediment logs, temporary earthen berms, temporary water bars, sediment traps, stone check dams, or other equivalent measures would be installed (including monitoring to ensure that erosion-control measures are properly installed and are functioning effectively).
- Chemicals, fuels, and other toxic materials would be stored, used, and disposed of in a proper manner.

• The contractor would provide temporary portable toilets for use by employees.

• Construction debris would be hauled from the Park to an appropriate disposal location.

Air Quality and Sound

• Dust control (i.e., use of water as a dust suppressant) would occur, as needed, on active work areas where dirt or fine particles are exposed.

• The following measures would be taken to limit noise and disturbance from vehicles and construction equipment:

- Equipment would not be allowed to idle longer than 15 minutes when not in use.
- 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.
- Mufflers and sound attenuation devices (such as rubber strips or sheeting) would be installed and maintained on all equipment. This would include truck tail and other gate dampeners (both opening and closing) for all dump trucks on the project.

Water Resources, Quality and Quantity

• Sediment traps, erosion checks, and /or filters would be constructed above or below all culvert drains (if such drains would be required) and in all other ditches before the runoff leaves the project construction limits.

• Surface restoration and revegetation of disturbed soils would be implemented to minimize long term soil erosion.

• A tarp/pump system would be hung under the bridge during bridge removal work to capture contaminants that would otherwise fall into the creek below and damage water quality. Procedures for water quality protection will comply with California State standards and guidelines.

• Except as authorized by this contract, mechanized equipment would not be operated or material discharged or placed in within the boundaries of any U.S. waters as identified by the ordinary high water mark or edge of a wetland. This includes wetlands, unless authorized by a permit issued by the U.S. Army Corps of Engineers according to 33 USC § 1344, and if required by the state agency having jurisdiction over the discharge of material into the waters of the U.S. In the event of an unauthorized discharge:

- Immediately prevent further contamination.
- Immediately notify appropriate authorities.
- Mitigate damages as required.

• Work areas would be separated, including material sources by the use of a suitable barrier that prevents sediment, petroleum products, chemicals, other liquids, or solid materials from entering the waters of the U.S.. Remove and properly dispose of sediment or other material collected by the barriers.

• The contractor may only extract water from the Park at approved sites such as fire hydrants and hose bibs. No water would be extracted from Sandy Creek.

Wetlands

• Prior to construction work, twelve-inch diameter certified weed-free (as defined below) excelsior logs would be installed to form a filter barrier around the construction area to trap sediments from running downslope into the wetland during construction.

Soil

• Topsoil would not be mixed with subsoil. Topsoil refers to the uppermost soil horizon, usually 6 to 18 inches deep, which includes duff and other materials capable of supporting vegetation.

• Twelve-inch diameter, certified weed-free coir logs or certified weed-free wood excelsior sediment logs would be installed for filtering sediment from runoff and reducing the velocity of sheet flow. Logs would be installed according to plans and as directed by FHWA and the Park to address erosion concerns. Logs would be placed in drainages that pass through work areas to limit erosion of exposed soils.

• Silt fencing would be installed where necessary to prevent sediment runoff at construction areas per the NPS BMPs. Straw or hay bales would not be used as filter barriers. Silt fence would be installed according to plans; fencing would consist of one continuous piece of semi-permeable fabric or steps would be taken to join sections so there would be no gaps; fence would remain in an upright position after installation; materials and equipment would not be leaned against fencing to avoid fence collapse; and fencing would be repaired to ensure an effective barrier within 24 hours of deficiency notification.

• Excavated material that is suitable for growth of native vegetation as determined by the Park would be salvaged.

• Erosion and sediment control devices would be installed and vegetation cleared prior to salvaging topsoil for storage. Topsoil would be salvaged and stockpiled before any additional construction work took place.

• Weed-free certification would meet or exceed the North American Weed Management Association (NAWMA) standards. For a material source provider to be considered certified weed-free, all staging areas, work areas, and facilities associated with producing the material would be inspected by a qualified government inspector, qualified park employee or other proper officials or authority: a representative of that State's Department of Agriculture, a Weed Supervisor or Weed Superintendent, a University Extension Agent, or an individual designated by that State's law or regulations and determined to be free of all noxious weed and invasive plant species.

• All imported rock and topsoil material for the project would be inspected and accepted by the FHWA Project Engineer. All materials to be transported directly to the Park and to be transported and stored such that they will not acquire invasive non-native plant seeds from adjacent vegetation.

Vegetation and Special Status Plant Species

• No vegetation would be disturbed outside of the construction limits unless prior approval is obtained from the Park. Any unauthorized disturbance would result in the contractor paying for the restoration of that area using the methods set forth in the contract documents.

• The hydroseeding method of choice would be a two-step process that applies seed in a slurry of water, seed and tackifier on a prepared seedbed as the first step. The second step would apply wood fiber mulch and tackifier in a slurry of water over the first application. Tackifiers used in the process would be derived from plant materials to have no residual effects on the soil, seed or germinating plants. The mulch and tackifier would serve to hold sediment in place until growing plants are able to hold soils in place. All imported rock, topsoil, and erosion control materials that are capable of harboring plant seed would be certified weed-free.

• All impacted areas would be hydroseeded and mulched to establish native plants, control erosion, and limit growth of invasive plant species.

Fish, Wildlife, and Special Status Fish and Wildlife Species

• Construction personnel would be informed of the occurrence and status of special status species and would be advised of the potential impacts to the species and potential penalties for taking or harming a special status species.
• Noise-generating activities above ambient noise would not be performed between one hour after sunrise and one hour before sunset to prevent impacts to sensitive wildlife.
• Feeding or approaching wildlife would be prohibited.
• A litter control program would be implemented during construction to eliminate the accumulation of trash. All food items would be stored inside vehicles, trailers, or wildlife-resistant receptacles except during actual use to prevent attracting wildlife.

Cultural Resources

• 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 immediately be notified. Work in the affected area(s) would stop immediately until the historic properties are reviewed by the Park. As appropriate, consultation with the DAHP and any affected Native American 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 site of discovery.

• Monitor Construction During Excavation of Sensitive Archeological Sites: An Archeological Monitor and/or Resource Advisor would be present during the project when work activity takes place in areas of archeological sensitivity. These would be defined as areas where archeological resources recommended or determined eligible for inclusion on the National Register of Historic Places have been documented adjacent to the area of potential impact. The Park Archaeologist would provide a list of sensitive sites to be included in the contract. The Contractor would notify the Park two weeks in advance before doing excavation, drilling or other work in sensitive archaeological areas.

Visitor Use and Experience

• Local newspapers, the Monument newsletter, and the Monument website would post updated information regarding construction in order to alert potential visitors to construction activities.

Appendix D: Impairment Determination

Impairment of Pinnacles National Monument Resources or Values:

Sandy Creek Bridge Relocation

A determination of impairment is made for each of the resource impact topics carried forward and analyzed in the environmental impact statement for the preferred and other alternatives. The description of park significance in chapter 1 was used as a basis for determining if a resource is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or
- identified in the park's general management plan or other relevant NPS planning documents as being of significance.

Impairment determinations are not necessary for visitor experience, socioeconomics, public health and safety, environmental justice, land use, and park operations, etc., because impairment findings relate back to park resources and values. These impact areas are not generally considered to be park resources or values according to the 1916 Organic Act, and cannot be impaired the same way that an action can impair park resources and values. The 2006 *NPS Management Policies* and DO-12, require analysis of potential effects to determine if actions would impair park unit resources. The fundamental purpose of the National Park system, established by the 1916 Organic Act and reaffirmed by the 1970 General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid or minimize, to the greatest degree practicable, adverse impacts on park and monument resources and values.

Physical Resources

Air Resources

The air in and surrounding the Monument is good with no sources of pollution locally that would affect visibility or contribute to degradation of air quality. The air quality is one of many attributes which attract visitors to recreation opportunities in the Monument. The preferred alternative would have short-term, negligible to minor and long-term negligible adverse impacts to air quality resulting from construction activities such as grading, excavations, vehicle and equipment use. NPS judges that these pollution sources would not be sufficient to affect the overall ambient air quality in a measurable way. Cumulative effects would be short- and long-term negligible and adverse.

Because impacts would be short-term and not exceed minor, the preferred alternative would not result in impairment.

Soil Resources

Geological features and the preservation and enjoyment thereof are a significant part of the Monument's purpose, however, there are no unique or outstanding geological resources, surface or subsurface, within the project area. The new unpaved road, 770 feet long and 14' wide, would permanently disturb about .25 acres of flat Elder gravelly loam soil. The long term impact of the road would be adverse and minor as long as construction equipment is kept sufficiently away from the stream channel upper slope break.

Because impacts would not exceed minor, the preferred alternative would not result in impairment.

Water Resources, Wetlands and Floodplains

Since the project is sited on Sandy Creek, a perennial stream flowing into the Monument from the northeast, it is within the 100 year floodplain and is a primary location of riparian habitat within the Monument. Sandy Creek is a dynamic system whose structure is modified with each flood, with the greatest changes generally occurring during the greatest floods. Placing buried vegetated riprap, in limited area of the project will have a negligible effect on energy dissipation or sediment transport processes in the creek. The buried, revegetated riprap may extend below ordinary high water and have some negligible effect on wetlands during construction. The rip rap as well as shading from the new bridge may have negligible to minor long-term adverse effects on wetlands.

Because impacts would not exceed minor, the preferred alternative would not result in impairment.

Natural Soundscapes

The area affected by the proposed action can be characterized as an ambient soundscape fairly free of human-caused sound. NPS values that are connected to soundscapes and are exemplified in the Monument and this project area include visitor experience and habitat values for a variety of species dependent on that condition for procreation, cover, and foraging. The soundscape impacts of the project would be adverse, and moderate to major during two to three weeks of actual construction activities. The daily and seasonal timing of noise generating construction activities will minimize impacts. Since the inclusive construction period is not likely to exceed six weeks total, the impact would be short term, ceasing immediately upon project completion.

Considering the duration of the impact, its overall severity is judged to be negligible, and the preferred alternative would not result in impairment.

Natural Resources

Vegetation

Pinnacle N.M. uniquely contains many different ecosystems and vegetation complexes in its range of elevation, and geology. The project area is contains two major land types and vegetation complexes: a stream course that can be described as a steep-sided, incised perennial stream channel with a fairly abundant matrix of riparian vegetation, including large woody species; and an old alluvial plain (Sandy Creek valley floor) perched above and adjacent to the stream channel and is dominated by grass and shrub lands, with inclusions of large Valley oak trees. Much of this flat land has been affected historically by human occupancy mostly for agricultural purposes. The bridge construction and placement would remove a few small diameter (most less than 12”) Grey pines, Coast Live oaks, and Valley oak from the creek channel. The unpaved road would remove approximately .25 acres of grassland vegetation currently heavily populated with exotic weeds. The impact of this project would be an adverse, long-term minor impact.

Because impacts would not exceed minor, the preferred alternative would not result in impairment.

Fish and Wildlife

Vegetation in the project area and Sandy Creek includes nesting habitat for long-eared owl and Cooper's hawk (both California State Species of Special Concern) in the dense riparian woodland. The stream itself is habitat for federally threatened California red-legged frogs (see below) and a small population of Three-Spined Sticklebacks, not considered a sensitive species.

Special Status Species

The only federally listed species potentially affected by the bridge construction is the California red-legged frog. This is an apparently isolated population with no other known populations in the area, making Pinnacle N.M. critical habitat for the species. Sandy Creek provides habitat for the full life cycle of the CRLF in its slow stream runs and pools. Disruption during breeding season, accidental damage to individual frogs or tadpoles, and alteration of habitat are potential impacts of the projects. These will be minimized by implementing all the resource protection measures listed in this document. The design of the bridge, abutments, and channel stabilization for this project are intended to have minimal negative impacts on stream hydrology and the rip rap and associated vegetation may provide CRLF habitat. Resulting impacts to CRLF are expected to be long-term and minor beneficial to negligible adverse.

Because there would be long-term beneficial effects and adverse impacts would not exceed minor, the preferred alternative would not result in impairment.

Cultural and Historic Resources

The cultural resources of Pinnacle N.M. are necessary to fulfill the purposes for which the park was established and to maintain the integrity of the Ben Bacon Ranch Historic District. This bridge location aligns well with the historic circulation pattern, entering the ranch core along the same alignment as an existing road which passes between the hay barn and the main house. Although the historic bridge did not enter the ranch core at this location, this alternative nevertheless provides an excellent opportunity to introduce modern visitors into the cultural landscape. The action in the preferred alternative would have a *minor adverse impact* (for purposes of Section 106 of the NHPS, *No Adverse Effect*) associated with the construction. The potential adverse effects would be easy to effectively mitigate, while at the same time does not pose any long-term or indirect adverse effects. The alternative would have a net beneficial impact due to its location and the facilitation of enjoyment and interpretation of the cultural resources at the site. There would be no impact to the archaeological resources in the area.

Because there would be long-term beneficial effects and adverse impacts would not exceed minor, the preferred alternative would not result in impairment.

Summary

As described above, any adverse impacts anticipated as a result of implementing the preferred alternative on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or identified as significant in the park's general management plan or other relevant NPS planning documents, would not rise to levels that would constitute impairment.

Appendix E: Proposed Bridge Design