

National Park Service
U.S. Department of the Interior

Bandelier National Monument
New Mexico



Environmental Assessment Replacement of Motor and Pedestrian Bridges

February 2015



Replacement of Motor and Pedestrian Bridges Bandelier National Monument

Environmental Assessment

SUMMARY

Bandelier National Monument, in cooperation with the Federal Highway Administration, is proposing replacement of a motor vehicle bridge, two pedestrian bridges, and road repairs and improvements as a result of flooding. The purpose of the proposed project is to reestablish safe access to the picnic area, parking, and trailheads on the west side of Rito de los Frijoles (Frijoles Creek). The proposed project is needed to address the loss of vehicle access across Frijoles Creek and diminished pedestrian access as a result of wildfire and subsequent flooding. The Las Conchas fire in June 2011 burned more than 156,000 acres in and surrounding the Monument, including more than 80% of the Frijoles Canyon watershed.

This Environmental Assessment (EA) evaluates two alternatives: a no action alternative and a preferred action alternative. Under the no action alternative, vehicular access across Frijoles Creek would not be restored and the two lost pedestrian bridges would not be rebuilt. A temporary pedestrian bridge would remain in place to allow visitor access to trailheads. Under the preferred alternative, a vehicular crossing would be built at a new location about 900 feet downstream from the previous bridge location near the visitor center. The proposed new vehicular crossing would be a low-profile structure designed to pass flood flows and reduce the potential for flood flows to back up and damage the visitor center and other facilities. A new 200-foot spur road off of the entrance road would need to be constructed to access the new vehicular crossing. The new crossing would connect with the existing road on the west side of Frijoles Creek. Damaged road and parking areas in the picnic area west of Frijoles Creek would be repaired with minor road widening to accommodate two-way traffic. The lost pedestrian bridges would be replaced at the same locations as the previous bridges. The new timber pedestrian bridges would be designed to break away under high flood flows to prevent debris buildup and flood damage. In addition, a flood-damaged road shoulder and culvert outlet on the entrance road would be repaired, along with other minor improvements to drainage structures, and a new water line.

This EA has been prepared in compliance with the National Environmental Policy Act to provide the decision-making framework that 1) analyzes a reasonable range of alternatives to meet the objectives of the proposal, 2) evaluates potential issues and impacts on the resources and values, and 3) identifies mitigation measures to lessen the degree or extent of these impacts.

This EA analyzes the following resource topics in detail because the resultant impacts would be noticeably measurable: geology and soils, floodplains, cultural landscapes, species of special concern, and visitor use and experience. Other resource topics were dismissed because the proposed project would have less than minor effects. Public scoping was conducted to assist with the development of this document. During this scoping period, four comments in support of the proposed project were received from the public.

Compliance with section 106 of the National Historic Preservation Act (NHPA) is being conducted separately from the NEPA process. A draft Memorandum of Agreement (MOA)

outlining measures to mitigate the adverse effects of the preferred alternative is available for review in Appendix C of this document.

Public Comment

If you wish to comment on the EA or the MOA, you may post comments online at <http://parkplanning.nps.gov/band> or mail or hand deliver comments to: Superintendent; Bandelier National Monument, 15 Entrance Road, Los Alamos, NM 87544. This EA will be on public review for 15 days.

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. Although you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so. Comments will not be accepted by fax, email, or in any other way than those specified above. Bulk comments in any format (hard copy or electronic) submitted on behalf of others will not be accepted.

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PURPOSE AND NEED

Introduction

Bandelier National Monument (Monument), in cooperation with the Federal Highway Administration (FHWA), is proposing replacement of a vehicular bridge and two pedestrian bridges to restore access to picnic and parking areas and trailheads across Frijoles Creek lost as a result of flooding (Figure 1). Road and parking areas damaged by flooding would also be repaired and improved under the proposed action.

The Monument was established by an act of Congress in 1916 to preserve and protect an array of archeological, historic, and natural features. The 33,677-acre Monument contains one of the largest concentrations of pre-Columbian archeological sites in the American Southwest. Within the Monument are more than 3,000 sites, most dating from AD 1100 to 1550 and associated with the Ancestral Pueblo period. These sites consist of large villages containing up to 400 rooms, hundreds of small farming hamlets, cliff houses, and scatters of artifacts. Major sites include Frijolito, Yapashi, Tyuonyi, Long House, San Miguel, Painted Cave, and Tsankawi. The Monument and the surrounding area also contain a high concentration of a unique architectural form called *cavates* (cliff houses that have been carved out of the soft volcanic tuff bedrock). In addition to the ancestral pueblo homes, the Monument contains Civilian Conservation Corps (CCC) constructed buildings and structures, wilderness, and natural resources. The National Park Service (NPS) administers the historic, natural, and scenic values of the area that contribute to the public's enjoyment of the Monument.

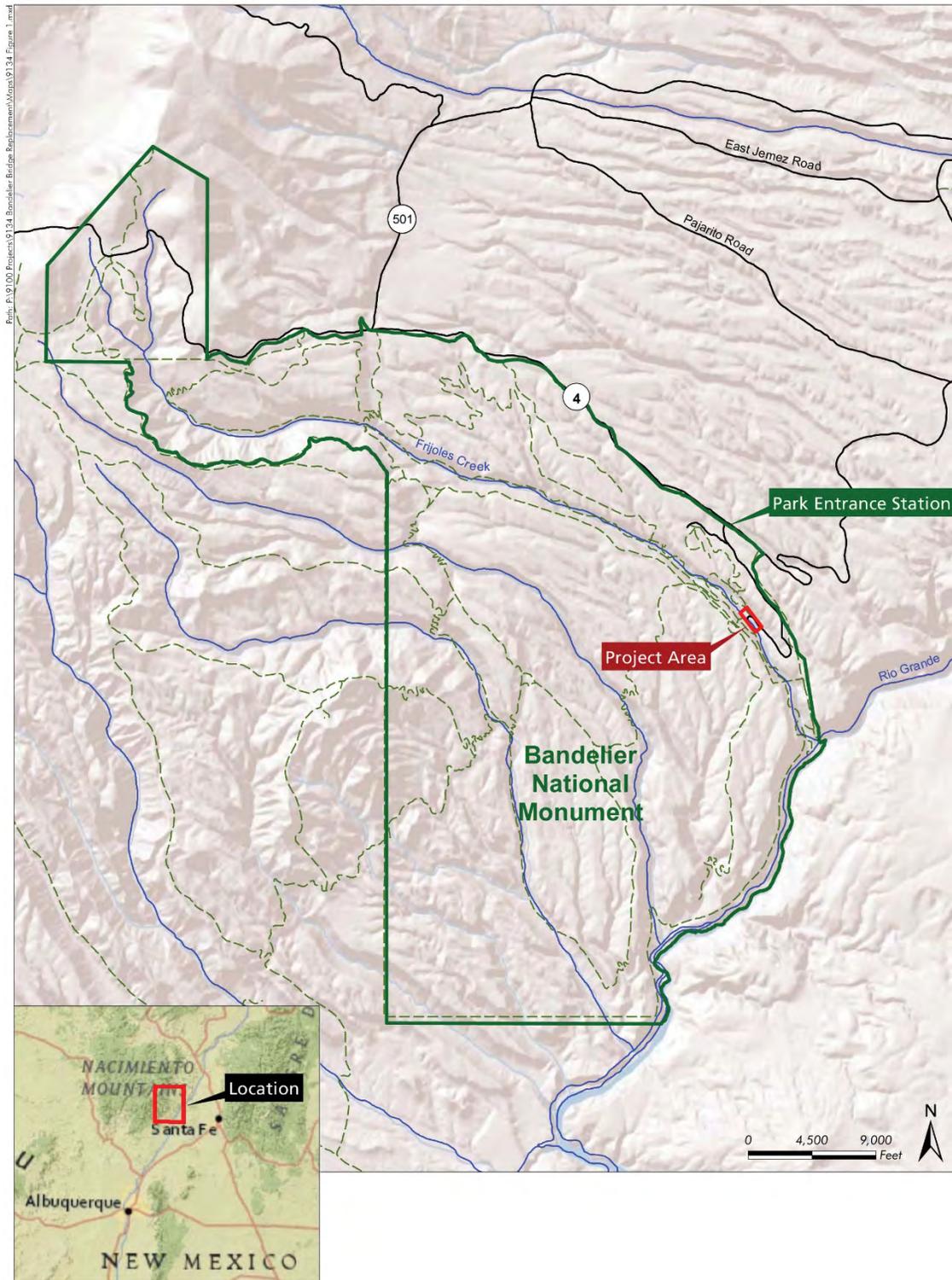
The purpose of Bandelier National Monument is to:

“protect, preserve, and interpret an outstanding portion of the Pajarito Plateau, including one of the largest concentrations of Ancestral Pueblo archeological sites in the American Southwest. The monument provides opportunities for people to connect with and enjoy a diversity of cultural and natural resources, striking scenery, wildlife habitats, remnants of a volcanic landscape, and wilderness”.

The purpose of this Environmental Assessment (EA) is to examine the environmental impacts and cultural resource effects associated with the proposed action to replace lost bridges and repair other flood-related damage and a no action alternative that does not replace lost bridges or make other repairs and improvements. This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, regulations of the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations (CFR) §1508.9), and NPS Director's Order (DO)-12 (*Conservation Planning, Environmental Impact Analysis, and Decision-Making*). The EA will determine whether significant impacts would occur as a result of the proposed action and if an environmental impact statement or finding of no significant impact would be required.

Compliance with section 106 of the National Historic Preservation Act (NHPA) is being conducted separately from the NEPA process through ongoing consultation with the New Mexico State Historic Preservation Office (SHPO), Monument-affiliated American Indian tribes/pueblos, and the Advisory Council on Historic Preservation (ACHP). The separate NHPA section 106 process resulted in preparation of a draft Memorandum of Agreement (MOA) outlining measures to mitigate the adverse effects of the preferred alternative (Appendix C). Comments on the draft memorandum may also be submitted during the comment period for the EA.

Figure 1. Bandelier National Monument Project Area



Purpose and Need

The purpose of the proposed project is to reestablish safe access to the picnic area, parking areas, and trailheads on the west side of the Rito de los Frijoles (Frijoles Creek) and to repair flood-damaged roads and other structures (Figure 1).

The proposed project is under consideration because of the need to address the loss of vehicle access across Frijoles Creek and diminished pedestrian access as a result of wildfire and subsequent flooding. The Las Conchas fire in June 2011 burned more than 156,000 acres in and surrounding the Monument, including more than 80% of the Frijoles Canyon watershed. Following the fires, Monument staff removed the vehicular bridge (Figure 2) and two pedestrian bridges near the visitor center in anticipation of flooding. These structures were of concern because of the potential for flood flows to carry large volumes of debris that can back up behind the bridges and flood the visitor center and other historic features in the Monument.

Flooding damaged the asphalt on Routes 201/202 and deposited debris and sediments on the roads making them inaccessible. Without vehicle access across Frijoles Creek, Monument staff are unable to repair the damaged roads and perform routine maintenance of parking, the picnic area, restrooms, and other facilities. The lack of vehicle access reduced the Monument's ability to respond to wildfires, perform search and rescue operations, and repair structures damaged by fire. The loss of access to parking on the west side of Frijoles Creek reduces visitor parking capacity by 40%, including backpacker overnight parking. Visitor access and circulation on the west side of Frijoles Creek is an important component of the Historic Landscape District and cultural landscape. The west side of Frijoles Creek supports visitor parking, picnic facilities, a comfort station, and backcountry trail access. Repairs also are needed at an eroded entrance road shoulder near a historic stone headwall to address safety concerns for vehicles and pedestrians walking on the road shoulder. Replacement of a water line under Routes 201/202 concurrent with repair of these roads would be an efficient similar action needed in the picnic area to restore the only source of drinking water on the west side of Frijoles Creek.

Figure 2. Removal of Old Vehicular Bridge to Reduce Flood Damage and Protect the Visitor Center.



Summary of Project Objectives

- Provide safe and convenient access for vehicles and pedestrians across Frijoles Creek
- Restore visitor parking and picnic opportunities lost as a result of flooding
- Repair flood-damaged roads to provide safe travel
- Restore vehicle access to allow Monument staff to perform search and rescue operations, fire suppression, facility operations, and road and trailhead maintenance
- Efficiently implement construction and repair work while minimizing impacts on visitors
- Protect and restore natural, cultural, and scenic values
- Identify a design and access location that minimizes impacts on Monument resources in accordance with NPS regulations and policies and is consistent with Monument regulations and policies.

NPS highly regards green building practices, including sustainability, for the design, construction, and maintenance of new structures. This includes, but is not limited to, minimizing resource damage, employing integrated design principles, optimizing energy performance, generating a lower total cost of facility ownership, and reducing the environmental impact of materials. These and other environmentally friendly principles would be considered during construction of the vehicular crossing structure and pedestrian bridges, road repairs, and other improvements. Making these new features sustainable would be consistent with NPS policies.

Impact Topics Retained for Further Analysis

Based on internal and external scoping, the following impact topics were identified for further analysis in this EA:

- Geology and Soils
- Floodplains
- Cultural Landscapes
- Species of Special Concern
- Visitor Use and Experience

Impact Topics Dismissed from Further Analysis

The NPS dismissed impact topics from further analysis in this EA for those resources where there would be no effects or the effects would be slight. Prime farmlands, wild and scenic rivers, wilderness, wetlands, lightscape, environmental justice, museum collections, and ethnographic resources were dismissed because there would be no effect from the alternative actions. Vegetation, wildlife, water quality, air quality, soundscapes, historic structures, archeological resources, socioeconomics, park operations, and climate change were dismissed because effects would be minimal and primarily short-term. Table 1 briefly discusses those impact topics with minor effects that were dismissed from further analysis along with a brief explanation of the reasons for dismissal.

Table 1. Impact Topics Dismissed from Further Analysis.

Topic	Affected Environment / Reason Dismissed
Vegetation	The majority of construction activities would occur within previously disturbed areas. Construction of a new vehicular crossing and access road and minor widening of Route 202 would result in a long-term loss of vegetation resources on about 0.69 acre, including the removal of less than 20 trees. The access road to the new vehicular crossing would be partially located along an existing dirt road to reduce native vegetation disturbance. Temporary disturbances would be revegetated with native vegetation after construction is completed and portions of abandoned roads would be obliterated and revegetated.
Wildlife	Construction activities would result in temporary disturbances and noise that may displace some wildlife. When construction is complete, wildlife is expected to return to the area. Removal of less than 20 trees for road work and the loss of about 0.69 acre of vegetation from construction of the new vehicular crossing structure and widening of Route 202 would have minimal impacts on wildlife because of the limited value of the habitat in a highly disturbed visitor use area and the presence of more suitable habitat elsewhere in the Monument. Best Management Practices (BMPs), such as clearing trees outside of the bird breeding season or conducting surveys prior to removal would be implemented to avoid impacts on migratory birds. Temporarily disturbed areas would be revegetated following construction. Potential impacts on species of special concern, including the Mexican spotted owl, are discussed in more detail on page 33.
Water Quality	Construction activities would result in short-term adverse impacts on water quality in Frijoles Creek from the introduction of sediment during installation of the vehicular crossing structure and other construction activities. BMPs would be implemented to capture sediment and minimize these impacts. There would be no long-term impacts on water quality.

Topic	Affected Environment / Reason Dismissed
Air Quality	Earthwork and equipment operation during construction would temporarily increase dust and vehicle emissions. Vehicle emissions would dissipate quickly and dust control BMPs would reduce the potential for fugitive dust. There would be no long-term impacts on air quality.
Soundscapes	Noise levels would temporarily and noticeably increase during construction as a result of equipment, vehicular traffic, and construction crews. BMPs requiring appropriate vehicle mufflers and limiting idling would reduce impacts on the soundscape. There would be no long-term changes to the soundscape with restoration of visitor and vehicle access to the picnic area and parking areas on the west side of Frijoles Creek.
Historic Structures	The Bandelier CCC Historic District/National Historic Landmark (NHL) consists of a number of features including pueblo buildings, the entrance road, and a stone culvert headwall off the entrance road impacted by flooding. Repair of the road above the historic headwall is addressed under the topic “Cultural Landscapes” on page 31.
Archeological Resources	The Monument contains numerous archeological resources. Survey work indicates that eight archeological sites are in proximity to the project area, but outside of the area of ground disturbance. BMPs requiring the presence of an archeologist during excavation activities and measures to stop work should there be any inadvertent discovery of cultural resources would be used to protect archeological resources.
Socioeconomics	Implementation of the preferred alternative would result in construction-related expenditures for labor, supplies, equipment, and material. Construction spending would have a slight beneficial effect on the regional economy. There would be no long-term effects on socioeconomics.
Park Operations	A short-term impact on park operations would occur during construction from disrupted traffic flow along the entrance road, possible temporary loss in parking capacity, and actions needed to direct visitors to trailheads near the construction area. Park operations would benefit from restored vehicle access to the picnic area with a new crossing. This would allow the Monument to conduct maintenance operations, search and rescue operations, wildfire response, and other Monument operations.
Climate Change	Vehicle emissions from construction activities would contribute to increased greenhouse gas (GHG) emissions, but such emissions would be short-term and would end with the cessation of construction. Any effects of construction-related GHG emissions on climate change would not be discernible at a regional scale, as it is not possible to meaningfully link the GHG emissions of such individual project actions to quantitative effects on regional or global climatic patterns.

ALTERNATIVES

Alternative A – No Action

The no action alternative describes the conditions that would continue to exist in the project area if no improvements or repairs were made. Under the no action alternative, the vehicular bridge and two pedestrian bridges lost during flooding would not be replaced with new structures. The existing temporary pedestrian bridge installed near the parking lot would remain. This bridge would allow visitors and Monument staff to cross Frijoles Creek by foot to access trails and facilities on the west side of the creek. Vehicle access to the west side of Frijoles Creek for parking, maintenance, emergency services, and other park operations would no longer be available. The picnic area would not be restored because of the limited access for maintaining facilities. Repair or removal of damaged asphalt and sediment deposition on Routes 201/202 and in the parking and picnic area would not be possible without vehicle access. The eroded road shoulder adjacent to a historic stone headwall would not be repaired nor would the water line.

Alternative B – Bridge Replacements with Road Repairs, and Improvements

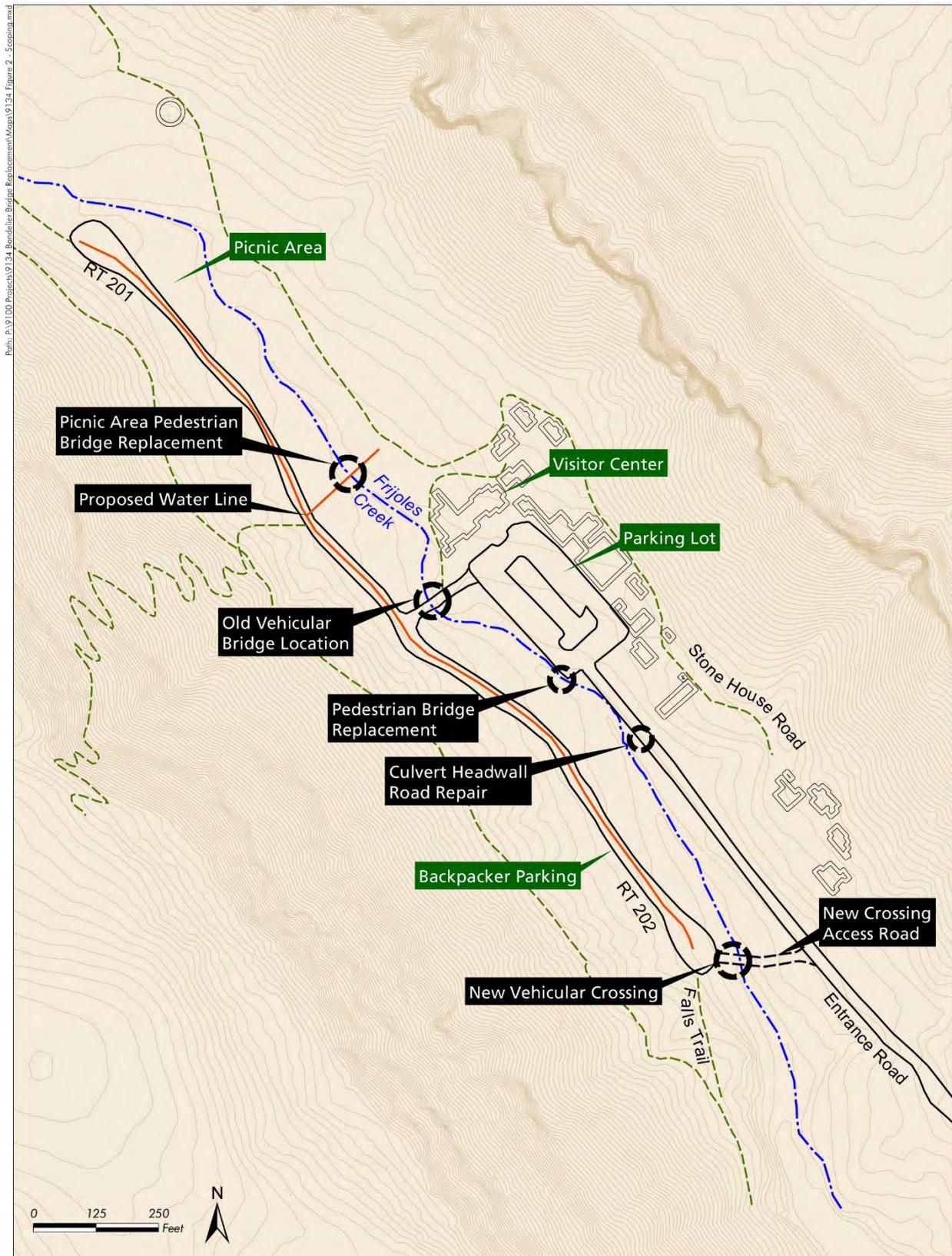
Alternative B consists of constructing a new vehicular crossing of Frijoles Creek; road repairs and improvements to Routes 201 and 202, including installation of a water line; repairs to the shoulder of the entrance road and protection of a historic culvert headwall; and construction of two new replacement pedestrian bridges. The project area is about 5 acres and comprises less than 0.02% of the entire Monument.

New Vehicular Crossing and Access Road

A new vehicular crossing of Frijoles Creek would be constructed about 900 feet downstream from the previous bridge location near the visitor center (Figure 3). The 24-foot-wide by 10-foot-long crossing structure would consist of a cast-in-place box culvert or precast concrete box culvert constructed off-site and installed in the creek. Eight-foot-high concrete wing walls would be constructed on the inlet and outlet to protect the natural streambanks. Cast-in-place footings would be keyed into the bedrock to anchor the crossing. The low-profile crossing would have concrete curbs on the edges. The concrete would be colored to blend with the environment. The crossing design would allow passage of normal flows through the box culvert. High flows above the capacity of the culvert would pass over the top of the crossing without substantially impeding flows and allowing debris to be carried downstream without damaging the crossing structure or backing up streamflow. A conduit for future utilities would be included in the crossing design.

Streamflow in Frijoles Creek would be diverted around the construction zone during placement of the crossing structure to protect water quality. This may involve temporary use of a culvert to bypass flows around the construction zone, a coffer dam within the channel to pool streamflow and pump the water around the construction zone, or other measure. Installation of the crossing structure would occur when streamflow is low.

Figure 3. Proposed Alternative B Actions



Approximately 200 feet of new road would be constructed from the entrance road to the new vehicular crossing following an existing clearing that provides access to a sewage lift station (Figure 3). The new road design includes two 9-foot-wide travel lanes to allow two-way traffic. A stop sign would control traffic at the intersection with the entrance road with a posted speed of 10 miles per hour. About 50 feet of new road would be constructed to tie into the existing end loop of Route 202 on the west side of Frijoles Creek to restore access to parking areas, picnic areas, and trailheads previously accessed by the upstream bridge that was removed near the visitor center.

A total of about 0.22 acre of new disturbance would occur with construction of the new vehicular crossing and access road. Native trees and vegetation would be preserved to the extent possible to blend the crossing and access road into the natural landscape. Construction of the crossing and access road would require removal of 8 to 10 ponderosa pine and elm trees. Temporarily disturbed areas would be revegetated with native plants following construction.

Road Repairs and Parking Improvements Routes 201 and 202

Routes 201 and 202 (Figure 3), which were damaged by flooding, would be repaired. Route 201 begins from the old bridge crossing and extends north about 1,350 feet to a loop turnaround. Route 202 also begins at the old bridge crossing and extends about 900 feet south to the proposed new vehicular crossing. Improvements to both roads include: removing flood-deposited sediment and debris, pulverizing existing pavement and supplementing with aggregate base, and repaving. The pavement width would vary from 9 to 18 feet depending on site conditions. The existing road and parking areas on Route 201 would be repaired and replaced in-kind with no substantial change from the pre-flood footprint. Widening of Route 202 to about 18 feet would be needed to more safely accommodate two-way traffic. A portion of the existing loop at the end of Route 202 would no longer be needed with the new vehicular crossing and entry road. Thus, about 2,060 square feet of the loop road near Frijoles Creek would be obliterated and revegetated. About 8 to 10 ponderosa pine trees would need to be removed on the margin of the existing road to allow road widening. New permanent disturbance from selective widening of Route 202 would impact about 0.47 acre.

Paved pullouts would be reestablished and repaired using similar methods as road work. Unpaved pullouts would remain unpaved. Head-in or diagonal parking would be used with accessible parking areas signed.

A new ¾-inch-diameter PVC water line would be buried within the footprint of the proposed road work on Routes 201 and 202 prior to road paving. It is anticipated the water line would be installed with a “Ditch Witch” type trencher to minimize the area of excavation. The approximate 1,500-foot water line would be buried to a depth of at least 42 inches to prevent freezing. The water line would connect to an existing water line on the east side of Frijoles Creek at the location of the picnic area pedestrian bridge replacement (Figure 3). The water line would be encased in concrete under Frijoles Creek to protect it from damage during high streamflow. The proposed new water line would replace an old and damaged line and would serve three drinking water fountains and supply water to the comfort station on the west side of Frijoles Creek. The water fountains would be located at the Lower Falls and Alcove House trailheads in the Cottonwood picnic area. The other water fountain would be located in front of the Cottonwood comfort station.

Entrance Road Repair

The flood-damaged entrance road shoulder and asphalt at an existing culvert headwall would be repaired (Figure 3). The existing historic stone headwall is in good condition, but flooding has created a steep eroded drop-off. Repair options include extending the existing culvert and burying the headwall or raising the headwall (this would provide a safety clear zone for

vehicular traffic). Because of the angle of the culvert outlet and existing historic stone deflectors (wing walls) at the culvert outlet, flexible plastic pipe may be used for the culvert extension to keep the flow in the channel and to minimize any erosion of the channel side slope. A stone apron would be constructed at the culvert outlet to dissipate flows. Existing debris would be removed and reshaped at the inlet. The road shoulder above the culvert would be widened a few feet to accommodate a possible future bike lane. Aggregate material would be used for the road shoulder.

Picnic Area Pedestrian Bridge Replacement

The pedestrian bridge north of the visitor center that was removed because of flooding would be replaced (Figure 3). This work includes removing the existing nonhistoric bridge abutments that constrict the Frijoles Creek channel and constructing new concrete abutments that allow the new bridge to span Frijoles Creek. A new timber pedestrian bridge approximately 40 feet long with a slight realignment would be constructed on the new abutments. The previous pedestrian bridge had a span of 28.5 feet. The proposed new bridge would be elevated and lengthened a few feet so that higher flood and debris flows can be passed with more likelihood of survival and less flooding of historic areas. At high flows, the bridge would be designed to break away and not capture flood debris. Gravel trail connections on either side of the bridge would be reestablished. The steep trail gradient to the bridge on the east side would be raised slightly to make the approach to the bridge safer to access. The proposed water line from Routes 201 and 202 would cross at this pedestrian bridge and would connect to an existing water line on the east side of the bridge.

Pedestrian Bridge at Parking Lot

The pedestrian bridge at the southwest corner of the visitor center parking lot would be replaced with a new bridge (Figure 3). The existing abutments are structurally sound and would require only minor repair or rebuilding to accommodate the new bridge. The proposed timber bridge would be designed to break away at high flows and not obstruct flood flow or capture debris. On the visitor center side, the bridge connects to an existing nonhistoric stone path with stone/masonry curbing. A portion of this path would be reconstructed to meet the top of the new bridge deck. An existing 4-foot-wide asphalt path that leads from Route 201 to the bridge would be rehabilitated as part of the project.

Removal of Approach to Old Bridge

The old vehicular bridge and abutments were removed prior to flooding. The remaining asphalt pavement approach to the old vehicular bridge would be obliterated (Figure 3). The bridge approach on the west side also would be obliterated. About 265 square feet of the obliterated area not used as a service road would be revegetated with native species. Large rocks would be placed along the old bridge approach to prevent vehicles from traveling that direction. Asphalt would be recycled elsewhere in this project or disposed of outside of the Monument.

Staging, Materials, and Disposal

Temporary staging and stockpiling areas would be needed for equipment and material storage during construction. Staging and stockpiling areas would be located within existing disturbed areas of the Monument including the stables area, a portion of the main parking area as needed, or along Routes 201 and 202. No new disturbance would be needed to support staging operations.

Any fill material needed for proposed work would come from Monument-approved weed-free commercial sources outside of the Monument. Disposal of any excess material, not suitable

for use as fill, would be transported outside of the Monument to a suitable commercial landfill or recycling facility.

Soil Contamination

In 1995, the NPS discovered several areas near the proposed project area that were contaminated with DDT, a pesticide used in the park in the 1950s and 60s to control insect infestations. The extent of the DDT contaminated soil is not known, but DDT or decomposition byproducts could be present in the area of the proposed new vehicular crossing structure and access road. NPS and FHWA would conduct sampling of areas where soils would be disturbed for the new crossing and road prior to construction to determine if any remedial action or safety precautions are needed.

Dust Control and Water Use

Water that would be used for dust control, compaction of base material, and incidental needs related to the construction would be trucked in from sources outside of the Monument. Water needs for this project are anticipated to be about 120,000 gallons over the duration of the project, with deliveries averaging about three or four times per week. Water transport equipment would be cleaned prior to use to prevent the introduction of weed seeds.

Sustainability

The NPS has adopted the concept of sustainable design as a guiding principle of facility planning and development. The objectives of sustainability are to design park facilities to minimize adverse effects on natural and cultural values, to reflect their environmental setting, and to maintain and encourage native biodiversity; to construct and retrofit facilities using energy-efficient materials and building techniques; to operate and maintain facilities to promote their sustainability; and to illustrate and promote conservation principles and practices through sustainable design and ecologically sensitive use. Essentially, sustainability is living within the environment with the least impact on the environment. The preferred alternative subscribes to and supports the practice of sustainable planning and design by installing a new low-profile vehicular crossing that would convey normal flows and pass flood flows with minimal potential for flood damage compared with other designs. The new vehicular crossing would also be designed to pass debris and minimize impacts on surrounding resources and structures during flood events. Asphalt on Routes 201 and 202 would be pulverized and recycled in place in support of conservation principles. Pedestrian bridges would be designed to break away under high flows to reduce the potential to impact other structures during flooding.

To the extent possible, the design and management of facilities would emphasize environmental sensitivity in construction, use of nontoxic materials, resource conservation, recycling, and integration of visitors with natural and cultural settings. The NPS also reduces energy costs, eliminates waste, and conserves energy resources by using energy-efficient and cost-effective technology. Energy efficiency is incorporated into the decision-making process during the design and acquisition of buildings, facilities, and transportation systems that emphasize the use of renewable energy sources.

Erosion Control

This project would use filter barriers and other BMPs to protect Frijoles Creek and minimize erosion and sedimentation during construction activities. A stormwater pollution prevention plan would be prepared before implementation of the project.

Traffic Control and Visitor Access

The majority of the proposed work would be conducted away from the entrance road and would not disrupt vehicle travel in and out of the Monument. Exceptions include construction of the access road to the new vehicular crossing and repair of the eroded road shoulder along the entrance road, which would require closure of one lane of the entrance road. Alternating one-way traffic controlled by flaggers would be used to control traffic during this work. Lane closure for this work is expected to take less than two weeks.

Work on Routes 201 and 202 would affect pedestrian access to trailheads on the west side of Frijoles Creek. The Monument would maintain visitor access to trailheads during construction to the extent possible, but detours and alternate access routes may need to be established depending on the location and stage of construction activity. Any trail closures would be advertised in advance.

Schedule

Construction of the new vehicular crossing and crossing access road, rehabilitation of Routes 201 and 202, construction of two pedestrian bridges, entrance road repairs, and other actions would take approximately 14 weeks to complete. It is anticipated that work would begin in April 2015 and would be completed by August 20, 2015. No night work would be allowed, but extended hours may be allowed on occasion.

Best Management Practices

The following Best Management Practices (BMPs) would be implemented to minimize the degree and/or severity of adverse effects.

General Measures

- Construction limits would be clearly marked with stakes prior to beginning ground-disturbing activities. No disturbance would occur beyond these limits other than protection measures for erosion/sediment control.
- All contractor employees and subcontractors shall attend an orientation session(s) regarding park regulations focused on minimizing impacts on resources, human health and safety. Sessions would include specific education on the status and protection of the Mexican Spotted Owl and laws regarding archeological resources.
- All tools, equipment, barricades, signs, surplus materials, and rubbish would be removed from the project area work limits upon project completion. Construction debris would be hauled from the Monument to an appropriate disposal location.

Floodplains

- Staging and stockpiling areas would be situated outside of the floodplain to the extent possible. Construction equipment may be parked within the floodplain during periods when the potential for flooding is low.
- Sustainable design principles that minimize impacts on the natural environment would be used by building new stream crossing structures into the natural configuration of the land.

Water Resources

- Stormwater runoff control measures, using silt capture techniques such as silt fences, sediment curtains, sediment logs or wattles, or sediment traps would be employed as

needed to contain sediment in the immediate work zone, improve the quality of runoff, and prevent degradation of Frijoles Creek.

- A Nonpoint Source Discharge Elimination System Permit (NPDES) would be obtained prior to construction and a Stormwater Pollution Prevention Plan (SWPPP) would be prepared and used by all construction personnel.
- Construction activities would cease if a large storm event is forecast that could substantially increase flow in Frijoles Creek. Construction activities would not recommence until the flow of the creek has decreased to normal low-flow conditions.
- The contractor would provide a Spill Prevention, Control, and Countermeasure Plan (SPCC) for oil and oil products used during construction to prevent pollution of Frijoles Creek. All construction staff would be familiar with the SPCC prior to starting construction.
- Equipment use in Frijoles Creek would be limited to the minimum necessary to construct the vehicular crossing structure and move equipment across the creek. Mechanized equipment would not be operated or material discharged or placed within the boundaries of any U.S. waters as identified by the ordinary high water mark or edge of a wetland, unless authorized by a permit issued by the U.S. Army Corps of Engineers (Corps of Engineers).
- Only biodegradable vegetable-based hydraulic fluid would be used in excavators that may reach into Frijoles Creek.
- All fueling would occur more than 100 feet from any surface water in a location where a fuel spill would not be able to enter the water.
- To minimize possible petrochemical leaks from construction equipment, the contractor would regularly monitor and check construction equipment to identify and repair any leaks.
- Fuel and oil services for construction machinery would be provided in a designated area away from Frijoles Creek. This would include secondary containment for all fuel storage tanks and on-site availability of a spill kit.

Wildlife and Species of Concern

- Construction personnel would be instructed on appropriate behavior in the presence of wildlife and on proper storage and handling of food, garbage, and other attractants.
- Tree clearing would be conducted outside of the bird breeding season (May 1 to August 15 for migratory birds; March 1 to August 15 for the Mexican spotted owl) if feasible. If this is not feasible, field surveys for nesting birds/Mexican spotted owls would be conducted prior to tree removal. Tree removal would be conducted after 9 a.m.
- Additional conservation measures would be taken to protect the Mexican spotted owl:
 - Preconstruction surveys for Mexican spotted owl nesting would be conducted within ¼ mile of the project area prior to construction activities.
 - Removal of ponderosa pine trees for widening of Route 202 would occur prior to the Mexican spotted owl breeding season if feasible.
 - No night work would be allowed.
 - Monument staff would inform construction personnel of the occurrence and status of the Mexican spotted owl within the project area, the potential impacts construction activities may have on the species, and the potential penalties for taking or harming this species.

- 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.

Vegetation

- Disturbance to vegetation would be avoided as much as possible and contained to as small a footprint as possible while meeting project objectives. Tree removal would be limited to the minimum necessary for installation of a new vehicular crossing and road improvements.
- Construction equipment would be cleaned before entering the Monument to minimize the transportation of exotic seeds to the site. All equipment entering the Monument would be inspected and may be required to be pressure washed to remove foreign soil, vegetation, and other materials that may contain nonnative seeds or vegetation.
- Revegetation and recontouring of disturbed areas would take place following construction, and would be designed to minimize visual intrusions. Revegetation efforts would use native species to strive to reconstruct the natural spacing, abundance, and diversity of native plant species. All disturbed areas would be restored as nearly as possible to preconstruction conditions shortly after construction activities are completed.
- Nonnative invasive plant infestations near disturbed areas would be treated on a yearly basis for a minimum of three years following project completion.
 - Soil, duff, and litter from work areas would be salvaged prior to disturbance. Material would be stored in pile under tarp in shade and reapplied as soon as work is completed. Reclaimed areas would be watered with creek water to stabilize and promote growth.
 - Soil, duff, and litter would be applied after construction work is completed.
 - As needed, on steeper slopes, drainage patterns, or active creek banks geotextile erosion fabric (¼" natural hemp open mesh) and would be applied and secured with hardware staples.
 - Introduced seed or plant materials (even named native species) from commercial sources would not be used. Natural revegetation from native seed and root sources should be sufficient for revegetation. If the park biologist determines additional plant material is needed, it would be collected from local native seed and salvaged plant material.

Soils

- Disturbance to soils would be contained to as small a footprint as possible while meeting project objectives.
- Erosion-control measures that provide for soil stability and prevent movement of soils into waterways would be implemented.
- Topsoil would be salvaged, stored, and used to restore temporarily disturbed areas following construction.
- Any topsoil temporarily disturbed during construction would be aerated and replanted with native vegetation and mulched with native hay to reduce compaction and prevent erosion.

- To minimize the amount of ground disturbance, staging and stockpiling areas would be placed on previously disturbed land.

Hazardous Material

- A DDT sampling plan would be developed and the site would be tested for DDT and associated contaminants. If a level of 142 ppm or higher is detected through sampling, a treatment plan would be developed for areas potentially disturbed by construction.
- Construction workers involved in the removal of contaminated soil would wear protective clothing in accordance with Occupational Safety and Health Administration requirements.

Cultural Resources

- Known historic sites and isolated occurrences would be flagged and avoided during construction, and a NPS archeologist would be on-site during ground-disturbing activities, including trenching for installation of the water line.
- Should construction unearth previously undiscovered cultural resources, work would be stopped in the area of any discovery and the NPS archeologist would consult with the SHPO and the ACHP, as necessary, according to §36 CFR 800.13, *Post Review Discoveries*. In the unlikely event that human remains are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed.
- Monument staff would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting artifacts or intentionally damaging paleontological materials, archeological sites, or historic properties. Contractors and subcontractors would also be instructed on procedures to follow in case previously unknown paleontological or archeological resources are uncovered during construction.

Visitor Use and Experience

- Signs, press releases, and other communication methods would be used to inform visitors about construction, trail access, and traffic delays.
- Trail connections on the west side of Frijoles Creek would be maintained as feasible during construction.
- Contractor employees and subcontractors would not park vehicles in the visitor center parking lot for longer than 30 minutes within a day.

Air Quality and Soundscapes

- Fugitive dust generated by construction would be controlled as necessary by spraying water on the construction site.
- All construction motor vehicles and equipment would have mufflers conforming to original manufacturer specifications that are in good working order to prevent excessive or unusual noise, fumes, or smoke.
- To reduce noise and emissions, construction equipment would not be permitted to idle for longer than 15 minutes when not in use.

Public Health, Safety, and Park Operations

- Appropriate barriers and barricades would be used to clearly delineate work areas and provide for safe visitor travel through construction areas.

- Construction workers would wear appropriate attire such as hard hats, gloves, and goggles to protect themselves from natural hazards. Visitors would not be allowed into construction zones. Monument staff would also be required to wear protective gear when they are in the construction zone.
- Trucks hauling debris and other loose materials would be covered to maintain adequate freeboard to prevent spillage to paved surfaces.
- Emergency response protocols would be developed for implementation during construction. Construction activities would be conducted in accordance with established safety protocols.
- Employees and construction crews would be required to park their vehicles in designated locations.
- Construction workers and supervisors would be informed about the special sensitivity of Monument values, regulations, and appropriate housekeeping.

Alternatives Considered and Dismissed

The following alternatives were considered for project implementation, but were dismissed from further analysis, as described below.

Vehicular Crossing Location Options

Several vehicular crossing locations were evaluated based on a hydraulic analysis of Frijoles Creek (Blackler 2013). Locations considered, but dismissed, included the site of the old bridge near the visitor center, a site upstream from the old bridge, and a site farther downstream. Replacement of the crossing at the old bridge location or farther upstream would have greater risk for backing up flood flows and impacting the visitor center and other components of the Historic District. A crossing location downstream from the proposed location would reduce the risk of visitor center flooding, but would have greater environmental and possible cultural resource effects because a new longer road would need to be constructed.

Vehicular Crossing Design Options

Alternative vehicular crossing designs were considered, including a large span bridge or arched culvert. While these types of bridges would adequately convey normal flows, they are more likely to catch debris during flood events that would back up water and increase the risk of flooding the visitor center and damage to other Monument facilities. The proposed low-profile box culvert crossing in Alternative B was determined to be the best design for minimizing the risk of flood damage, thus alternative designs were eliminated from further analysis.

Temporary Vehicular Bridge

Installation of a temporary seasonal bridge for vehicle use at the location of the old bridge was considered, but dismissed. Installation of a seasonal bridge with removal during flood risk months would not meet the project purpose and need. New bridge abutments would need to be constructed and a temporary bridge would not allow the Monument to provide year-round access for visitors or Monument maintenance and emergency services.

Pedestrian Bridge Design Options

Construction of a strongly reinforced pedestrian bridge designed to withstand flood flows was considered, but dismissed because of concern that this type of bridge would capture logs and other debris during flood events that could impact the visitor center and Monument facilities.

Alternative Summaries

A comparison of the alternatives and the degree to which each alternative fulfills the needs and objectives of the proposed project is summarized in Table 2.

Table 2. Environmental Impact Summary by Alternative.

Impact Topic	Alternative A – No Action	Alternative B – Bridge Replacements with Road Repairs, and Improvements
Geology and Soils	No direct disturbance to geology or soil resources would occur under the no action alternative because this alternative does not include any construction-related ground disturbance.	Construction activities would adversely affect soils in the project area as a result of grading, excavation, compacting, paving over soils, removing soils, and removing vegetation. The total area of long-term soil impacts from new and widened roads would be about 0.69 acre. A variety of BMPs would be used to protect soils during and following construction.
Floodplains	With no new construction activities, there would be no new effects on floodplains. Periodic storm events could result in additional flooding in the visitor center area, particularly until the upstream watershed recovers from wildfire.	Construction-related activities may temporarily adversely affect floodplains as a result of increased sedimentation into Frijoles Creek; however, BMPs would be implemented to minimize the effects. The proposed action would provide increased conveyance of flood flows and reduce the likelihood of flooding of historic structures. The new stream crossings would be designed to avoid scouring, deposition, and other damage to the floodplain.
Cultural Landscapes	With no new construction activities, the Bandelier National Monument Cultural Landscape; its four component landscapes (Bandelier Backcountry, Tsankawi, Frijoles Canyon Historic District, and the CCC Historic District) would not be physically affected. However, the historic and pre-flooding pattern of vehicular traffic access to the west side of Frijoles Creek would not be restored.	Construction activities would cause adverse impacts on the Bandelier National Monument Cultural Landscape, the Frijoles Canyon Historic District, and the Bandelier CCC Historic District (component landscapes). While the historic and pre-flood pattern of vehicular access to the west side of Frijoles Creek would be restored in this alternative, construction of the vehicular crossing, improvements to Routes 201 and 202, and changes to the entrance road would result in physical disturbance to the Cultural Landscape within the Historic Districts. The addition of nonhistoric pedestrian bridges and temporary construction activities would introduce new nonhistoric elements, along with altering the historic circulation pattern. A draft MOA outlining measures to mitigate the adverse effects of the preferred alternative is included in Appendix C.

Impact Topic	Alternative A – No Action	Alternative B – Bridge Replacements with Road Repairs, and Improvements
Species of Special Concern	There would be no effect on the Mexican spotted owl or other federally listed species because there would be no construction disturbance or habitat loss.	Construction-related noise and disturbance could deter Mexican spotted owl activity in the project area. This would have a short-term impact on foraging and roosting habitat and no impact on nesting habitat. Removal of less than 20 trees and other habitat loss would have a long-term impact on available roosting habitat. With implementation of conservation measures, the proposed action may affect, but is unlikely to adversely impact, the Mexican spotted owl or critical habitat. There would be no effect on other federally listed species. A Biological Assessment is included in Appendix B.
Visitor Use and Experience	How visitors use and experience a portion of the Monument would be adversely affected under the no action alternative. If the vehicular bridge is not replaced, visitors would no longer have motor vehicle access to the picnic area and parking on the west side of Frijoles Creek. Total parking capacity near the visitor center would be reduced about 40%. The picnic area and restroom on the west side of Frijoles Creek would remain closed. Pedestrian access across Frijoles Creek would be limited to the one bridge near the visitor center parking lot. The damaged entrance road shoulder would not be repaired.	Restoration of facilities would return the quality and opportunities for recreation on the west side of Frijoles Creek to what they were prior to flood damage. This would have a long-term beneficial effect on the quality of the visitor experience. Access to visitor facilities on the west side of Frijoles Creek lost as a result of flooding would be restored by construction of new crossing structures and bridges. Parking, picnic areas, restroom facilities, and drinking fountains would be repaired and restored. Construction work would have a short-term adverse impact on the quality of the visitor experience from noise, dust, disturbance, and traffic delays.

Environmentally Preferable Alternative

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

Overall Alternative A (no action) is the environmentally preferable alternative because there would be no activities that would disturb elements of the biological and physical environment. With no new construction of a vehicular crossing of Frijoles Creek and access road, repairs to Routes 201 and 202, installation of two pedestrian bridges, and new water line, this alternative best protects and preserves natural resources. Existing conditions would be maintained and no new adverse effects on the environment would occur. This alternative would not involve new construction or any other development that could disturb existing natural and cultural resources. However, not repairing the eroding entrance road shoulder above a historic culvert may lead to additional erosion, damage to the CCC stone culvert headwall, and continued soil

erosion and public safety concerns. In addition, Alternative A would not restore the historic vehicle circulation pattern to the picnic area, which is a component of the Historic District.

NPS Preferred Alternative

No new information came forward from public scoping or consultation with other agencies to necessitate the development of any new alternatives, other than those described and evaluated in this document. While Alternative B is not the environmentally preferable alternative, it better accomplishes the project purpose and need and objectives of the proposal and would not substantially impact natural or cultural resources. With thoughtful BMPs in place, Alternative B better achieves a balance between visitor use and enjoyment and conservation of Monument resources and, therefore, is considered the NPS preferred alternative.

AFFECTED ENVIRONMENT

This chapter describes the affected environment (existing setting or baseline conditions) and a description of the resources potentially affected by the alternatives. It is organized by impact topics that were derived from internal NPS and external public scoping. This section describes only those environmental resources that are relevant to the decision being made and does not describe the entire existing environment; only those environmental resources that could be affected by the alternatives, if they were implemented, are discussed. This section, in conjunction with the description of the "no action" alternative, forms baseline conditions for determining the environmental impacts of the proposed action.

Geology and Soils

The Monument is in the Jemez Mountains, an area with a long history of volcanic activity (NPS 2007). The Monument is at the southern end of the Pajarito Plateau that was formed by volcanic eruptions 1.6 to 1.4 million years ago. Much of the plateaus and cliffs are composed of ash fall, pumice, and rhyolite tuff referred to as Bandelier Tuff. The Monument ranges in elevation from 5,340 feet at the Rio Grande to the south to 10,199 feet at the summit of Cerro Grande. Frijoles Creek drains the steep narrow canyon off the side of the Jemez Caldera Rim. Deposits along Frijoles Creek are composed of Quaternary gravels of alluvial material deposited by stream flow and flood events over time.

The Monument contains several soil types (NPS 2007). Soil characteristics such as depth, texture, and erodibility vary with parent material; position on the landscape; and slope. The soils typically have high infiltration rates because of the abundance of highly porous volcanic parent material. Erosion hazard can range from moderate to severe depending on slope, vegetation, and ground cover. Although infiltration rates of undisturbed soils are high, soils can become saturated and runoff and erosion can be high during large precipitation events. The wildfire in the upper watershed that destroyed much of the overhead vegetation substantially increased the potential for erosion and runoff. Infiltration rates in severely burned areas typically decrease with the formation of hydrophobic soils that reduce permeability and increase runoff.

In 1989, the NPS discovered the presence of DDT contaminated soils in the tissues of fish and invertebrates in Frijoles Creek. Subsequent soil sampling in 1995 indicated the presence of DDT in the soils near the maintenance compound near the proposed project area. An ecological and human health risk assessment conducted at that time determined that remediation of the DDT contaminated soils in the identified areas was not warranted on the basis of ecological risk and potential human health impacts based on federal laws and standards (NPS 1996). The presence of DDT in the disturbance area for the proposed project is unknown.

Floodplains

The climate at the Monument is characterized as a semiarid, continental mountain climate, with significant variability due to the range in elevation and topography within the Monument (Weeks 2007). Precipitation events are often localized and vary considerably along the length of the long drainage canyons within the Monument (Mott 1999). At the Firetower weather station, located near the project area, annual precipitation measured between 2001 and 2013 varied from 5.8 inches in 2012 to 17.4 inches in 2004, and averaged 11.7 inches. Late April through June is typically the driest period. July, August, and September are typically the wettest months, when large convective storms occur.

Frijoles Creek is the largest stream in the Monument. Its drainage area is 19.8 square miles (nearly all within the Monument), average baseflow is about 1 cfs, and it flows perennially from its headwaters in the Sierra de los Valles to its confluence with the Rio Grande (Weeks 2007). Frijoles Creek gains water from shallow ground water and from faults that discharge bedrock ground water to the stream. Other sources of flow are runoff from snowmelt and precipitation events. The U.S. Geological Survey (USGS) operates a stream gage at a location about 3,600 feet upstream of the Monument’s headquarters. Flow data collected from 1983 to 1996 and from 2012 to 2014 show that flows typically range between 1 and 10 cfs. Table 3 provides information on large storm events recorded at the Firetower weather station since 1991 and peak flows measured in Frijoles Creek at the USGS gage.

Table 3. Large Precipitation Events and Peak Streamflows on Frijoles Creek in the Monument.

Precipitation Event Period	Total Precipitation at Firetower Station (Inches)	Date of Peak Stream Flow	Peak Stream Flow at USGS Gage (cfs)
7/22/1991 to 8/20/1991	5.88	NA	NA
4/2/2004 to 4/11/2004	3.08	NA	NA
7/28/2009 to 7/29/2009	2.91	NA	NA
8/21/2011	0.96	8/21/2011	Estimate of 7,000 ¹
7/25/2013 to 7/26/2013	1.44	7/26/2013	5,410
9/10/2013 to 9/15/2013	7.20	9/12/2013	2,140
NA	NA	7/19/2014	1,040

¹ Peak flow estimate is from indirect measurement. Center of storm event that caused this flood may have occurred farther upstream than Firetower weather station.

According to Neary (1995), “wildfire in southwestern environments affects the quantity of water derived from a watershed by reducing interception, storage, transpiration, and infiltration, and increasing overland flow, and surface storm flow. Watershed response to storm events is greater with shortened time to peak-flow and a greater susceptibility to flash floods. Total water yields from burned watersheds are higher. The magnitude of measured water yield increases the first year after the fire disturbance and can vary greatly at one location or between locations depending on the fire intensity, climate, precipitation, geology, soils, watershed aspect, tree species, and proportion of the forest vegetation burned. Watershed recovery can vary from a few years to decades. Wildfires generally produce higher sediment yields than other forest disturbances. After fires, turbidity can increase due to the suspension of ash and soil particles. The increased erosion and peak flows can also increase bed loads.” Surface infiltration of precipitation may also be reduced due to ash accumulation and because the heat of the fire physically alters the surface permeability and destroys vegetation (Corps of Engineers 2014), resulting in increased runoff.

The magnitude of the peak flows has less to do with the size of the precipitation event than the condition of the watershed (Mott 1999). Wildfires in and adjacent to the Monument have burned large areas and have increased peak flows and the rate of erosion and sediment movement to the channel of Frijoles Creek. The post-burn hydrograph is flashier, with sharper, steeper limbs (Mott 1999). The channel, banks, and floodplain of the stream have been altered due to the large flood flows and resulting sediment movement. The July 2011 Las Conchas fire burned more than 80% of the Frijoles Creek watershed and left the area vulnerable to post-fire flooding. The impacts of erosion have included landslides, debris flows, channel scouring, undercutting of canyon walls, widening and movement of the channel, aggradation of sediment in the channel, and the transport and deposition of large rocks in the channel. After large fires occurred at the Monument in 1977 and 1996, it was observed that as vegetation reestablished itself during the second year after the fire, annual maximum peak flows began to decrease, and by the third year

had decreased further, but remained about three to five times greater than pre-fire maximum peak flows. More than 20 years after these fires occurred, flood magnitudes remained greater than prior to the fires (Veenhuis 2002).

The Corps of Engineers has computed post-fire peak discharges for Frijoles Creek (Corps of Engineers 2014) (Table 4).

Table 4. Computed Peak Discharges on Frijoles Creek Downstream of the Visitor Center.

Recurrence Interval	Peak Flow (cfs)
1-year	4,030
100-year	18,070
500-year	23,630

Removed vehicular and pedestrian bridges on Frijoles Creek were within the floodplain. Portions of the existing visitor center parking lot, the visitor center, picnic area, trails, and other infrastructure are located in or near the floodplain and have been affected by flooding in the past.

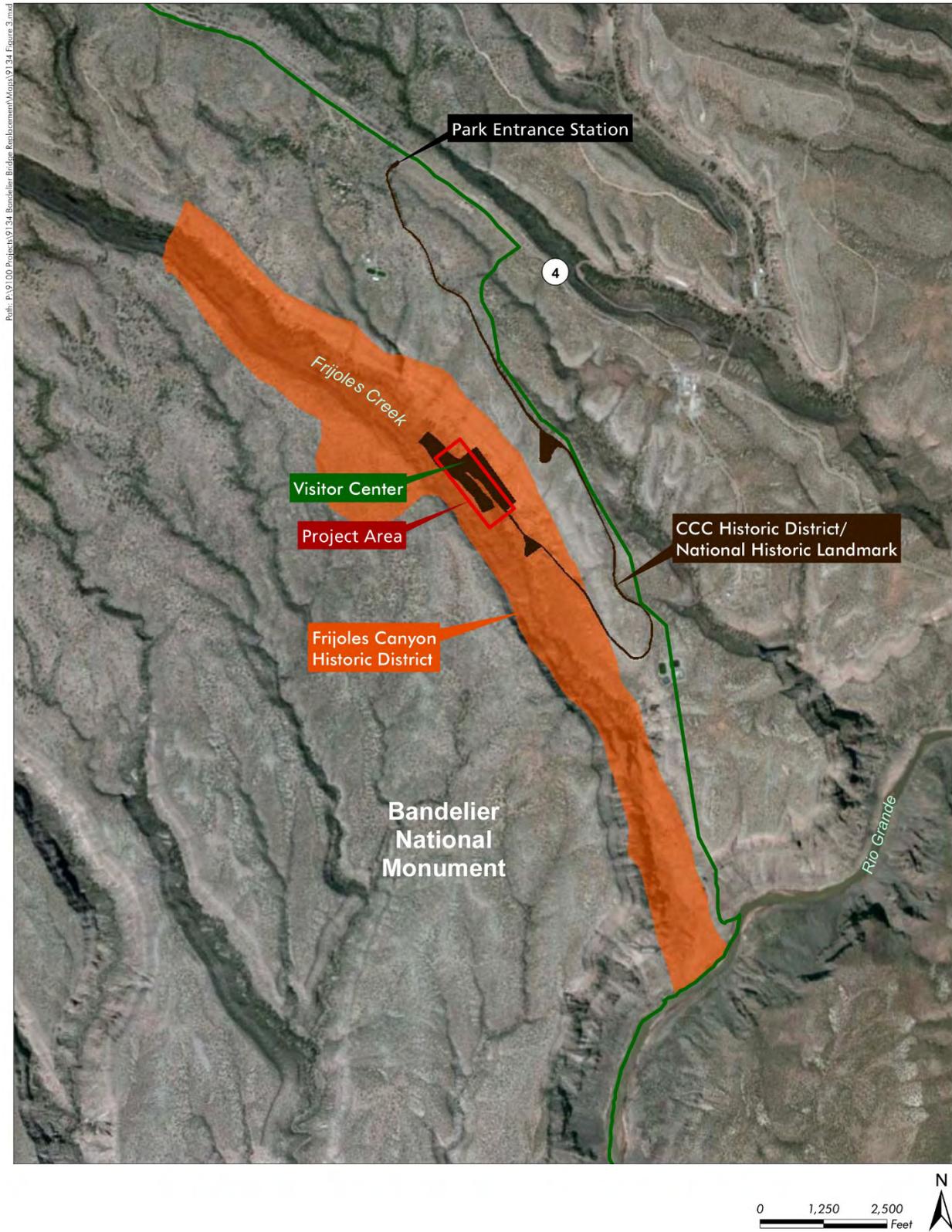
Cultural Landscapes

The NPS has identified and documented the entire Monument as the Bandelier National Monument Cultural Landscape. The monument-wide "parent" landscape is composed of four component landscapes: 1) Bandelier Backcountry, 2) Frijoles Canyon Historic District, 3) Tsankawi Historic District, and 4) the CCC NHL Historic District (NHL 87001452). The CCC NHL Historic District became an NHL in 1987, and is composed of the CCC-era complex that forms the current administrative, residential, and maintenance complex for the Monument and the Entrance Station and Entrance Road. The Frijoles Canyon Historic District includes most of the CCC NHL Historic District and extends further to the north into the canyon and further south to the Rio Grande to include a broader range of prehistoric and historic sites that have experienced heavy human use throughout time (NPS 2006) (Figure 4).

Frijoles Canyon is a narrow steep-sided canyon with a perennial stream (Frijoles Creek) and a variety of plant communities located within the Monument. The canyon has many prehistoric and historic structures and features that evidence a complex history of human use including Paleo-Indian, Archaic, and Ancestral Puebloan cultures, scholars, explorers, Hispano, Pueblo, and Anglo grazers, farmers, and homesteaders, U.S. Forest Service, NPS, New Deal Era public works employees, employees of the Manhattan Project, regional residents, tourists, and nearby pueblos with ancestral ties to the prehistoric residents of the canyon (NPS 2006). The Frijoles Canyon component landscape was found eligible as a Historic District in 2006 and its period of significance for the Frijoles Canyon component landscape is 1150 to 1976. The Frijoles Canyon component landscape/Historic District is eligible for listing in the National Register of Historic Places under:

- Criterion A (association with events that have made a significant contribution to the broad patterns of our history);
- Criterion B (association with the lives of persons significant in our past);
- Criterion C (embodies distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possess high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction); and
- Criterion D (has yielded, or may be likely to yield, information important in prehistory or history).

Figure 4. Frijoles Canyon Historic District and CCC National Historic Landmark District



Structures and features within the project area that are contributing to the Frijoles Canyon Historic District include all CCC structures described previously, and the Falls Trail (LCS 839724), Main Loop Trail (LCS 841593), Frijoles Canyon Alcove House Trail (LCS 841574), El Rito de los Frijoles, native vegetation and ecosystem, Nature Trail, Old Nature Trail below the backpacker parking lot/CCC campground, and views of natural features and the historic district. Structures and features within the project area that are contributing to the Bandelier CCC Historic District cultural landscape include all CCC structures listed above, and the Cottonwood Bosque and Riparian Corridor, Frijoles Canyon, pattern of using native landscaping to blend the development with the surrounding natural features, use of masonry walls, use of the Parking Plaza as a central plaza for the district, use of boulders to delineate parking spaces in the former campground, rustic and Pueblo-Revival style architectural and landscape features, and regional southwestern elements.

The Bandelier CCC Historic District consists of 31 Pueblo-Revival style buildings and associated landscape areas, which mimicked a typical small New Mexico village. All of the buildings were designed by the NPS and constructed by the CCC and provided a range of uses from office space and employee housing to guest lodging and a visitor center. The Frijoles Canyon Lodge was also appropriated by the U.S. government during World War I to house employees of the Manhattan Project. Also included in the Bandelier CCC Historic District are the entrance road and minor structures such as stone water fountains and faucets in the former campground. Within the proposed project area, a culvert (beneath the entrance road) with a stone/masonry headwall constructed by the CCC was eroded by the recent flooding and the proposed action may affect this historic structure.

The original circulation pattern in the historic district included primary access for vehicular traffic via the entrance road and secondary access via paved pedestrian paths that linked the four use areas (campground, lodge and administrative area, maintenance area, and residential area) (NPS 1987). The Bandelier CCC Historic District has changed very little since the 1930s (NPS 2006). The period of significance for the Bandelier CCC Historic District is 1933 to 1941.

Species of Special Concern

Federally listed threatened, endangered, proposed, and candidate species potentially occurring in the action area are presented in Table 5. The Mexican spotted owl is the only federally listed threatened, endangered, candidate, or proposed species with the potential to occur in the action area. There is no suitable habitat or the project area is outside of the known range for the other federally listed species.

The USFWS listed the Mexican spotted owl as threatened on March 16, 1993 (58 CFR 14248). The Mexican spotted owl ranges throughout Utah and portions of Colorado, Arizona, Texas, New Mexico, and Mexico. The nesting season for the Mexican spotted owl is March 1 through August 31, during which time a mated pair may defend a breeding territory. Mexican spotted owls nest on cliff ledges and caves, in stick nests built by other birds, on debris platforms in trees, and in tree cavities (Ganey and Balda 1989). In the Monument, Mexican spotted owls nest exclusively in rock cavities and use trees for roosting. The project area is within critical habitat unit SRM-NM-4, which totals 57,297 acres. The entire Monument (33,727 acres) is within designated critical habitat for the Mexican spotted owl, although not all designated critical habitat at the Monument is suitable for the Mexican spotted owl.

NPS staff have conducted Mexican spotted owl surveys at the Monument for more than 20 years. The nearest known protected activity center (PAC) to the action area is about 2 miles away. The project area has been surveyed annually since 2002 and no Mexican spotted owl

has ever been observed at the Monument during these surveys and no responses have been noted to pre-dawn calling (Fettig, pers. comm. 2014). The project area is not suitable nesting habitat since it lacks cliffs with eroded pockets typically used by nesting Mexican spotted owls in the Jemez Mountains. The project area does contain potential roosting and foraging habitat in the riparian area along Frijoles Creek. It is possible that a dispersing or roosting Mexican spotted owl could occasionally use this habitat; however, the owl would not be expected to remain in the area for long, and there are no records of Mexican spotted owls in the action area.

Table 5. Threatened, Endangered, Candidate/Proposed Species and the Potential to Occur in the Project Area.

Species Common and Scientific Name	Status ¹	Potential to Occur in the Project Area	Rationale for Exclusion ²	Habitat Description and Range
FISHES				
Rio Grande silvery minnow <i>Hybognathus amarus</i>	E	No	ODR	Occupies a variety of habitats in low-gradient large streams with shifting sand or silty bottoms. Not known to be present along the Rio Grande reach adjacent to the Monument's southeastern boundary.
AMPHIBIANS AND REPTILES				
Jemez Mountains salamander <i>Plethodon neomexicanus</i>	P	No	ELE, HAB	Restricted to the Jemez Mountains in northern New Mexico in Los Alamos, Rio Arriba, and Sandoval Counties. The action area is outside the elevation range of this species.
MAMMALS				
New Mexico jumping mouse <i>Zapus hudsonius luteus</i>	E	No	ODR, HAB	In the Jemez Mountains, this species uses wetlands with tall dense herbaceous vegetation, especially sedges, on perennially moist soil. No suitable habitat for this species is present in the action area. The nearest known population is 15 miles away, on the other side of the mountains from the action area.
BIRDS				
Mexican spotted owl <i>Strix occidentalis lucida</i>	T, CH	Yes		This species is found in steep-sided canyons with old-growth mixed conifer forests. Nesting occurs on cliff ledges or caves along canyon walls in shady/cool canyons. Known to occur in the action area.
Southwestern willow flycatcher (SWFL) <i>Empidonax traillii extimus</i>	E	No	HAB	The action area is not suitable habitat for this species. SWFL likely occurs along the Rio Grande, although no nesting has been documented.
Yellow-billed cuckoo <i>Coccyzus americanus</i>	T	No	HAB	In the western U.S., this species breeds in large blocks of riparian habitats, particularly woodlands with cottonwoods (<i>Populus fremontii</i>) and willows (<i>Salix</i> sp.). This species has never been documented at the Monument, and the action area does not provide suitable habitat.

The U.S. Fish and Wildlife Service species list (USFWS 2014) was obtained and reviewed and species not having the potential to occur were excluded from further review with a no effect determination.

¹**Status Codes:** E=federally listed endangered; T=federally listed threatened; C=federal candidate for listing; P=federally proposed for listing; and CH=designated critical habitat.

²**Exclusion Rationale Codes:** ODR=outside known distributional range of the species; HAB=no habitat present in analysis area; ELE=outside of elevation range of species; and SEA=species not expected to occur during the season of use/impact.

Visitor Use and Experience

The Monument offers a variety of natural resources, cultural resources, scenic resources, and recreational opportunities for visitors to enjoy. The Monument has averaged about 225,000 visitors per year over the last decade, although visitation decreased over the last several years due to wildfires. In 2013, visitation was 125,000. The highest visitation is between May and September. Monthly visitation ranges from about 4,000 to more than 30,000 during peak visitation. To address traffic congestion during busy periods, the Monument partnered with Los Alamos County and Atomic City to provide shuttle bus service from the White Rock Visitor Center to Frijoles Canyon. The shuttle service is temporary, and long-term strategies to address the Monument's transportation issues are currently being studied. Visitors before 9:00 a.m. and after 3:00 p.m. may drive into the Monument. At other times visitors are required to take the shuttle.

The Monument provides a number of recreational and educational experiences for visitors. Typically visitors start at the visitor center in Frijoles Canyon where information and exhibits are available about the history of the Monument and ways to explore it. Other than the entrance road and short spur roads into the picnic area, there are few other roads in the Monument. Most visitors enjoy the Monument by hiking on some of the 70 miles of trails. Trails access backcountry natural areas and archeological sites located along the canyon. The main loop trail is a popular self-guided trail that provides access to Alcove House, cliff dwellings, and other historic features. Prior to the flood that required removal of the vehicular bridge across Frijoles Creek, visitors could access the picnic area by vehicle. A temporary pedestrian bridge provides access to trailheads on the west side of Frijoles Creek, but the picnic areas have not been restored following flooding because of the lack of vehicle access. There is no lodging in the Monument, but the Juniper Campground located on top of the mesa provides overnight camping. Ponderosa Campground on top of the mesa on the north side of the Monument provides group camping.

ENVIRONMENTAL CONSEQUENCES

Introduction

This section contains the environmental impacts, including direct, indirect, and cumulative effects for each alternative. The analysis is based on the assumption that the mitigation measures and BMPs described in the Alternatives section of this EA would be implemented for the preferred alternative. Overall, the NPS based these impact analyses and conclusions on the review of existing literature and studies, information provided by experts within the Monument, other agencies, professional judgment and Monument staff insights, and public input.

Direct, indirect, and cumulative effects are analyzed for each resource topic carried forward. which requires considerations of impact type, context, and duration as defined below:

- **Type** describes the classification of the impact as either beneficial or adverse, direct, or indirect:
 - *Beneficial*: A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
 - *Adverse*: A change that moves the resource away from a desired condition or detracts from its appearance or condition.
 - *Direct*: An effect that is caused by the action and occurs in the same time and place.
 - *Indirect*: An effect that is caused by the action but is later in time or farther removed in distance, but is still reasonably foreseeable.
- **Context** describes the area or location in which the impact would occur. Effects may be site-specific, local, regional, or even broader.
- **Duration** describes the length of time an effect would occur – either short-term or long-term:
 - *Short-term* impacts generally last only during construction, and the resources resume their preconstruction conditions following construction.
 - *Long-term* impacts last beyond the construction period, and the resources may not resume their preconstruction conditions for a longer period of time following construction.

Cumulative Impact Scenario

The CEQ regulations that implement NEPA 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 both the no action and preferred alternatives.

Cumulative impacts were determined by combining the impacts of the actions included in the alternatives with other past, present, and reasonably foreseeable future actions. Therefore, it is necessary to identify other past, present, or reasonably foreseeable future projects at the Monument that could result in cumulative impacts. Because the scope of this project is relatively small, the geographic and temporal scope of the cumulative analysis is similarly small. The geographic scope for this analysis includes actions within the Monument's boundaries, while the temporal scope includes projects within a range of approximately 10 years. The past and future

projects described below were identified for the purpose of conducting the cumulative effects analysis:

Past and Current Actions

Fires in the upper Frijoles Creek watershed necessitated removal of the vehicular bridge and two pedestrian bridges near the visitor center.

Flooding and the risk of future flooding also necessitated the installation of sandbag retaining walls along a section of Frijoles Creek at the visitor center. The retaining walls will remain in place until the potential for extreme flooding diminishes.

Future Actions

The Monument is planning to replace the existing primary and secondary electrical systems in Frijoles Canyon to provide the Monument with a reliable electrical system. This project would require about 2.3 miles of trenching to install new electrical system conduit. The project would extend along the entrance road with components of the new system serving offices, the visitor center, and other facilities in the Monument. Short-term ground disturbances for the electrical system would occur after the proposed bridge and road work is completed.

The Monument is currently preparing a Transportation Plan and EA to address potential solutions to transportation issues associated with limited parking, traffic congestion, safety, and resource impacts. The Monument is looking at a number of options in cooperation with local communities and the public.

The Monument is considering a channel stabilization effort along about 1,500 feet of Frijoles Creek in the developed area near the visitor center and parking lot. A number of structural measures and riparian vegetation plantings are being considered to improve channel morphology and address degradation of the channel due to post-fire flooding. These measures are intended to improve aquatic habitat and reduce the potential for damage to Monument infrastructure during future flood events. This work would be conducted after the proposed actions described in this EA.

Geology and Soils

Impacts of Alternative A – No Action

No direct disturbance to geology or soil resources would occur under the no action alternative because this alternative does not include any construction-related activities, excavation, or ground disturbance. Flood-deposited sediment on asphalt roads in the picnic area would not be removed. This material would likely wash into Frijoles Creek during precipitation events and would be dispersed by winds. Periodic flood events would continue to transport sediment and shape the morphology of Frijoles Creek.

Cumulative Effects – Past actions from the removal of the vehicular and pedestrian bridges resulted in minor soil disturbance, but reduced the potential for flood damage. The temporary flood barriers installed between Frijoles Creek and the visitor center influenced flood flows and may have affected the location of sediment deposition. Installation of a 2.3-mile new buried electrical system would result in temporary soil disturbances with only slight adverse impacts following construction and revegetation. Future plans for stabilization of 1,500 feet of Frijoles Creek have the potential to reduce erosion, sedimentation, and loss of soil material from bank erosion. Overall, these past, current, and future actions would contribute beneficial effects on geology and soils by removing impediments to streamflow and stabilizing the channel. Because the no action alternative does not involve any ground disturbances, it would not incrementally add to the beneficial cumulative effects.

Impacts of Alternative B (Preferred) – Bridge Replacements with Road Repairs, and Improvements

Construction of the new Frijoles Creek crossing and access road would require earthwork to prepare the road base and channel work to install the box culvert. These activities would require disturbance to soils and excavations to bedrock to anchor the crossing structure. Much of the new crossing access road would be located within an area of previous disturbance, but construction work would impact about 0.22 acre of soil resources and increase the potential for erosion and sedimentation in Frijoles Creek until disturbed areas are stabilized and revegetated. There would be a long-term loss in soil productivity within the footprint of the new paved road and short-term disturbance of soil from construction activities. Soil sampling would be conducted within the footprint of proposed new ground disturbances to determine the presence of DDT prior to initiating earthwork. Results of sampling would be used to determine if any remedial action or safety precautions should be implemented prior to or during construction.

Repairs to flood-damaged Routes 201 and 202 and widening of Route 202 also would result in short- and long-term disturbance to soils. Recently deposited sediment from flooding is covering much of these roads, and this material would be hauled away or used as road base in road repairs. Widening of Route 202 would result in a long-term loss of soil productivity on about 0.47 acre. Incidental short-term soil disturbance would also occur during road repairs and would be stabilized and revegetated following construction. The additional impervious surface from the new road and slight widening of Route 202 would have a small adverse effect on potential soil erosion as a result of additional runoff. Installation of the new water line within the road bed would require about 1,500 feet of trenching into soil material currently under the existing asphalt road with a connection to the water line on the east side of Frijoles Creek. Water line construction would have no long-term effect on soils.

Installation of new pedestrian bridges would disturb soils at the bridge abutments on each side of Frijoles Creek. Construction of the picnic pedestrian bridge would require removal of the existing abutments and construction of new abutments for the span bridge. The work on abutments would require short-term disturbance to the soils on Frijoles Creek streambanks. Repairs to the trail connections on either end of the bridge would also result in small areas of soil disturbance, primarily within areas of previously existing disturbance. Limited soil disturbance is anticipated for installation of the bridge from the parking lot since the existing abutments and trail require minimal repair.

The total area of long-term soil impacts from new and widened roads would be about 0.69 acre. A variety of BMPs would be used to protect soils during and following construction. Soil protection and erosion-control measures include possible use of silt fencing, couloir logs, mulch, and revegetation.

Cumulative Effects – The cumulative effects on geology and soils would be the same as under Alternative A except that Alternative B would introduce short- and long-term adverse impacts on geology and soils from construction disturbance. Considering the impacts on geology and soils from Alternative B in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effects on geology and soils would remain beneficial with a slight adverse contribution from Alternative B.

Floodplains

Impacts of Alternative A – No Action

Alternative A would not impact the floodplain because there would be no change to existing conditions. With no construction-related activities, excavation, ground disturbance, new stream

crossing, road or parking lot improvements, there would be no change to existing floodplain characteristics and values. The existing temporary pedestrian bridge near the parking lot would be removed if flooding is anticipated or would likely break away during high flows and would not impact the amount of flooding or other Monument structures or resources.

Cumulative Effects – The removal of the vehicular and pedestrian bridges near the visitor center has beneficially affected the floodplain by removing structures that would impede passage of flood debris that could impact the visitor center and other Monument structures. The installation of sandbag walls along Frijoles Creek at the visitor center may adversely affect the floodplain by rerouting the natural flow of flood water and increasing the velocity of the flood flow, which may result in increased flood damage downstream. Future installation of the new electrical system conduit would occur mostly outside of the floodplain with negligible adverse impacts on the floodplain. A future channel stabilization project for Frijoles Creek is being considered to restore the function and form of the creek, stabilize the bed and banks, increase habitat diversity by planting riparian vegetation, and improve aquatic habitat. This project would beneficially affect the floodplain by restoring it, as much as possible, to pre-fire conditions. These activities have and would appreciably affect the floodplain characteristics and values of Frijoles Creek. Cumulative effects on floodplains would be beneficial and long-term. Because Alternative A would result in no change to the floodplain, it would not contribute to the overall cumulative effects on floodplains.

Impacts of Alternative B (Preferred) – Bridge Replacements with Road Repairs, and Improvements

Alternative B would result in an overall long-term benefit from past conditions when the vehicular bridge and pedestrian crossing structures impeded flood flows, increasing the potential for flood damage to nearby structures. Floodplain effects for each of the project components are described below. Appendix A contains a floodplain statement of findings for Frijoles Creek.

New Vehicular Crossing – Construction activities could introduce pollutants and increase sedimentation into the stream and decrease water quality in the short term; however, BMPs would be used to reduce adverse effects. The new vehicular crossing would not impede flood flows or catch flood debris, and would be designed to avoid erosion, scouring, deposition, and other damage to the floodplain.

Picnic Area Pedestrian Replacement Bridge – During construction, pollutants and sediment could be introduced into the stream and decrease water quality in the short term; however, BMPs would be used to reduce adverse effects. The new bridge would not restrict flood flows and would be designed to avoid erosion, scouring, deposition, and other damage to the floodplain.

Parking Lot Pedestrian Bridge – The proposed timber bridge would be designed to break away at high flows and not obstruct flood flows or capture flood debris. The effects would be the same as described for the new picnic area pedestrian bridge.

Roads – The new road to the vehicular crossing and the widening of Route 202 would increase the impervious surface area in the floodplain by about 0.69 acre. Removal of the asphalt pavement to the previous vehicular bridge and part of Route 202 would reduce the impervious surface area by 0.01 acre. The net effect would be a slight long-term increase in impervious surface and runoff that would have negligible adverse effects on the floodplain or contribute to flooding in Frijoles Creek. The buried water line within Routes 201 and 202 would have no long-term effect on the floodplain and the portion of the line that crosses Frijoles Creek at the picnic pedestrian bridge would be buried under the channel and anchored to bedrock.

Repairs to the entrance road at the culvert headwall are on an intermittent drainage, but would be outside of the Frijoles Creek floodplain. Repair of this section of road would not directly impact a floodplain, but stabilizing this area would prevent further erosion that could adversely impact the Frijoles Creek floodplain.

Staging and Stockpiling Areas – Temporary construction staging and stockpiling areas would be located in existing disturbed areas in the Monument outside of the 100-year floodplain. Any fill material needed would come from outside the Monument and disposal of any material would be outside of the Monument. Construction equipment may park in the existing parking lot within the floodplain, but could be readily moved if flooding is anticipated.

Cumulative Effects – The cumulative effects on floodplains would be the same as under Alternative A except that Alternative B would result in short-term direct adverse effects on the floodplain, as well as short-term and long-term beneficial effects on the floodplain, thereby incrementally adding to the overall beneficial cumulative effect on floodplains.

Cultural Landscapes

Impacts of Alternative A – No Action

Alternative A would not impact the Bandelier National Monument Cultural Landscape, the Frijoles Canyon component landscape, or the Bandelier CCC Historic District. Alternative A also would not impact any of the eight archeological sites in proximity to the project area. With no construction-related activities, excavation, ground disturbance, repairs or improvements, or new features introduced into the landscape, there would be no change to the existing conditions of the Bandelier Cultural Landscape, the Frijoles Canyon component landscape, or the Bandelier CCC Historic District. However, pre-flood and historic vehicular access to the west side of Frijoles Creek would remain unavailable.

Cumulative Effects – Past actions include installation of the temporary pedestrian bridges and installation of sandbag walls on the west side of the visitor center. Reasonably foreseeable future projects include replacement of the Frijoles Canyon electrical system, development of a transportation plan, and a Foundation Document that provides guidance Monument planning and management. Overall, past, present, and reasonably foreseeable future activities have or would result in a mix of beneficial and adverse impacts on historic properties, all of which, cumulatively, are less than significant. Because Alternative A would result in no change to cultural landscapes, it would not contribute to the overall cumulative effect on cultural landscapes.

Impacts of Alternative B (Preferred) – Bridge Replacements with Road Repairs, and Improvements

Implementation of Alternative B would adversely impact the Bandelier Cultural Landscape, the Frijoles Canyon component landscape, and the Bandelier CCC Historic District component landscape. Alternative B would not impact any of the eight archeological sites in proximity to the project area. Construction of the vehicular crossing and changes to the entrance road would introduce new nonhistoric elements in these cultural landscapes and alter the historic circulation pattern. However, historic and pre-flood vehicular access to the west side of Frijoles Creek would be restored.

Short-term impacts related to construction would be adverse and would include the temporary use of a bypass culvert or coffer dam for installation of the vehicular crossing structure, introduction of temporary increased noise and decreased air quality in the cultural landscapes, as well as the visual intrusion of construction vehicles and workers. BMPs, including designing

these new structures to be historically sensitive to the existing historic properties and not allowing construction vehicles to idle, would help minimize temporary adverse effects.

New Vehicular Crossing and Access Road – Construction of a new Frijoles Creek crossing structure and access road in a new location within the Frijoles Canyon Historic District and CCC NHL Historic District would have direct physical impacts on the cultural landscapes.

Approximately 0.22 acre of new permanent disturbance would occur from construction of the new vehicular crossing and access road. Long-term adverse impacts would result from placing the new crossing (a permanent nonhistoric feature within the Bandelier CCC Historic District that would also not match the historic circulation pattern).

Road Repairs and Parking Improvements Routes 201 and 202 – Repairs to Routes 201 and 202 and parking areas along Route 201, including paved and unpaved pullouts, would be done to match conditions prior to the flood damage and, therefore, would have no adverse impact on cultural landscapes. A new water line would be buried within the footprint of Routes 201 and 202 and Route 202 would be widened to approximately 18 feet to accommodate two-way traffic. A portion of the existing loop at the end of Route 202 would be obliterated and revegetated. The total permanent disturbance along Route 202 would be approximately 0.69 acre. Road repairs and parking improvements would result in long-term less than minor adverse impacts on cultural landscapes and the CCC Historic District.

Entrance Road Repair – Repair of the entrance road would involve modifying the historic headwall and widening the historic entrance road as described in the Alternative description. These actions would make small changes to historic structures and add new elements to the cultural landscapes, resulting in minor adverse impacts on the Bandelier Cultural Landscape, the Frijoles Canyon component landscape, and the CCC Historic District subcomponent landscape.

Picnic Area Pedestrian Bridge Replacement – The replacement of the nonhistoric pedestrian bridge and other actions related to this replacement would introduce a new element into the cultural landscape, but similar to one that was removed prior to the flooding. The introduction of a new element would not adversely affect the landscape; the bridge design would be in character with the landscape.

Pedestrian Bridge at Parking Lot – Replacing the existing pedestrian bridge, in the same location, would result in long-term less than minor adverse impacts on cultural landscapes and the Bandelier CCC Historic District because the new bridge would be installed at a slightly higher elevation than the original bridge.

Removal of Approach to Old Vehicular Bridge – Removal of the east and west approaches to the old vehicular bridge would restore the soils and vegetation in this portion of the cultural landscape and would result in long-term minor beneficial impacts on cultural landscapes and the Bandelier CCC Historic District.

Cumulative Effects – Past actions include the installation of the temporary pedestrian bridges and installation of two sandbag walls on the west side of the visitor center to protect the visitor center from being inundated by the 2009 flood. Both of these actions resulted in short-term minor adverse impacts on cultural landscapes.

The proposed construction of a buried electrical system would have minor adverse impacts during construction and long-term negligible adverse impacts on cultural landscapes. Implementation of the Transportation Plan would result in long-term minor beneficial impacts on cultural landscapes and the Bandelier CCC Historic District by responding to increased visitation in a way that stabilizes private vehicular use and minimizes the construction of new transportation infrastructure within the Monument. Implementation of the Foundation Document

would also result in long-term minor beneficial impacts on cultural landscapes and the Bandelier CCC Historic District because the purpose of the Foundation Document is to refocus Monument staff and management on the Monument's purpose, significance, fundamental resources and values, and other important resources and values and interpretive themes to meet the demand for the continued use and enjoyment by the public while preserving key resources and values. Overall, these past, present, and reasonably foreseeable future actions have or would result in a mix of impacts on the cultural landscape and the Bandelier CCC Historic District. Alternative B would contribute an incremental adverse impact on the long-term minor adverse and long-term beneficial cumulative impacts.

Species of Special Concern

Impacts of Alternative A – No Action

Under the no action alternative there would be no effect on federally listed threatened or endangered species. There would be no earthwork, tree removal, or construction activity that affect potential Mexican spotted owl nesting, roosting, or foraging in the project area. Thus, there would be no effect on the Mexican spotted owl or other species of special concern under no action.

Cumulative Effects – Past actions from the removal of the vehicular and pedestrian bridges, installation of flood barriers, and other maintenance and operations in the project area have not affected Mexican spotted owl habitat. Human use and activity in the project area may deter owls from using habitat near parking and picnic areas. Future installation of a new buried electrical system would result in temporary construction activity, but would be conducted outside of the Mexican spotted owl breeding season. Future plans for stabilization of Frijoles Creek have the potential to improve Mexican spotted owl habitat. Overall, these past, current, and future actions would contribute minor adverse cumulative impacts on the Mexican spotted owl primarily from human activity within suitable roosting and foraging habitat. Because the no action alternative does not involve any new human disturbances or vegetation removal, it would not incrementally add to the overall adverse cumulative effects.

Impacts of Alternative B (Preferred) – Bridge Replacements with Road Repairs, and Improvements

Construction activities and tree removal under Alternative B has the potential to affect the Mexican spotted owl. The proposed action would result in a temporary increase in human activity and noise from construction equipment in the action area during construction. Currently, noise and human activity in the action area occurs as a result of frequent automobile, bus, and motorcycle traffic and visitor use of trails, parking areas, and visitor facilities. No suitable nesting habitat for the Mexican spotted owl is present in the action area, so nesting owls would not be affected by the proposed action. Although the proposed action is more than 2 miles from the nearest known protected activity center, it is possible that a Mexican spotted owl could roost in the action area before or during construction. If this were to happen, it is possible a Mexican spotted owl could be displaced from the action area by the increased noise and human activity resulting from construction. These effects would be minimal and temporary because of the presence of potential roosting and foraging habitat in the surrounding area. While project activities could cause the Mexican spotted owl to avoid the immediate project areas during periods of active construction, the proposed action would not reduce the ability of Mexican spotted owls to forage in the nearby vicinity and would not result in a reduction of prey availability. Noise-related effects would be short-term, occurring only during construction. After construction is complete, noise levels would return to existing ambient levels.

The total permanent impacts on vegetation would be 0.69 acre with less than 20 trees (mostly ponderosa pines) removed. The effects of habitat loss and tree removal would be permanent, but are expected to have little impact on potential Mexican spotted owl roosting and foraging habitat within the action area.

The potential for impacts would be greatly reduced by implementing the following conservation measures. Tree removal would occur prior to March 1 to avoid impacts on Mexican spotted owls and migratory birds, which would eliminate the possibility that a tree would be removed while being used for roosting. The NPS would conduct surveys for Mexican spotted owls in the project area before work starts to verify that no Mexican spotted owls are present. If a Mexican spotted owl is identified in the project area, the area would be resurveyed daily until the Mexican spotted owl is confirmed to have left the area. Additionally, construction would occur only during daylight hours at a time when the owls are not foraging. With implementation of the conservation measures, direct effects on Mexican spotted owls are extremely unlikely to occur and impacts would be insignificant and discountable. Indirect effects from the loss of foraging or roosting habitat would be about 0.69 acre and would be insignificant given the amount of Mexican spotted owl critical habitat available at the Monument, which is about 33,727 acres.

Most impacts from the proposed action would occur within previously disturbed areas such as existing roads, trails, and parking areas that do not contain the primary constituent elements (PCEs) of Mexican spotted owl critical habitat. A total of 0.69 acre of vegetation containing the PCEs for Mexican spotted owls would be disturbed as a result of the proposed action. Although a small amount of vegetation, including up to 20 ponderosa pine trees, would be removed, the action area would continue to provide the same PCEs following construction as prior to construction. No suitable nesting habitat or PACs would be affected. The permanent impacts on critical habitat would be 0.69 acre. This is less than 0.0012% of the total amount of designated critical habitat in the SRM-NM-4 critical habitat unit and less than 0.002% of the total designated critical habitat in the Monument. The loss of critical habitat would be small compared with the available habitat, the habitat in the action area is highly fragmented, and the action area is a high use area. Therefore, the impacts on critical habitat from the proposed action would be insignificant and discountable.

There would be no effect on other federally listed threatened, endangered, proposed, or candidate species because there is no suitable habitat or the project area is outside of the known range for these other species.

Cumulative Effects – Past, present, and reasonably foreseeable future cumulative effects on Mexican spotted owls would be similar to those under Alternative A except that Alternative B would add additional short-term potential impacts from construction-related disturbance plus long-term impacts from tree removal. Thus, Alternative B would contribute short- noise related disturbance and a long-term loss of potential Mexican spotted owl roosting habitat that would add to the overall adverse cumulative effects on Mexican spotted owls.

Visitor Use and Experience

Impacts of Alternative A – No Action

How some visitors use and experience a portion of the Monument would be adversely affected under the no action alternative. If the vehicular bridge is not replaced, visitors would no longer have motor vehicle access to the picnic area and parking on the west side of Frijoles Creek. Parking for backcountry overnight campers would have to be shifted to the visitor center parking lot, which would reduce available parking for day use visitors. Total parking capacity near the visitor center would be reduced about 40% with the loss of parking in the picnic area. Without vehicle access across Frijoles Creek, the Monument would not be able to maintain the picnic

area, so the picnic area would remain closed. Lack of vehicle access would also require permanent closure of the restroom facility in the picnic area.

Pedestrian access across Frijoles Creek would continue with the temporary bridge from the visitor center parking lot. This would allow continued access to all of the trails on the west side of the creek. The picnic pedestrian bridge would not be replaced. This may inconvenience some visitors and would reduce the number of creek crossings near the visitor center to the one at the southwest end of the visitor center parking lot and one upstream near Tyuonyi of the main loop trail. A replacement water line would not be installed and there would be no new drinking fountains available on the west side of Frijoles Creek.

No immediate repairs would be made to the eroded entrance road shoulder at a historic stone headwall under the no action alternative. The shoulder damage presents a safety concern for motorists and pedestrians walking along the road. Further erosion of the road shoulder is possible. Alternative A would have a long-term adverse impact on visitor use and experience because of the health and safety hazard presented from the damaged road.

Cumulative Effects – Removal of the vehicular and pedestrian bridges because of the potential for flood damage would reduce visitor recreational opportunities in the Monument. Replacement of one of the pedestrian bridges with a temporary structure would allow visitors to continue to access trails on the west side of Frijoles Creek. Installation of a new buried electrical system in the future may temporarily inconvenience visitors and traffic flow and would introduce construction noise and activity into the Monument. Future plans for stabilization of Frijoles Creek may also temporarily impact visitor use, but would have long-term beneficial effects from stabilization of the channel and reducing flood damage and erosion. Development of a transportation plan would result in long-term benefits on visitor use and experience by responding to increased visitation in a way that stabilizes private vehicular use and minimizes the construction of new transportation infrastructure within the Monument. Overall, these past, current, and future actions have or would contribute both short- and long-term beneficial effects on visitor use and experience. Alternative A would continue the adverse effects associated with the loss of vehicular access, parking areas, and picnic area use and would make it more difficult for Monument staff to maintain visitor infrastructure. Thus, Alternative A would contribute long-term adverse effects on the overall visitor use and experience by diminishing recreation opportunities on the west side of Frijoles Creek.

Impacts of Alternative B (Preferred) – Bridge Replacements with Road Repairs, and Improvements

Construction of a new vehicular crossing would restore visitor access to the picnic and parking areas on the west side of Frijoles Creek. While the location of the new crossing would change, the new access road would restore picnic area parking and backcountry overnight parking. Moving the new crossing to a location off of the entrance road would reduce traffic congestion near the visitor center and parking lot where the old bridge crossing was located. This would improve visitor safety by reducing traffic through a congested area where pedestrians are present. The revised parking layout in the picnic area would better define parking spaces, reduce resource damage, and improve traffic flow. The new vehicular crossing and slight widening of Route 202 to accommodate two-way traffic from the new Frijoles Creek vehicular crossing would change the historic circulation pattern, but would have a long-term benefit by improving traffic flow. Repairs to the damaged road shoulder along the entrance road would improve safety for drivers and pedestrians along the road.

Restoring vehicle access across Frijoles Creek would allow Monument staff to restore the picnic area, install tables, provide trash service, and open the restroom. Installation of a new water line and drinking fountains would improve the quality of the visitor experience. Installation of two

new pedestrian bridges to replace those removed during flooding would allow better circulation of visitors on trails and access to facilities on both sides of Frijoles Creek. Restoration of services and facilities would return the quality and opportunities for recreation on the west side of Frijoles Creek to what they were prior to flood damage, which would have a long-term beneficial effect on the quality of the visitor experience.

Heavy equipment, noise, and construction disturbance would reduce the quality of the visitor experience in the normally quiet setting. Work would begin in the spring prior to the typically busy summer season, but would continue into August. BMPs that minimize noise and dust would be implemented to reduce adverse effects. Visitors would not be permitted to access the construction zones, which would temporarily limit visitor activities in this area. The Monument would develop alternative routes around construction zones where feasible, to provide visitor access to trailheads.

Construction of the access road to the new Frijoles Creek crossing and repairs to the entrance road shoulder would adversely affect visitors driving into the Monument due to possible traffic delays. Alternating one-way traffic would affect traffic flow for less than two weeks, but would return to normal conditions once completed.

The Monument would implement a number of steps to provide timely and accurate information to visitors during construction work to maintain a quality visitor experience. To facilitate visitor planning, the status of work and traffic delays would be advertised two weeks in advance and would be updated daily. Information on trail access, road work, and travel restrictions would be communicated via the Monument website, newspaper, visitor center, and news releases.

Cumulative Effects – Past, present, and reasonably foreseeable future actions would have cumulative effects similar to Alternative A. However, Alternative B would contribute long-term beneficial effects on visitor use and experience by restoring and improving access on the west side of Frijoles Creek and repairing flood-damaged facilities. Alternative B would introduce short-term adverse construction impacts that would adversely impact visitor use and experience, but construction-related disturbance would occur prior to work on the electrical system or rehabilitation activities on Frijoles Creek. Overall, cumulative effects on visitor use and experience would be long-term and beneficial with the beneficial contributions from Alternative B.

CONSULTATION AND COORDINATION

Internal Scoping

Internal scoping was conducted by an interdisciplinary team of professionals from the Monument, FHWA, and Denver Service Center staff. Team members met multiple times in 2013 and 2014 to discuss the purpose and need for the project, various alternatives, potential environmental impacts, reasonably foreseeable actions that may have cumulative effects, and resource protection measures. The team also gathered background information and discussed public outreach for the project. Over the course of the project, team members have conducted numerous individual site visits to view and evaluate the proposed construction site.

External Scoping

Scoping is an early and open process to determine the breadth of issues and alternatives to be addressed in an EA. External scoping began with a public scoping notice released on September 26, 2014 describing the preferred alternative and soliciting comments or concerns with the proposal to construct a new vehicular crossing and pedestrian bridges, repair roads and parking areas, and make other improvements. The Monument sent letters describing the proposed project and asking for comments to individuals; businesses; organizations; state, county, and local governments; federal agencies; and American Indian tribes. A press release was also sent to local news organizations. During the 30-day scoping period, the public was given an opportunity to comment on the proposed project using the NPS Planning, Environment, and Public Comment website at <http://parkplanning.nps.gov/pais> or by mailing comments to the Monument. Four comments from the public were received during the scoping period, all of which were in favor of the proposed project. No substantive comments were received.

Agency Consultation

Endangered Species Act

In accordance with the Endangered Species Act, the NPS contacted the U.S. Fish and Wildlife Service (USFWS) by letter on September 26, 2014 to solicit input on threatened and endangered species concerns for the proposed project. The NPS conferred with the USFWS on October 22, 2014 and a decision was made to prepare a biological assessment because of potential for impacts on the Mexican spotted owl, a federally listed threatened species. The Monument prepared a biological assessment as part of Section 7 consultation under the ESA and submitted it to the USFWS for review and concurrence on December 22, 2014. The USFWS concurred with the Monument's findings that the proposed action may affect, but is not likely to adversely affect, federally listed species in a letter dated January 8, 2015.

Clean Water Act

In accordance with the Clean Water Act, a Section 404 Permit authorizes placement of fill or dredge material in waters of the U.S. The NPS would obtain this permit from the Corps of Engineers prior to installation of the vehicular crossing or abutments for the Picnic Pedestrian Bridge that extends below the ordinary high water mark. No other work is anticipated to occur within jurisdictional waters of the U.S.

Section 106 of the National Historic Preservation Act

Compliance with section 106 of the NHPA is not being included under NEPA, but will be conducted separately through ongoing consultation with the New Mexico SHPO, Monument-affiliated American Indian tribes, and the ACHP. The separate NHPA section 106 process will result in a MOA outlining measures to mitigate the adverse effects of the preferred alternative.

In accordance with section 106 of the NHPA, the NPS provided the New Mexico SHPO an opportunity to comment on the effects of this project with regard to historic properties. The NPS submitted a determination of “adverse effect” to the SHPO. The NPS also consulted with the ACHP and invited the council to participate in section 106 consultations and the development and implementation of a MOA to mitigate adverse effects associated with the proposed undertaking. In a November 26, 2014 letter, the SHPO concurred with the Monuments determination that the proposed action would have an adverse effect on the Frijoles Canyon component landscape and the Bandelier CCC Historic District National Historic Landmark. The SHPO agreed to participate in preparation of the MOA to resolve adverse effects. A draft MOA is included in Appendix C for public review and comment. NPS will use comments from the public, SHPO and tribes to develop a final MOA for signature.

Native American Consultation

The Monument initiated consultation with six American Indian tribes/pueblos (see list below) on September 26, 2014, informing them of the proposed project/undertaking and soliciting comments. Information from the tribes was also requested to determine if any ethnographic resources are in the project area and if the tribes wanted to be involved in the environmental compliance process.

- Pueblo of San Felipe
- Pueblo of Zuni
- Pueblo of Cochiti
- Pueblo Santo Domingo
- Pueblo of San Ildefonso
- Pueblo of Santa Clara

The Monument did not receive any comments from any of the American Indian tribes/pueblos traditionally associated with the lands of the Monument. To date, no concerns have been expressed and no additional information regarding ethnographic resources or traditional uses has been provided by any of the American Indian tribal representatives. American Indian tribes/pueblos traditionally associated with the lands of the Monument will have an opportunity to review and comment on this EA. The Monument will provide the tribes with the NHPA MOA for review and comment and invite their participation as concurring parties. The NPS will continue to consult with the tribes/pueblos throughout the planning and implementation of this proposed project/undertaking and if any additional information regarding ethnographic resources or traditional uses is provided, the Monument would work with the concerned parties to mitigate any potential impacts on ethnographic resources and traditional uses associated with any aspect of the project/undertaking.

NPS did not receive any responses from the tribes/pueblos during the scoping period. The EA will be sent to the tribes/pueblos during the public review period for their review and comment.

Environmental Assessment Review and List of Recipients

This EA is subject to a 15-day public comment period. To inform the public of the availability of the EA, the NPS will publish and distribute a letter to various agencies, tribes, and the

Monument's mailing list, as well as place an ad in the local newspaper. The document will be available for review on the PEPC website at <http://parkplanning.nps.gov/band> and at the Monument's visitor center. Copies of the EA will be provided to interested individuals, upon request.

During the 15-day public review period, the public is encouraged to submit their written comments to the NPS, as described in the instructions at the beginning of this EA. Following the close of the comment period, all public comments will be reviewed and analyzed, prior to the release of a decision document. The NPS will issue responses to substantive comments received during the public comment period and will make appropriate changes to the EA, as needed.

List of Preparers

The following persons assisted with the preparation of this EA.

National Park Service, Bandelier National Monument

Jason Lott, Superintendent
Joseph Gurule, Facility Manager
Barbara Judy, Chief of Resources
Stephen Fettig, Wildlife Biologist
Jonathon Stark, Preservation Program Manager

National Park Service, Denver Service Center

Cam Hugie, Project Manager
Laurie Domler, Natural Resource Specialist
Greg Cody, Cultural Resource Specialist
Margo Brooks, Cultural Resource Specialist

National Park Service, Intermountain Region

Jill Cowley, Historical Landscape Architect
Sam Tamburro, Historian

Federal Highway Administration, Central Federal Lands Highway Division

Justin Henwood, Project Manager
Leslie Doss, Project Engineer

ERO Resources Corporation

Mark DeHaven, Project Manager
Barbara Galloway, Hydrologist
Steve Butler, Biologist
Dave Hesker, Graphic Designer
Kay Wall, Technical Editor

Boston Archeological Consulting

Richard Boston, Archeologist

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APPENDIXES

Appendix A: Floodplain Statement of Findings

Appendix B: Biological Assessment

Appendix C: Memorandum of Understanding

Appendix A: Floodplain Statement of Findings

APPENDIX A: STATEMENT OF FINDINGS

**STATEMENT OF FINDINGS FOR
EXECUTIVE ORDER 11988 FLOODPLAIN MANAGEMENT**

**BANDELIER NATIONAL MONUMENT
REPLACEMENT OF MOTOR AND PEDESTRIAN BRIDGES
ENVIRONMENTAL ASSESSMENT**

Recommended: _____
Superintendent, Bandelier National Monument Date

Concurred: _____
Chief, Water Resources Division Date

Concurred: _____
Southwest Regional Safety Officer Date

Approved: _____
Director, Southwest Region Date

Executive Order (EO) 11988 (“Floodplain Management”) requires the National Park Service (NPS) and other agencies to evaluate the likely impacts of actions in floodplains. It is NPS policy to preserve floodplain values and minimize potentially hazardous conditions associated with flooding. If a proposed action is in an applicable regulatory floodplain, then flood conditions and associated hazards must be quantified and a formal Statement of Findings (SOF) must be prepared. The NPS *Procedural Manual #77-2, Floodplain Management* provides direction for the preparation of a floodplain SOF. This SOF has been prepared to comply with EO 11988 and *Procedural Manual #77-2*.

PROPOSED ACTION

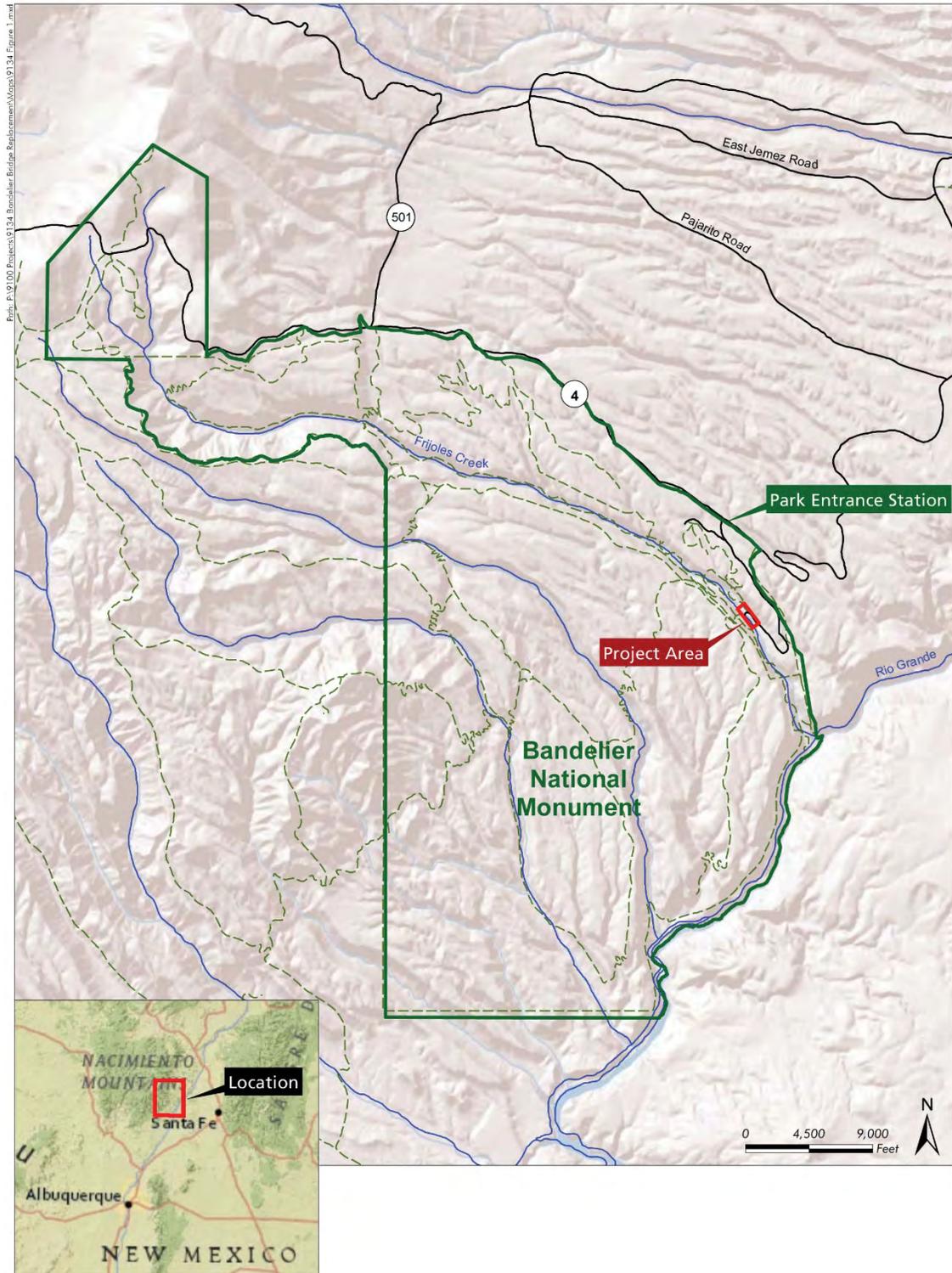
The NPS, in cooperation with the Federal Highway Administration (FHWA), is proposing replacement of a vehicular bridge and two pedestrian bridges in Bandelier National Monument (Monument or Bandelier) to restore access to picnic and parking areas across Rito de los Frijoles (Frijoles Creek) lost as a result of flooding. Road and parking areas damaged by flooding would also be repaired under the proposed action.

The proposed action is needed to address vehicle and diminished pedestrian access across Frijoles Creek lost as a result of wildfire and subsequent flooding. Without vehicle access across Frijoles Creek, Monument staff are unable to perform routine maintenance of roads, parking areas, the picnic area, restrooms, and other facilities. The lack of vehicle access reduces the Monument’s ability to respond to wildfires, perform search and rescue operations, and repair structures damaged by fire. The loss of access to parking areas on the west side of Frijoles Creek reduces visitor parking capacity. Visitor access and circulation on the west side of Frijoles Creek is an important component of the Historic Landscape District and cultural landscape. Repairs also are needed at an eroded entrance road shoulder near a historic stone headwall to address safety concerns for vehicles and pedestrians. The project components are described in more detail below.

Site Description

The project area is located near the Bandelier National Monument visitor center (Figure 1). The Monument is in the Jemez Mountains, an area with a long history of volcanic activity. Bandelier ranges in elevation from 5,340 feet at the Rio Grande to the south and 10,199 feet at the summit of Cerro Grande. Frijoles Creek drains the steep narrow canyon off the side of the Jemez Caldera Rim. The Las Conchas fire in June 2011 burned more than 156,000 acres in and surrounding the Monument, including more than 80% of the Frijoles Canyon watershed, and has substantially increased the potential for flooding in the Monument.

FIGURE 1. PROPOSED ACTION PROJECT AREA.



Project Actions

New Vehicular Crossing

A new vehicular crossing of Frijoles Creek would be constructed about 900 feet downstream from the previous bridge location near the visitor center (Figure 2). The 24-foot-wide by 10-foot-long crossing structure would consist of either a cast-in-place or precast concrete box culvert placed in the creek. The crossing would tie into the existing end of Route 202 at the end loop and the other side of the existing parking lot. Wing walls would protect the streambanks. The crossing design would allow passage of normal flows through the box culvert. High flows above the capacity of the culvert would pass over the top of the crossing without substantially impeding flows and allowing debris to be carried downstream without damaging the crossing structure or backing up streamflow.

Road Repairs and Parking Improvements Routes 201 and 202

Routes 201 and 202 repairs include removing flood-deposited sediment and debris, pulverizing existing pavement and supplementing with aggregate base, and repaving. The pavement width would vary from 9 to 18 feet depending on site conditions. The existing road and parking areas on Route 201 would be repaired and replaced in-kind with no substantial change from the pre-flood footprint. Widening of Route 202 to about 18 feet would be needed to more safely accommodate two-way traffic. A portion of the existing loop at the end of Route 202 would no longer be needed with the new vehicular crossing and entry road. Paved pullouts would be reestablished and repaired using similar methods as road work. Unpaved pullouts would remain unpaved.

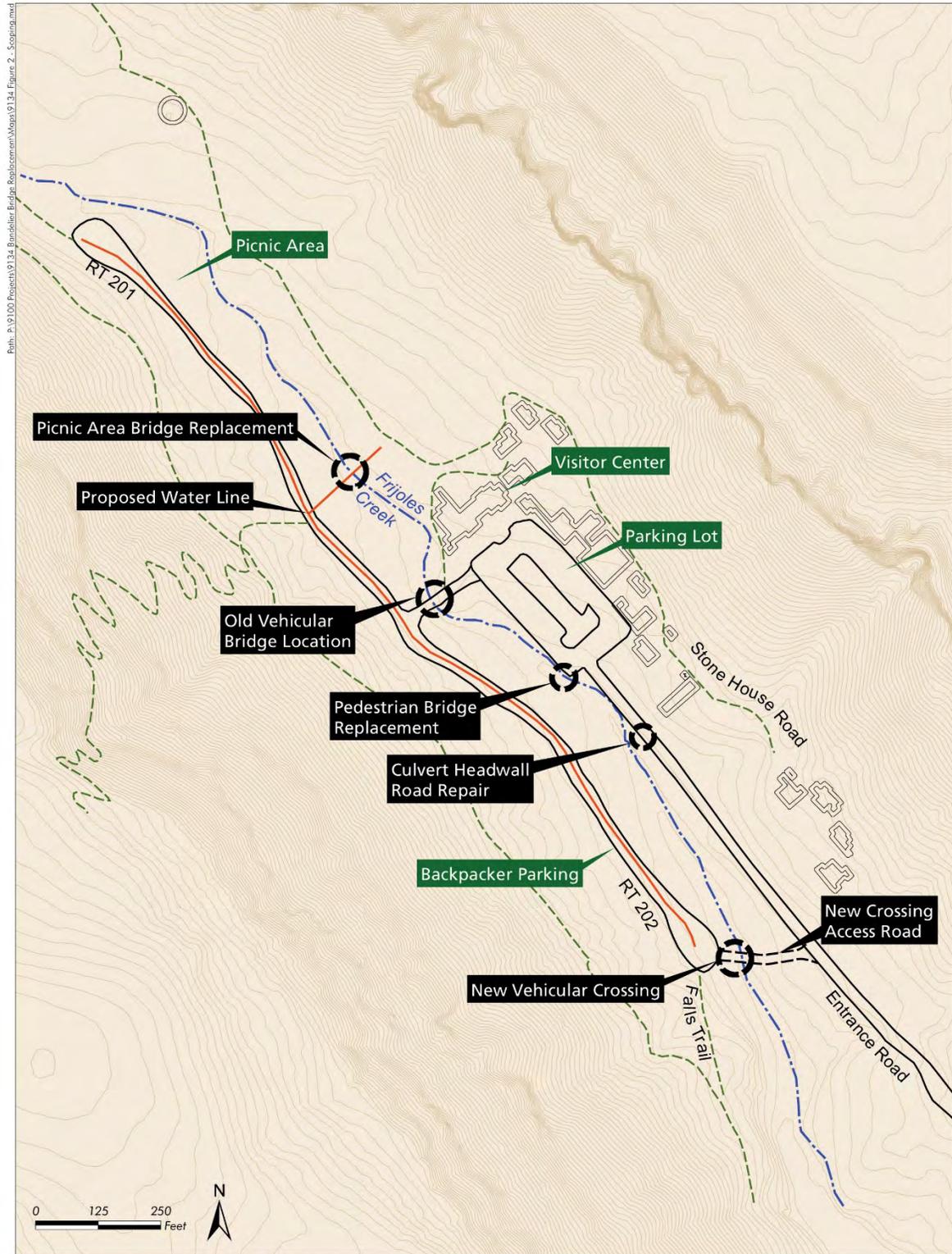
Entrance Road

Repair options include extending the existing culvert and burying the headwall or raising the headwall (this would provide a safety clear zone for vehicular traffic). Because of the angle of the culvert outlet and existing historic stone deflectors (wing walls) at the culvert outlet, flexible plastic pipe may be used for the culvert extension to keep the flow in the channel and minimize any erosion of the channel side slope. A stone apron would be constructed at the culvert outlet to dissipate flows.

Picnic Area Pedestrian Bridge

This work includes removing the existing nonhistoric bridge abutments that constrict the Frijoles Creek channel and constructing new concrete abutments that allow the new bridge to span Frijoles Creek. A new timber pedestrian bridge approximately 40 feet long with a slight realignment would be constructed on the new abutments. The proposed bridge would be elevated and lengthened a few feet so that higher flood and debris flows can be passed with more likelihood of survival and less flooding of historic areas. At high flows, the bridge would be designed to break away and not capture flood debris.

Figure 2. Proposed Action Area



Pedestrian Bridge at Parking Lot

The pedestrian bridge at the southwest corner of the visitor center parking lot would be replaced with a new bridge (Figure 2). The existing abutments are structurally sound and would require only minor repair or rebuilding to accommodate the new bridge. The proposed timber bridge would be designed to break away at high flows and not obstruct flood flow or capture debris. On the visitor center side, the bridge connects to an existing nonhistoric stone path with stone/masonry curbing. A portion of this path would be reconstructed to meet the top of the new bridge deck. An existing 4-foot-wide asphalt path that leads from Route 201 to the bridge would be rehabilitated as part of the project.

Removal of Approach to Old Bridge

The existing asphalt pavement approach to the vehicular bridge near the visitor center that was removed prior to flooding would be obliterated (Figure 2). The bridge approach on the west side also would be obliterated. About 265 square feet of the obliterated area not used as a service road would be revegetated with native species. Large rocks would be placed along the old bridge approach to prevent vehicles from traveling this direction.

Staging and Stockpiling Areas, and Material Fill and Disposal

Temporary construction staging and stockpiling areas would be located in existing disturbed areas in the Monument outside of the 100-year floodplain. Construction equipment may be parked at the visitor center parking lot, which is within the floodplain. Any fill material needed would come from outside the Monument and disposal of any material would be outside of the Monument.

FLOODPLAINS

The 100-year floodplain of Frijoles Creek was mapped by the Federal Emergency Management Agency in 2008 (Figure 3). Zone A is a Special Flood Hazard Area subject to inundation by the 1% annual chance flood (100-year flood), with no base flood elevation determined. The proposed project would be completed within the 100-year floodplain, which is about 300 feet wide.

Figure 3. Floodplain Mapping at Bandelier National Monument.

Hydrology and Flood History of Frijoles Creek

Frijoles Creek is the largest stream in the Monument. Its drainage area is 19.8 square miles (nearly all within the Monument), average baseflow is about 1 cubic foot per second (cfs), and it flows perennially from its headwaters in the Sierra de los Valles to its confluence with the Rio Grande (Weeks 2007). Bankfull flow near the visitor center is 423 cfs (Blackler 2013). Frijoles Creek gains water from shallow groundwater and from faults that discharge bedrock groundwater to the stream. Other sources of flow are runoff from snowmelt and precipitation events. The U.S. Geological Survey (USGS) operates a stream gage at a location about 3,600 feet upstream of Monument headquarters. Flow data collected from 1983 to 1996 and from 2012 to 2014 show that flows normally range between 1 and 10 cfs. July to September are typically the wettest months, when large convective storms occur. In 1977, there was a large wildfire (the La Mesa fire) in and near Frijoles Canyon, followed by flooding in 1978 (Veenhuis 2002). Between August 2011 and July 2014, four peak flows measured at the USGS stream gage exceeded 1,000 cfs. The flood events, listed in Table 1, occurred due to large precipitation events that occurred for one or more days.

Table 1. RECENT FLOOD EVENTS ON FRIJoles CREEK IN BANDELIER NATIONAL MONUMENT.

Date of Peak Flow	Peak Flow (cfs)	Source of Peak Flow Measurement
7/12/1978	1,800	USGS stream gage measurement
7/21/1978	3,030	USGS stream gage measurement
8/21/2011	7,000	Indirect measurements by USGS and NPS
7/26/2013	5,410	USGS stream gage measurement
9/12/2013	2,410	USGS stream gage measurement
7/19/2014	1,040	USGS stream gage measurement

Justification for Use of the Floodplain

The original Monument headquarters was constructed where it exists today; therefore, some of the historic structures have always existed in the floodplain. The location of structures in the floodplain and adjacent to Frijoles Creek is necessary to preserve the integrity of the historic structures and the historic core area of the Monument. The new crossings and bridges and road and parking area repairs cannot be constructed outside of the Frijoles Creek floodplain, and the floodplain cannot be avoided for access to Monument facilities located across Frijoles Creek from the Monument's entrance road and visitor center. Proposed construction and repairs would require work in the floodplain that cannot be avoided. Stormwater runoff control measures would be employed to prevent sediment movement into the floodplain during construction. Vehicular crossing and pedestrian bridge design would be completed in such a way as to leave the creek bank and channel in its present configuration with no change. The vehicular crossing would allow passage of low flows and overtopping of high flows to minimize impedance of flood flows. Pedestrian bridges would span Frijoles Creek and would be designed to break away at high flows. Construction would be completed during low-flow periods, and streamflow in Frijoles Creek would be diverted around the construction zone to protect water quality. Except for construction equipment parking, staging and stockpile areas would be located outside of the floodplain.

Investigation of Alternative Sites

Several alternatives were considered in a hydraulic analysis conducted by FHWA (Blackler 2013). These include different locations for the vehicular crossing and different vehicular crossing designs. All of the possible crossing locations would be within the 100-year floodplain, and two of the dismissed locations would have greater risk for backing up flood flows and impacting the visitor center and other parts of the historic district. Another location downstream of the proposed location would have greater resource effects because a new longer road would need to be constructed. Other vehicular crossing designs that were considered would be more likely to catch flood debris that would back up flood water and increase the risk of flooding the visitor center and other Monument facilities. Installation of a temporary vehicular bridge was considered, which would be removed during flood risk months, but this would not meet the project purpose and need of providing year-round access to picnic and parking areas across Frijoles Creek. Construction of a pedestrian bridge designed to withstand flood flows was considered, but dismissed because of concern that this type of bridge would capture flood debris, back up flood flows, and impact the visitor center and other Monument facilities.

Characterization of and Effect on Floodplain Values

Frijoles Creek natural floodplain values in the project area have been altered by human activities including roads, parking areas, bridge abutments, and construction of the

Monument's visitor center. The effect of these structures on flooding at Bandelier has not been quantified. After the 2011 flood, Monument staff removed the permanent vehicular bridge and two pedestrian bridges to prevent them from being clogged with large trees that would back up water and increase flood damage. The temporary pedestrian bridge now being used can be removed if flooding is anticipated. The footprint of the structures and modifications to the floodplain are relatively small compared with the size of the Frijoles Creek floodplain, so the overall effect on the floodplain values is likely not measurable.

Within the Monument, the floodplain still has many natural values, although the values have been considerably altered by wildfires. As a result of the burned areas, normal precipitation events in the region result in much higher runoff. Previous studies show that the watershed may produce many times the normal expected discharge for an average precipitation event (Veenhuis 2002). In addition to higher flow rates, it can be expected that large debris will be mobilized during flood events and significantly greater erosion along the mountain sides and cliffs would occur. Elevated rates of watershed erosion are delivering excess sediment to streams, decreasing habitat diversity and covering spawning areas. Riparian areas have sustained direct and indirect impacts associated with alteration of stream channels, banks, and floodplains.

Frijoles Creek drains a steep narrow canyon off the side of the Jemez Caldera Rim. Floodplains and riparian zones occur along intermittent and perennial sections of Frijoles Canyon. Riparian vegetation is maintained where phreatophytes have access to a dependable supply of alluvial groundwater. Due to flooding and increased erosion and sedimentation, large losses of riparian plants have occurred at some locations. The stream channel has variably cut down many feet to bedrock, has significantly widened, and/or banks have been undercut. Large rocks and boulders have been transported and deposited in clusters, establishing new stream morphologies. At some locations, entirely new channel sections have replaced the old ones, either through abandonment or sedimentation (Weeks 2007).

The proposed action would have minimal effects on the natural and beneficial values of the floodplain during construction and over the long term. Construction and repairs would occur during low flows and would be halted during storms when the threat of higher river flows is present. Construction activities would be monitored and erosion and sediment control Best Management Practices (BMPs) would be implemented to prevent erosion or downstream siltation. The new road to the vehicular crossing and the widening of Road 202 would increase the impervious surface area in the floodplain by about 0.69 acre, but removal of the asphalt pavement to the former vehicular bridge would reduce the impervious surface area by 0.01 acre. The net effect is a slight long-term increase in impervious surface and runoff that would have negligible adverse effects on the floodplain or contribution to flooding in Frijoles Creek.

Bridge abutments at the picnic area pedestrian bridge that constrict Frijoles Creek would be removed. After construction is completed, disturbed areas would be revegetated. The project would have no measurable effect on the floodplain because the new vehicular crossing, new bridges, and new or repaired roads and parking lot would not impede or alter flood flows. Overall, the proposed action within the 100-year floodplain would not substantially affect floodplain functions, restrict channel capacity, impede or alter flood flows, or increase the risk of flooding, and would minimize the impact of floods on human safety, health, and welfare.

Site-Specific Flood Risk

The hydraulic analysis completed by the FHWA for the new vehicular crossing determined that the new crossing would not significantly increase the surface water elevation or streamflow velocity in the vicinity of the crossing compared with existing conditions (FHWA 2014). The floodplain would be slightly negatively impacted during construction due to the presence of construction equipment and materials and possible erosion from bare soils prior to revegetation. The floodplain would be improved in the long term by removal of the picnic area pedestrian bridge abutments that constrict the active river channel.

MITIGATIVE ACTIONS

The proposed action would improve the conveyance of flood flows in Frijoles Creek near the visitor center compared with previous bridge structures. The new vehicular crossing and pedestrian bridges would not contribute to the likelihood of flooding of the historic structures and the historic core area of the Monument. Mitigation would be provided by incorporating methods for protecting life and minimizing damage through appropriate design and mitigation. Mitigation would include the following:

- The vehicular crossing structure would be constructed to pass low-flow events and to allow passage of high flows over the top without capturing flood debris.
- The vehicular crossing design would be completed in such a way as to leave the creek banks and channel in a stabilized condition. This would include revegetation of disturbed areas and may include armoring the creek banks if needed.
- The new picnic area pedestrian bridge would be constructed at an elevation to pass moderately high flows. The picnic area bridge and the parking lot pedestrian bridge would be constructed to break away at high flood flows.
- Staging and stockpiling areas would be situated outside of the floodplain to the extent possible. Construction equipment may be parked within the floodplain during periods when the potential for flooding is low.
- Use BMPs, as described in the Environmental Assessment, during and after construction to prevent degradation of the stream channel and water quality.

The project would be designed to minimize the adverse environmental impacts on natural floodplain values, minimize potential risk to lives and property, maintain the natural and beneficial floodplain values in the Monument, and keep the floodplain environment as close to its natural state as possible using all practicable means. Such means include stabilizing the creek banks and channel at each crossing construction area, revegetating disturbed areas, and avoiding construction of any structures that would alter or impede the natural flow of the creek and flood flows. The new stream crossings would be designed to avoid scouring, deposition, and other damage to the floodplain. Placement of fill in the creek channel would not occur. Natural drainage and natural contours would be preserved to the extent practicable when designing and constructing the new road and stream crossings and repairing existing structures. These mitigative measures would be in accordance with the NPS floodplain guidelines and with EO 11988 (“Floodplain Management”).

CONCLUSION

The protection of people and property is of high priority to the NPS. The proposed project would be constructed on NPS-managed land and Frijoles Creek flows across Bandelier National Monument. The NPS concludes that there is no other practicable alternative for the proposed project. With the new stream crossings, new road, and road and parking lot repairs designed to prevent or reduce flood damage, the risk to life and property would be minimized. There would be no significant negative effect on natural or beneficial floodplain values.

Mitigation would include good design through sustainable design principles, appropriate siting, and BMPs during and after construction. The NPS finds the proposal to be consistent with EO 11990.

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Appendix B: Biological Assessment

**Replacement of Motor and Pedestrian Bridges
Biological Assessment
Bandelier National Monument**

December 2014

National Park Service – U.S. Department of the Interior

Bandelier National Monument
15 Entrance Road
Los Alamos, New Mexico 87544

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INTRODUCTION

The purpose of this biological assessment (BA) is to review the proposed project to replace vehicular and pedestrian bridges and make other improvements in Bandelier National Monument (Monument or Bandelier) and to determine to what extent the proposed action may affect federally listed threatened, endangered, candidate, or proposed species or their critical habitat. This BA was prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act of 1973, as amended (16 USC 1536, et seq.) (ESA); and follows the standards established in the National Park Service (NPS) Director's Order 12 (DO-12). Species and critical habitat addressed in this BA are presented in Table 1.

The NPS is preparing an Environmental Assessment (EA) concurrently with this BA. The EA will evaluate potential environmental, socioeconomic, and cultural resource effects from the preferred alternative to replace the bridges and a no action alternative that does not replace the bridges. The EA will be prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 and implementing regulations, 40 Code of Federal Regulations (CFR) Parts 1500-1508 and NPS DO-12 and Handbook, *Conservation Planning, Environmental Impact Analysis, and Decision-making*.

CONSULTATION HISTORY

Informal consultation was initiated with the U.S. Fish and Wildlife Service (USFWS) in a scoping letter sent on September 26, 2014. A list of federally listed threatened, endangered, candidate, and proposed species potentially occurring in the action area was obtained from the USFWS on October 15, 2014 using the Information, Planning, and Conservation System (IPAC) website (USFWS 2014). Additional informal consultation consisted of a telephone conversation between Laurie Domler (NPS Natural Resource Specialist) and Eric Hein (USFWS New Mexico Ecological Services Division) on October 22, 2014. The discussion focused on the need to prepare a BA, the BA process, and the BA format.

PROPOSED ACTION

Bandelier is proposing to construct a new vehicular crossing of Frijoles Creek, implement road repairs and improvements to Routes 201 and 202 including installation of a water line, repair a section of road shoulder and protect a historic culvert on the entrance road, and construct two new replacement pedestrian bridges. The location of the proposed action is shown in Figure 1 and Figure 2.

Background

In June 2011, the Las Conchas fire burned more than 156,000 acres in and surrounding the Monument, including more than 80% of the Frijoles Canyon watershed. Following the fires, Monument staff removed the vehicular bridge (Figure 2) and two pedestrian bridges near the visitor center in anticipation of flooding. These structures were of concern because of the potential for flood flows to carry large volumes of debris that can back up behind the bridges and flood the visitor center and other historic features in the Monument.

Figure 1. Replacement of Motor and Pedestrian Bridges Project Area

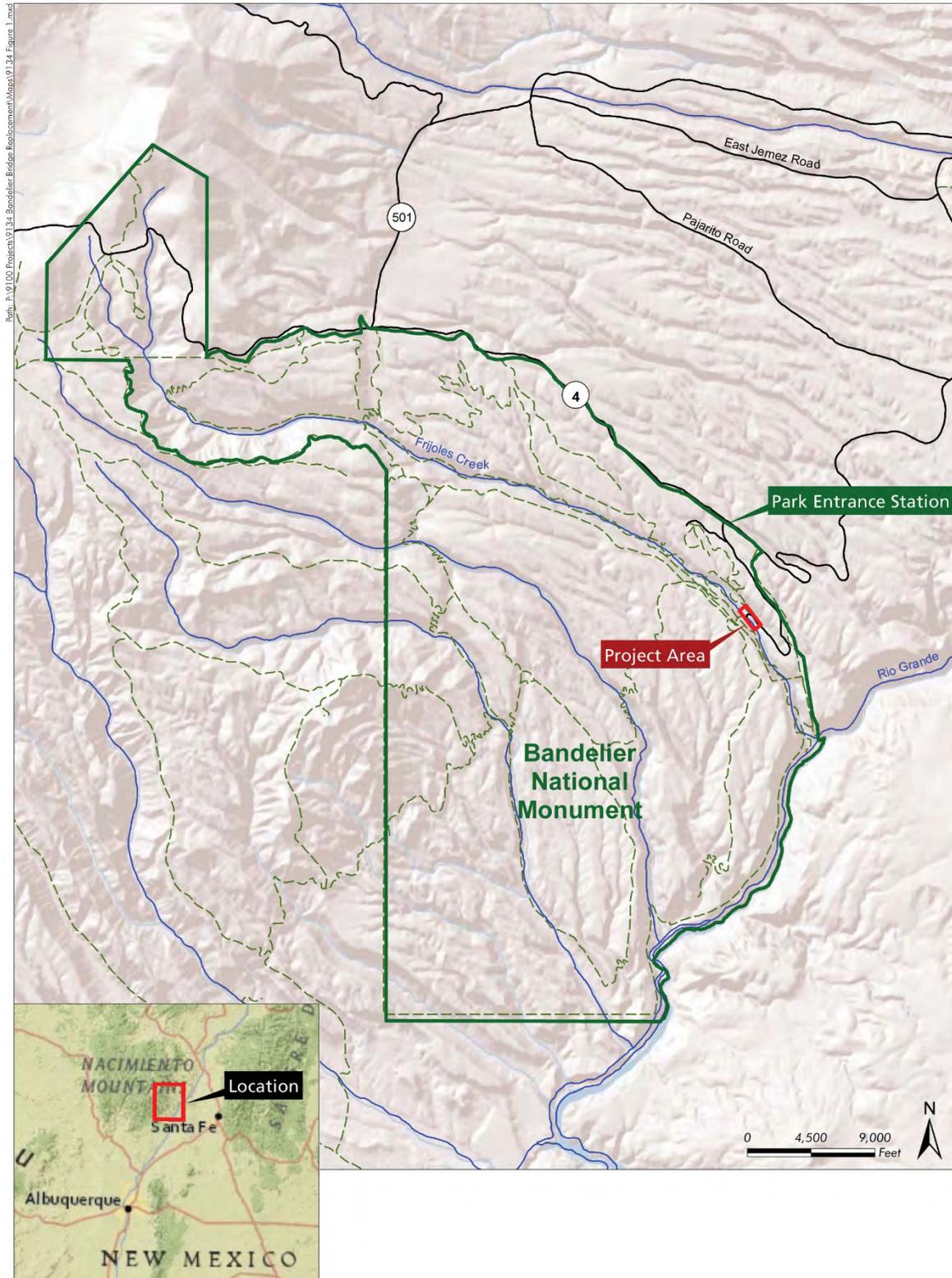
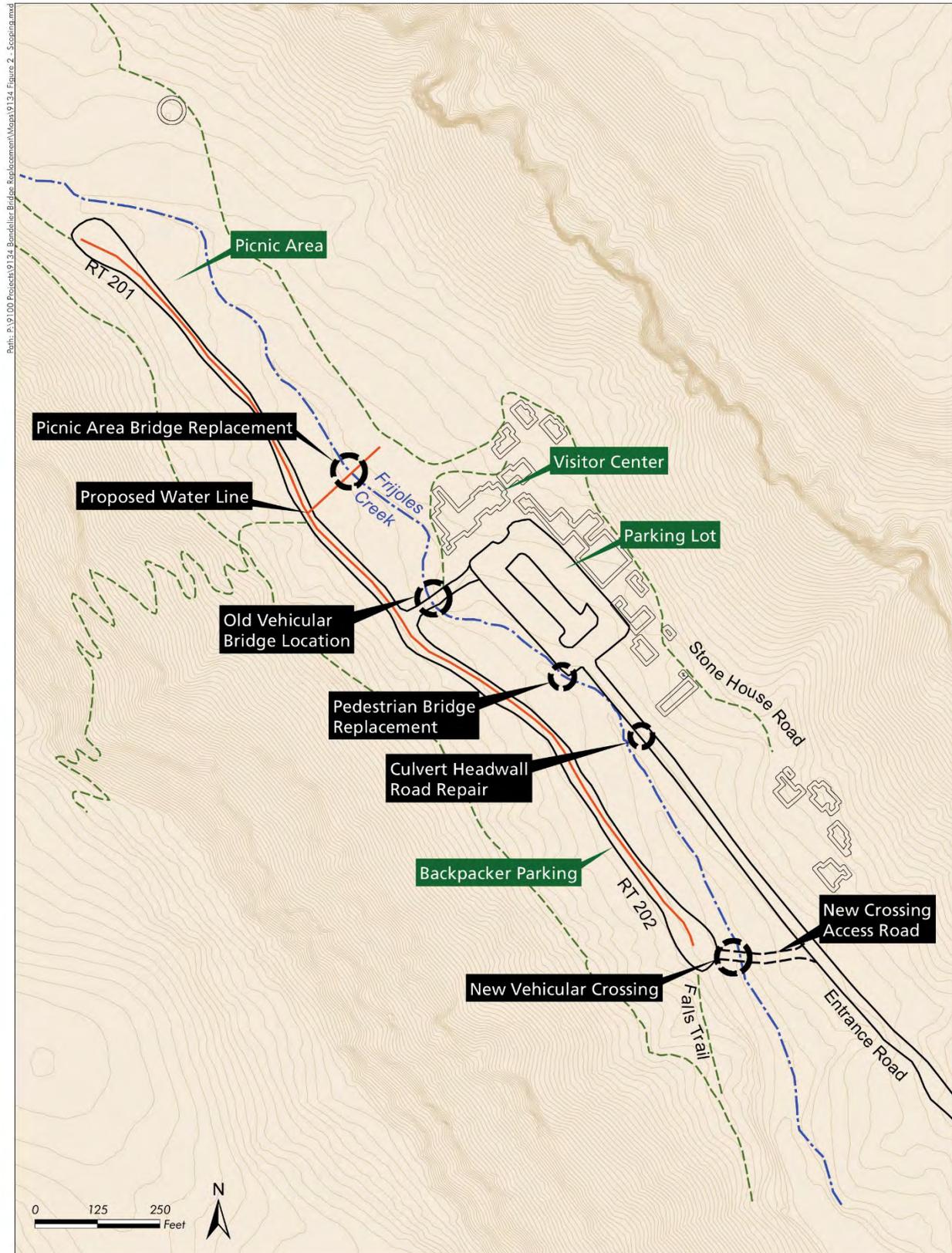


Figure 2. Proposed Action



Without vehicle access across Frijoles Creek, Monument staff are unable to perform routine maintenance of roads, parking areas, the picnic area, restrooms, and other facilities. The lack of vehicle access reduces the Monument's ability to respond to wildfires, perform search and rescue operations, and repair structures damaged by fire. The loss of access to parking areas on the west side of Frijoles Creek reduces visitor parking capacity by 40%, including backpacker overnight parking. Visitor access and circulation on the west side of Frijoles Creek is an important component of the Historic Landscape District and cultural landscape. Repairs also are needed at an eroded entrance road shoulder near a historic stone headwall to address safety concerns for vehicles and pedestrians walking on the road shoulder. A new water line is needed in the picnic area to serve a water faucet damaged by flooding.

New Vehicular Crossing and Access Road

A new vehicular crossing of Frijoles Creek would be constructed about 900 feet downstream from the previous bridge location near the visitor center (Figure 2 and Figure 3). The 24-foot-wide by 10-foot-long crossing structure would consist of either a cast-in-place or precast concrete box culvert placed in the creek. Eight-foot concrete wing walls would be constructed on the inlet and outlet to the crossing to protect the natural streambanks. Cast-in-place footings would be keyed into the bedrock to anchor the crossing. The low-profile crossing would have concrete curbs on the edges. The concrete would be colored to blend with the environment. The crossing design would allow passage of normal flows through the box culvert. High flows above the capacity of the culvert would pass over the top of the crossing without substantially impeding flows and allowing debris to be carried downstream without damaging the crossing structure or backing up streamflow. A conduit for future utilities would be included in the crossing design.

Figure 3. New Vehicular Crossing Location



Streamflow in Frijoles Creek would be diverted around the construction zone during placement of the crossing structure to protect water quality. This may involve a culvert bypass, a coffer dam and pumping, or other measure. Installation of the crossing structure would occur when streamflow is low.

A new road about 200 feet long would be constructed from the entrance road to the new vehicular crossing following an existing clearing that provides access to a sewage lift station (Figure 2). The new road design includes two 9-foot-wide travel lanes to allow two-way traffic. A stop sign would control traffic at the intersection with the entrance road. The posted speed limit would be 10 miles per hour. The new access road would tie into the existing end loop of Route 202 on the west side of Frijoles Creek to restore access to parking areas, picnic areas, and trailheads previously accessed by the upstream bridge that was removed near the visitor center.

A total of about 0.22 acre of new disturbance would occur with construction of the new vehicular crossing and access road. Native trees and vegetation would be preserved to the extent possible to blend the crossing and access road into the natural landscape. Construction of the crossing and access road would require removal of 8 to 10 ponderosa pine and elm trees. Temporarily disturbed areas would be revegetated with native plants following construction.

Road Repairs and Parking Improvements Routes 201 and 202

Routes 201 and 202 (Figure 2), which were damaged by flooding, would be repaired. Route 201 begins from the old bridge crossing and extends north about 1,350 feet to a loop turnaround. Route 202 also begins at the old bridge crossing and extends about 900 feet south to the proposed new vehicular crossing. Improvements to both roads include removing flood-deposited sediment and debris, pulverizing existing pavement and supplementing with aggregate base, and repaving. The pavement width would vary from 9 to 18 feet depending on site conditions. The existing road and parking areas on Route 201 would be repaired and replaced in-kind with no substantial change from the pre-flood footprint. Widening of Route 202 to about 18 feet would be needed to accommodate two-way traffic (Figure 4). A portion of the existing loop at the end of Route 202 would no longer be needed with the new vehicular crossing and entry road. Thus, about 2,060 square feet of the loop road near Frijoles Creek would be obliterated and revegetated. About 8 to 10 ponderosa pine trees would need to be removed on the margin of the existing road to allow road widening. New permanent disturbance from selective widening of Route 202 would impact about 0.47 acre.

Paved pullouts would be reestablished and repaired using similar methods as road work. Unpaved pullouts would remain unpaved. Head-in or diagonal parking would be used with accessible parking areas signed.

A new ¾-inch PVC water line would be buried within the footprint of the proposed road work on Routes 201 and 202 prior to road paving. It is anticipated the water line would be installed with a “Ditch Witch” type trencher to minimize the excavation area. The approximate 1,500-foot water line would be buried to a depth of at least 42 inches to prevent freezing. The water line would connect to an existing water line on the east side of Frijoles Creek at the location of the picnic area pedestrian bridge replacement (Figure 2). The water line would be encased in concrete under Frijoles Creek to protect it from damage during high streamflow. The proposed new water line would serve water fountains at each end of Routes 201 and 202.

Figure 4. Damaged Section of Route 202 Needing Repair and Widening.

Entrance Road Repair

The flood-damaged entrance road shoulder and asphalt at an existing culvert headwall would be repaired (Figure 2). The existing historic stone headwall is in good condition, but flooding has created a steep eroded drop-off. Repair options include extending the existing culvert and burying the headwall or raising the headwall (this would provide a safety clear zone for vehicular traffic). Because of the angle of the culvert outlet and existing historic stone deflectors (wing walls) at the culvert outlet, flexible plastic pipe may be used for the culvert extension to keep the flow in the channel and to minimize any erosion of the channel side slope. A stone apron would be constructed at the culvert outlet to dissipate flows. Existing debris would be removed and reshaped at the inlet. The road shoulder above the culvert would be widened slightly to accommodate a possible future bike lane. Aggregate material would be used for the road shoulder.

Picnic Area Pedestrian Bridge Replacement

The pedestrian bridge north of the visitor center that was removed because of flooding would be replaced (Figure 2). This work includes removing the existing nonhistoric bridge abutments that constrict the Frijoles Creek channel and constructing new concrete abutments that allow the new bridge to span Frijoles Creek. A new timber pedestrian bridge approximately 40 feet long with a slight realignment would be constructed on the new abutments. The previous pedestrian

bridge had a span of 28.5 feet. The proposed new bridge would be slightly elevated and lengthened so that higher flood and debris flows can be passed with less risk to the bridge and less flooding of historic areas. At high flows, the bridge would be designed to break away and not capture flood debris. Gravel trail connections on either side of the bridge would be reestablished. The steep trail gradient to the bridge on the east side would be raised slightly to make the approach to the bridge safer to access. The proposed water line from Routes 201 and 202 would cross at this pedestrian bridge and would connect to an existing water line on the east side of the bridge.

Pedestrian Bridge at Parking Lot

The pedestrian bridge at the southwest corner of the visitor center parking lot would be replaced with a new bridge (Figure 2). The existing abutments are structurally sound and would require only minor repair or rebuilding to accommodate the new bridge. The proposed timber bridge would be designed to break away at high flows and not obstruct flood flow or capture debris. On the visitor center side, the bridge connects to an existing nonhistoric stone path with stone/masonry curbing. A portion of this path would be reconstructed to meet the top of the new bridge deck. An existing 4-foot-wide asphalt path that leads from Route 201 to the bridge would be rehabilitated as part of the project.

Removal of Approach to Old Bridge

The existing asphalt pavement approach to the vehicular bridge near the visitor center that was removed prior to flooding would be obliterated (Figure 2). The bridge approach on the west side also would be obliterated. About 265 square feet of the obliterated area not used as a service road would be revegetated with native species. Large rocks would be placed along the old bridge approach to prevent vehicles from traveling that direction. Asphalt would be recycled elsewhere in this project or disposed of outside of the Monument.

Staging, Materials, and Disposal

Temporary staging and stockpiling areas would be needed for equipment and material storage during construction. Staging and stockpiling areas would be located within existing disturbed areas of the Monument including the stables area, a portion of the main parking area as needed, or along Routes 201 and 202. No new disturbance would be needed to support staging operations.

Any fill material needed for proposed work would come from Monument-approved weed-free commercial sources outside of the Monument. Disposal of any excess material, not suitable for use as fill, would be transported outside of the Monument to a suitable commercial landfill or recycling facility.

Dust Control and Water Use

Water that would be used for dust control, compaction of base material, and incidental needs related to the construction would be trucked in from sources outside of the Monument. Water needs for this project are anticipated to be about 120,000 gallons over the duration of the project, with deliveries averaging about three or four times per week. Water transport equipment would be decontaminated prior to use.

Erosion Control

This project would use filter barriers and Best Management Practices to protect Frijoles Creek and minimize erosion and sedimentation during construction activities. A stormwater pollution prevention plan would be prepared before implementation of the project.

Conservation Measures

The following mitigation measures/design criteria would be implemented to protect the Mexican spotted owl:

- Preconstruction surveys for Mexican spotted owl nesting would be conducted within ¼ mile of the project area prior to construction activities.
- Ponderosa pine nest trees potentially used by Mexican spotted owls would be removed prior to the breeding season.
- No night work would be allowed.
- 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.

Additional conservation measures include:

- Disturbance to vegetation would be avoided as much as possible and contained to as small a footprint as possible while meeting project objectives. Tree removal would be limited to the minimum necessary for installation of a new vehicular crossing and road improvements.
- Monument staff would inform construction personnel of the occurrence and status of the Mexican spotted owl within the project area, the potential impacts construction activities may have on the species, and the potential penalties for taking or harming this species.

Schedule

Construction of the new vehicular crossing and crossing access road, rehabilitation of Routes 201 and 202, construction of two pedestrian bridges, entrance road repairs, and other actions would take approximately 14 weeks to complete. It is anticipated that work would begin in April 2015 and would be completed by August 20, 2015. No night work would be allowed, but extended hours may be allowed on occasion.

DESCRIPTION OF THE ACTION AREA

The action area includes all areas where threatened, endangered, candidate, or proposed species may be directly or indirectly affected by the proposed action. The action area is defined as the section of Frijoles Creek from the picnic area pedestrian bridge downstream to the new vehicular crossing, as shown in Figure 2, and all areas within 0.25 mile.

The action area includes the most heavily visited portion of the Monument, including the main paved parking area, visitor center and gift shop, employee housing, entrance road, backpacker parking area, picnic area, trailheads, trails, and pedestrian bridges. The action area is fragmented by this existing development. Frijoles Creek within the action area is bordered on

both sides by existing roads or trails and is crossed by three existing or previously existing bridges.

Vegetation along Frijoles Creek includes ponderosa pine (*Pinus ponderosa*), box elder (*Acer negundo*), and cottonwood (*Populus angustifolia*), with an understory of New Mexico olive (*Foresteria pubescens*), alder (*Alnus oblongifolia*), and various forbs such as goosefoot (*Chenopodium* sp.). Much of the vegetation along the creek has been impacted by past flooding, resulting in damage to trees and shrubs and a relatively sparse understory.

SPECIES ACCOUNTS AND STATUS OF SPECIES IN THE ACTION AREA

Federally listed threatened, endangered, candidate, and proposed species potentially occurring in the action area are presented in Table 1.

Table 1. Threatened, endangered, candidate/proposed species with the potential to occur in the action area.

Species Common and Scientific Name	Status ¹	Potential to Occur	Rationale for Exclusion ²	Habitat Description and Range
FISHES				
Rio Grande silvery minnow <i>Hybognathus amarus</i>	E	No	ODR	Occupies a variety of habitats in low-gradient large streams with shifting sand or silty bottoms. Not known to be present along the Rio Grande reach adjacent to Bandelier's southeastern boundary.
AMPHIBIANS AND REPTILES				
Jemez Mountains salamander <i>Plethodon neomexicanus</i>	P	No	ELE, HAB	Restricted to the Jemez Mountains in northern New Mexico in Los Alamos, Rio Arriba, and Sandoval Counties. The action area is outside the elevation range of this species.
MAMMALS				
New Mexico jumping mouse <i>Zapus hudsonius luteus</i>	E	No	ODR, HAB	In the Jemez Mountains, this species uses wetlands with tall dense herbaceous vegetation, especially sedges, on perennially moist soil. No suitable habitat for this species is present in the action area. The nearest known population is 15 miles away, on the other side of the mountains from the action area.
BIRDS				
Mexican spotted owl <i>Strix occidentalis lucida</i>	T, CH	Yes		This species is found in steep-sided canyons with old-growth mixed conifer forests. Nesting occurs on cliff ledges or caves along canyon walls in shady/cool canyons. Known to occur in the action area.
Southwestern willow flycatcher (SWFL) <i>Empidonax traillii extimus</i>	E	No	HAB	The action area is not suitable habitat for this species. SWFL likely occurs along the Rio Grande, although no nesting has been documented.

Species Common and Scientific Name	Status ¹	Potential to Occur	Rationale for Exclusion ²	Habitat Description and Range
Yellow-billed cuckoo <i>Coccyzus americanus</i>	T	No	HAB	In the western U.S., this species breeds in large blocks of riparian habitats, particularly woodlands with cottonwoods (<i>Populus fremontii</i>) and willows (<i>Salix</i> sp.). This species has never been documented at the Monument, and the action area does not provide suitable habitat.

The U.S. Fish and Wildlife Service species list (USFWS 2014) was obtained and reviewed and species not having the potential to occur were excluded from further review with a no effect determination.

¹**Status Codes:** **E**=federally listed endangered; **T**=federally listed threatened; **C**=federal candidate for listing; **P**=federally proposed for listing; and **CH**=designated critical habitat.

²**Exclusion Rationale Codes:** **ODR**=outside known distributional range of the species; **HAB**=no habitat present in analysis area; **ELE**=outside of elevation range of species; and **SEA**=species not expected to occur during the season of use/impact.

As indicated in Table 1, the Mexican spotted owl is the only federally listed threatened, endangered, candidate, or proposed species with the potential to occur in the action area. Therefore, only the Mexican spotted owl is addressed hereafter in this BA. The remaining species in Table 1 without potential to occur are not analyzed further based on the rationale provided. The proposed action would have no effect on any of these other species.

Mexican Spotted Owl

Species Background

The USFWS listed the Mexican spotted owl as threatened on March 16, 1993 (58 CFR 14248). The Mexican spotted owl ranges throughout Utah and portions of Colorado, Arizona, Texas, New Mexico, and Mexico. Threats include historic and continued habitat alteration from timber harvest practices that produce and maintain even-aged forest stand conditions. The Mexican spotted owl is also threatened in some areas by the potential for high-severity stand-replacing fire (USFWS 2012).

The USFWS Recovery Plan (1995 and 2012) gives guidelines for forested areas and recommends retaining large trees (greater than 24 inches diameter at breast height (dbh)) unless overriding management situations require the tree removal to protect human safety (such as the removal of hazard trees along roads). Key habitat components for Mexican spotted owls in forested environments consist of very large trees (greater than 24 inches dbh), other large trees (18 to 24 inches dbh), large snags, large down logs, and hardwoods with multilayered canopies (USFWS 2012).

The nesting season for the Mexican spotted owl is March 1 through August 31, during which time a mated pair may defend a breeding territory. Mexican spotted owls nest on cliff ledges and caves, in stick nests built by other birds, on debris platforms in trees, and in tree cavities (Ganey and Balda 1989). Tree nests are constructed on platforms such as old squirrel nests or other raptor nests, in cavities formed by broken off branches or tops, and on witches' brooms formed by dwarf mistletoe (*Arceuthobium* sp.). Eggs are typically laid in early April and incubation lasts approximately 30 days when the female rarely leaves the nest. Eggs usually hatch in early May (Ganey 1988) and the owlets fledge in early to mid-June, four or five weeks after hatching (Ganey 1988). Dispersal typically occurs in September through early October (Ganey et al. 1998).

Critical Habitat

On August 31, 2004, the USFWS issued a final rule designating critical habitat for the Mexican spotted owl (69 Federal Register 53182). Critical habitat boundaries were expanded with the final rule. Within the critical habitat boundaries, critical habitat only includes protected or restricted habitat (USFWS 1995, 2012).

Critical habitat includes Mexican spotted owl protected (occupied) and recovery habitat. As defined by the 2012 Mexican spotted owl recovery plan, Primary Activity Centers (PACs) are “a minimum area of 600 acres surrounding the ‘activity center,’ which includes the nest site, a roost grove commonly used during the breeding season in the absence of a verified nest site, or the best roosting/nesting habitat if both nesting and roosting information are lacking” (USFWS 2012). PACs exist for the life of the recovery plan even if Mexican spotted owls are not located during subsequent years and the nest becomes inactive. Recovery habitat is currently unoccupied pine-oak or mixed conifer forest that meets the definition of Mexican spotted owl habitat in the revised recovery plan (USFWS 2012).

The primary constituent elements (PCEs) for Mexican spotted owl critical habitat are as follows (USFWS 2012):

For forest structure:

- A range of tree species, including mixed conifer, pine-oak, and riparian forest types composed of different tree sizes reflecting different ages of trees, 30% to 45% of which are large trees with a trunk diameter of 12 inches or more when measured 4.5 feet from the ground;
- A shade canopy created by the tree branches covering 40% or more of the ground; and
- Large dead trees (snags) with a trunk diameter of at least 12 inches when measured 4.5 feet from the ground.

For maintenance of adequate prey species:

- High volumes of fallen trees and other woody debris;
- A wide range of tree and plant species, including hardwoods; and
- Adequate levels of residual plant cover to maintain fruits and seeds and allow plant regeneration.

For canyon habitat:

- Presence of water (often providing cooler and higher humidity than the surrounding areas);
- Clumps or stringers of mixed-conifer, pine-oak, piñon-juniper, and/or riparian vegetation;
- Canyon wall containing crevices, ledges, or caves; and
- High percentage of ground litter and woody debris.

The action area is within critical habitat unit SRM-NM-4, which totals 57,297 acres. The entire Monument (33,727 acres) is within designated critical habitat for the Mexican spotted owl. Not all designated critical habitat at the Monument is suitable for Mexican spotted owls. Areas such as parking lots and developed areas with buildings are not suitable habitat.

Habitat and Occurrence in the Action Area

Bandelier lies within the Southern Rocky Mountains—New Mexico Recovery Unit (USFWS 1995) and within designated critical habitat for Mexican spotted owls (66 CFR 8530). Within Bandelier, three classes of spotted owl habitat are recognized for management purposes: nesting, roosting, and foraging habitat. Nesting habitat consists of areas where owls are likely to nest and regularly roost during the breeding season, as described above. Every Mexican spotted owl nest located to date in the Jemez Mountains has been on a cliff, even in areas where extensive tree-nesting habitat is present. The volcanic rocks of the Jemez Mountains provide eroded pockets that provide good shelter for nesting Mexican spotted owls, and nesting at the Monument occurs exclusively in these eroded pockets (Fettig, pers. comm. 2014). Roosting habitat consists of areas with large trees that may provide roosting sites for Mexican spotted owls outside of nesting habitat. Foraging habitat is all other areas where Mexican spotted owls may forage and includes most other areas at the Monument. Much of the Mexican spotted owl foraging and roosting habitat at the Monument was damaged or destroyed by the Las Conchas fire in 2011.

NPS staff have conducted Mexican spotted owl surveys at the Monument for more than 20 years. The nearest known PAC to the action area is about 2 miles away. The action area has been surveyed annually following USFWS survey protocols since 2002. No Mexican spotted owl has ever been observed during these surveys and no responses have been noted to pre-dawn calling (Fettig, pers. comm. 2014). The action area is not suitable nesting habitat since it lacks cliffs with eroded pockets typically used by nesting Mexican spotted owls in the Jemez Mountains. The action area does contain potential roosting and foraging habitat in the riparian area along Frijoles Creek. It is possible that a dispersing or roosting Mexican spotted owl could occur in the action area; however, the owl would not be expected to remain in the area for long, and there are no records of Mexican spotted owls in the action area.

ENVIRONMENTAL BASELINE

As defined under the ESA, the environmental baseline includes past and present impacts of all federal, state, and private actions in the action area; the anticipated impacts of all proposed federal actions in the action area that have undergone formal or early Section 7 consultation; and the impact of state and private actions that are contemporaneous with the Section 7 consultation process. Future actions and their potential effects are not included in the environmental baseline.

Past actions in the action area included construction of the entrance road, parking areas, visitor center, gift shop, employee housing and other buildings, pedestrian and vehicular bridges, trails, trailheads, and other man-made features. The action area is a high-use area. The Monument has averaged about 225,000 visitors per year over the last decade, many of whom visit the developed facilities within the action area. This high level of development has fragmented habitat for the Mexican spotted owl and ongoing recreational use and human presence has likely resulted in less use of the area by Mexican spotted owls.

Numerous wildfires have burned portions of the Monument over the years. In June 2011, the Las Conchas fire burned more than 156,000 acres in and surrounding the Monument, including more than 80% of the Frijoles Canyon watershed. The fire eliminated or degraded much of the Mexican spotted owl habitat in the Monument. The fire resulted in less vegetation cover in the Frijoles Canyon watershed, which in turn resulted in a greater frequency of flash floods. The impacts of erosion have included landslides, debris flows, channel scouring, undercutting of

canyon walls, widening and movement of the channel, aggradation of sediment in the channel, and the transport and deposition of large rocks in the channel. It is unknown if increased flooding has had adverse effects on spotted owls.

EFFECTS ANALYSIS

Direct and Indirect Effects on Mexican Spotted Owls

The proposed action would result in a temporary increase in human activity and noise from construction equipment in the action area during construction (about 14 weeks from April through August 2015). Currently, noise and human activity in the action area occurs as a result of frequent automobile, bus, and motorcycle traffic and visitor use of trails, parking areas, and visitor facilities.

Studies have determined that noise-related disturbance can affect nesting, roosting, and feeding activities of spotted owls (Delaney et al. 1999; Delaney and Grubb 2004; USFWS 2006). Reactions of birds to noise are complex and depend on a number of variables including topography, vegetation type, noise levels and distance to receptors, and the life stage of the species. Behavioral and physiological responses to noise disturbance have been reported in the literature. Behavioral responses may include increased alertness, turning toward the sound of the disturbance, fleeing the disturbance, changes in patterns of activity, changes in habitat use, and nest abandonment. Physiological effects could include increased respiration and heart rate as well as temporary or permanent hearing threshold shifts and masking of auditory signals.

No suitable nesting habitat for the Mexican spotted owl is present in the action area; therefore, nesting owls would not be affected by the proposed action. Although the proposed action is more than 2 miles from the nearest known PAC, it is possible that a Mexican spotted owl could roost in the action area before or during construction. If this were to happen, it is possible a Mexican spotted owl could be displaced from the action area by the increased noise and human activity resulting from construction. These effects would be minimal and temporary (lasting about 14 weeks) because of the presence of potential roosting and foraging habitat in the surrounding area. While project activities could cause Mexican spotted owls to avoid the immediate project areas during periods of active construction, the proposed action would not reduce the ability of Mexican spotted owls to forage in the nearby vicinity and would not result in a reduction of prey availability. Noise-related effects would be short-term, occurring only during the 14-week construction period. After construction is complete, noise levels would return to existing ambient levels.

The majority of project activities would occur in previously disturbed nonhabitat areas such as existing trails, roads, and bridge crossing sites. About 0.22 acre of new permanent disturbance would occur at the new vehicular bridge crossing and about 0.47 acre of vegetation would be permanently disturbed by widening of Route 202. Total permanent impacts on vegetation would be 0.67 acre. Less than 20 trees, mostly ponderosa pines, would be removed. The effects of habitat loss and tree removal would be permanent, but are expected to have little impact on potential Mexican spotted owl roosting and foraging habitat within the action area. The access road to the new vehicular crossing would be partially located along an existing dirt road to reduce native vegetation disturbance. Temporary disturbances would be revegetated with native vegetation after construction is completed and portions of abandoned road would be obliterated and revegetated.

The potential for impacts would be greatly reduced by implementing the conservation measures described above. Tree removal would occur prior to March 1 to avoid impacts on migratory birds and eliminate the possibility that a tree would be removed while being used for roosting by Mexican spotted owls. The NPS would conduct surveys for Mexican spotted owls in the action area before work starts to verify that no Mexican spotted owls are present. If a Mexican spotted owl is identified in the action area, the action area would be resurveyed daily until the Mexican spotted owl is confirmed to have left the area. Additionally, construction would occur only during daylight hours at a time when the owls are not foraging. This would likely reduce the potential for disturbing foraging owls.

With implementation of the conservation measures, direct effects on Mexican spotted owls are extremely unlikely to occur and impacts would be insignificant and discountable. Indirect effects from loss of foraging or roosting habitat would be about 0.67 acre and would be insignificant given the amount of habitat available at the Monument, which is about 33,727 acres. Loss of foraging and roosting habitat would be less than 0.002% of the total spotted owl habitat available at the Monument.

Effects on Critical Habitat

Most impacts from the proposed action would occur within previously disturbed areas such as existing roads, trails, and parking areas that do not contain the PCEs of Mexican spotted owl critical habitat. A total of 0.67 acre of vegetation containing the PCEs for Mexican spotted owl would be disturbed as a result of the proposed action. Although a small amount of vegetation, including up to 20 ponderosa pine trees, would be removed, the action area would continue to provide the same PCEs following construction as prior to construction. No suitable nesting habitat or PACs would be affected. The permanent impacts on critical habitat would be 0.67 acre. This is less than 0.0012% of the total amount of designated critical habitat in the SRM-NM-4 critical habitat unit and less than 0.002% of the total designated critical habitat at the Monument. The loss of critical habitat would be relatively small compared with the available habitat, the habitat in the action area is highly fragmented, and the action area is a high-use area. Therefore, the impacts on critical habitat from the proposed action would be insignificant and discountable.

Cumulative Effects

Cumulative effects are the effects of past, present, and reasonably foreseeable future activities of state, local, or private actions in the proposed action area. As defined under Section 7 of the ESA, the BA should consider:

“those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation.” [50 CFR § 402.02]

Cumulative effects only involve future actions, “past and present impacts of nonfederal actions are part of the environmental baseline. Future federal actions requiring separate consultation (unrelated to the proposed action) are not considered in the cumulative effects section” (USFWS 1998). Section 7 only requires consideration of future private actions that are reasonably certain to occur.

There are no known nonfederal activities in the area; the action area is surrounded by federal lands. Future federal projects in the area would be addressed under separate Section 7 consultation.

EFFECTS DETERMINATION

Mexican Spotted Owl and Critical Habitat

Past surveys have shown that Mexican spotted owls are not present in the action area. The action area contains suitable roosting and foraging habitat for Mexican spotted owls, but suitable nesting habitat is not present. Disturbance to breeding Mexican spotted owls would be avoided because the nearest PAC is more than 2 miles away. Current year surveys would be performed before beginning work in the action area. If surveys reveal Mexican spotted owl presence in the action area, construction activity would be delayed or halted until additional surveys confirm that Mexican spotted owls are no longer present in the area. Vegetation removal would occur mostly within existing disturbed areas, with only 0.67 acre of suitable roosting and foraging habitat permanently affected, which is less than 0.002% of the available habitat at the Monument. No incidental take is expected as a result of the proposed action. Considering the current status of the spotted owl in the project area, and the direct, indirect, and cumulative effects of the proposed action, the Monument concludes that the proposed action **may affect, but is not likely to adversely affect**, the Mexican spotted owl and its designated critical habitat, as the effects of this action are insignificant and discountable for the reasons previously described.

Other Listed Species

Due to the low likelihood of the occurrence of the Rio Grande silvery minnow, Jemez Mountains salamander, New Mexico jumping mouse, southwestern willow flycatcher, and yellow-billed cuckoo within the Monument and adjacent to project activities, there would be **no effect** on these species.

NEED FOR REASSESSMENT BASED ON CHANGED CONDITIONS

This BA and findings above are based on the best current data and scientific information available. A new analysis and revised BA must be prepared if one or more of the following occurs: (1) new species information (including, but not limited to, a newly discovered activity area or other species information) reveals effects on threatened, endangered, candidate, or proposed species or designated/proposed critical habitat in a manner or to an extent not considered in this assessment; (2) the action is subsequently modified or it is not fully implemented as described herein, which causes an effect that was not considered in this assessment; or (3) a new species is listed or critical habitat is designated that may be affected by the action that was not previously analyzed herein.

LIST OF CONTACTS/PREPARERS

Steve Butler, ERO Resources Corporation, Ecologist
Mark DeHaven, ERO Resources Corporation, Natural Resource Specialist
Steve Fettig, Bandelier National Monument, Wildlife Biologist
Mike Wrigley, NPS Regional Wildlife Biologist/Endangered Species Coordinator
Laurie Domler, NPS Denver Service Center

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Appendix C: Memorandum of Understanding

**MEMORANDUM OF AGREEMENT (MOA)
BETWEEN THE UNITED STATES DEPARTMENT OF THE INTERIOR (NATIONAL PARK SERVICE)
AND THE NEW MEXICO STATE HISTORIC PRESERVATION OFFICER REGARDING THE
RECONSTRUCTION OF VEHICLE AND PEDESTRIAN BRIDGES FOR FRIJoles CANYON
EMERGENCY FLOOD REPAIR AT BANDELIER NATIONAL MONUMENT**

WHEREAS, the United States Department of the Interior, National Park Service, Bandelier National Monument (NPS) proposes to reconstruct vehicle and pedestrian bridges for Frijoles Canyon emergency flood repair at Bandelier National Monument (the Undertaking, see Appendix A) and in doing so must meet the requirements of Sections 106 and 110(f) of the National Historic Preservation Act (16 U.S.C. 470f, 470h-2(f)); and

WHEREAS, the Federal Highways Administration—Central Federal Lands, Highway Division is providing funding, design, and construction services for this project through the Emergency Relief for Federally Owned Roads (ERFO) Program and has designated the National Park Service as lead federal agency for compliance with Section 106 of the National Historic Preservation Act; and

WHEREAS, the NPS consulted with the New Mexico State Historic Preservation Officer (SHPO) pursuant to the November 14, 2008 *Programmatic Agreement among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers* (NPS Nationwide PA) and 36 CFR Part 800; and

WHEREAS, the NPS and SHPO concur that the area of potential effect is the Frijoles Historic District (see Appendix B), which on July 18, 2006 the NPS and SHPO concurred was eligible for listing in the National Register of Historic Places; and

WHEREAS, the NPS and SHPO determined that the Undertaking shall adversely affect the Frijoles Canyon Historic District and the Bandelier CCC National Historic Landmark District, as defined at 36 CFR §800.16(l)(1); and

WHEREAS, the NPS provided for public involvement and considered alternatives to the Undertaking in the context of complying with the National Environmental Policy Act of 1969 (NEPA) pursuant to 36 CFR §800.8 and included a draft of the MOA with the EA for public review and comment; and

WHEREAS, the NPS consulted with the six Pueblos traditionally associated with Bandelier National Monument (San Ildefonso, Cochiti Pueblo, San Felipe Pueblo, Santa Clara Pueblo, Santo Domingo Pueblo, Zuni Pueblo) concerning the Undertaking and historic properties of cultural significance to them; and

WHEREAS, the Tribes **agreed/declined** to participate in the negotiation of the MOA pursuant to 36 CFR §800....; and

WHEREAS, the NPS notified the Advisory Council on Historic Preservation (ACHP) of the potential adverse effect pursuant to 36 CFR §800.6(a)(1)(i)(B); and

WHEREAS, the ACHP **agreed/declined** to participate pursuant to 36 CFR §800.6(a)(1)(iv); and

NOW, THEREFORE, the NPS and SHPO agree that the Undertaking shall be implemented in accordance with the following stipulations in order to take into account the effects of the Undertaking on historic properties, and further agree that these stipulations shall govern the Undertaking and all of its parts until this MOA expires or is terminated.

STIPULATIONS

(I) PROFESSIONAL QUALIFICATIONS AND STANDARDS

A. The NPS will ensure that all work performed that has the potential to have an effect, directly or indirectly, on historic properties is performed or supervised by qualified individuals and/or teams that meet the *Secretary of the Interior's Historic Preservation Professional Qualification Standards*, 62 Fed. Reg. 33,707 (June 20, 1997), for history, architectural history, architecture, historic architecture and conservation, landscape architecture and/or archeology, as appropriate. Nothing in this stipulation may be interpreted to preclude NPS or any agent or contractor thereof from using the properly supervised services of persons who do not meet the professional qualification standards.

B. Any testing, inventory or documentation of potential or known historic properties pursuant to implementation of the MOA shall conform to the provisions of the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation* (48 FR. 44716-44740) and applicable standards and guidelines for historic preservation established by the New Mexico SHPO.

(II) DOCUMENTATION

NPS will document site conditions prior to and after construction through digital photographs. The photographs will at a minimum include the picnic area bridge, pedestrian bridge, new vehicle crossing and road, culvert headwall and, and representative areas along routes 201 and 202 as depicted in See Figure 1 below (Appendix A). Photos will meet National Register standards.

(III) Project Review

A. NPS and FHWA will ensure that the project plans and specifications meet the recommendations in the 100% draft cultural landscape report to the maximum extent possible, including the design of pedestrian bridges, road treatments, and recommended vegetative pallets. NPS will provide the SHPO with a copy of the plans and a description of how these recommendations adhered to for review and comment.

B. Construction materials shall not be staged on undisturbed surfaces, especially within the footprint of archeological sites. Proposed staging areas will be indicated on the project plans for review.

OTHER STIPULATIONS NEGOTIATED BETWEEN NPS AND SHPO....

(IV) INADVERTANT DISCOVERIES AND UNANTICIPATED EFFECTS

A. In the event that previously unreported and unanticipated historic properties or unanticipated effects to already known historic properties are found during activities conducted by or on behalf of the NPS, the NPS shall protect the discovery location consult with the SHPO to identify and evaluate, and to avoid, minimize, or mitigate any adverse effect to, the historic property consistent with 36 CFR 800.13(b) and 36 CFR Part 60.

B. In the event that cultural items subject to the Native American Graves Protection and Repatriation Act (NAGPRA) are discovered, Section VI of the NPS Nationwide PA and Section 3(c) of NAGPRA will be followed.

(V) DISPUTE RESOLUTION

A. Should the signatories executing this MOA at any time object in writing to the manner in which the terms of this MOA are implemented, to any action carried out or proposed with respect to implementation of this MOA, or to any document prepared in accordance with and subject to the terms of this MOA, the objecting party shall notify the other signatory, and the signatories shall consult within seven calendar days to resolve the objection.

B. If the objection is resolved through consultation, the NPS may proceed with the disputed action in accordance with the terms of such resolution.

C. If, after initiating consultation, the NPS determines that the objection cannot be resolved through consultation, or if the duration of the consultation has exceeded 15 days from the commencement of consultation to resolve the dispute, the NPS shall forward all documentation relevant to the objection to the ACHP, including the NPS's proposed resolution of the objection, with the expectation that the ACHP shall within 30 days after receipt of such documentation:

1. Advise the NPS that the ACHP concurs in the NPS's proposed resolution of the objection, whereupon the NPS shall notify the signatories executing this MOA, and NPS shall resolve the objection accordingly; or
2. Provide the NPS with recommendations, which the NPS shall take into account in reaching a final decision to resolve the objection. The NPS shall notify the signatories executing this MOA of its final decision.

D. The procedures outlined in stipulations (V)A to (V)C, above, shall apply only to the subject of the objection. The NPS's responsibility to carry out all actions under this MOA that are not the subjects of the objection, and which do not foreclose the consideration of alternatives to resolve the objection, shall remain unchanged.

(VI) ADMINISTRATIVE PROVISIONS

A. Effective date of the MOA. This MOA shall take effect on the date that it has been signed by the last executing signatory.

B. Amendments. Any signatory executing this MOA may propose that this MOA be amended, whereupon the NPS and other executing signatories shall consult to consider such amendment. This MOA may be amended only upon the written agreement of the executing signatories. The amendment shall be effective on the date a copy signed by all of the signatories is filed with the ACHP by the NPS.

C. Termination. If any signatory executing this MOA proposes termination of the MOA, the party proposing termination shall, in writing, notify the other signatories executing this MOA, explain the reasons for proposing termination, and consult to seek alternatives to termination. Should such consultation fail, the signatory proposing termination may terminate this MOA by promptly notifying in writing the other executing signatories. Termination shall render this MOA without further force or effect. Should this MOA be terminated, the NPS shall consult regarding the Undertaking with the executing signatories in accordance with 36 CFR Part 800.

D. Duration of the MOA. Unless terminated pursuant to stipulation (VI)B, the duration of this MOA is five years from the date of its execution. NPS may initiate consultation with the signatories executing this MOA approximately one (1) year prior to the expiration date of this MOA to reconsider its terms. Reconsideration may include the continuation or revision of this MOA by amendment or termination.

E. Anti-deficiency Act. Any requirement for the payment or obligation of funds by the Government established by the terms of this MOA shall be subject to availability of appropriated funds. No provision in this MOA shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, 31 USC Section 1341. If the availability of funds and compliance with the Anti-Deficiency Act impair the NPS' ability to perform under this MOA, then the NPS shall consult in accordance with stipulation VI.B of this MOA.

Execution of this MOA and implementation of its terms evidence that the NPS has taken into account the effects of this Undertaking on historic properties and has afforded the ACHP an opportunity to comment on the Undertaking and its effect on historic properties.

SIGNATORIES

NATIONAL PARK SERVICE

Jason Lott
Superintendent, Bandelier National Monument

Date: _____

NEW MEXICO STATE HISTORIC PRESERVATION OFFICER

Dr. Jeff Pappas
State Historic Preservation Officer

Date: _____

CONCURRING PARTIES

FEDERAL HIGHWAYS ADMINISTRATION

Justin Henwood

Date: _____

SAN ILDEFONSO PUEBLO

Signatory

Date: _____

COCHITI PUEBLO

Signatory

Date: _____

SAN FELIPE PUEBLO

Signatory

Date: _____

SANTA CLARA PUEBLO

Signatory

Date: _____

SANTO DOMINGO PUEBLO

Signatory

Date: _____

ZUNI PUEBLO

Signatory

Date: _____

APPENDIX A UNDERTAKING

The Undertaking is described as Alternative B on pages 7-12 of the EA for this project and reproduced below.

The Undertaking consists of constructing a new vehicular crossing of Frijoles Creek; road repairs and improvements to Routes 201 and 202, including installation of a water line; repairs to the shoulder of the entrance road and protection of a historic culvert headwall; and construction of two new replacement pedestrian bridges. The project area is about 5 acres and comprises less than 0.02% of the entire Monument.

New Vehicular Crossing and Access Road

A new vehicular crossing of Frijoles Creek would be constructed about 900 feet downstream from the previous bridge location near the visitor center (See Figure 1 below). The 24-foot-wide by 10-foot long crossing structure would consist of a cast-in-place box culvert or precast concrete box culvert constructed off-site and installed in the creek. Eight-foot concrete wing walls would be constructed on the inlet and outlet to protect the natural streambanks. Cast-in-place footings would be keyed into the bedrock to anchor the crossing. The low-profile crossing would have concrete curbs on the edges. The concrete would be colored to blend with the environment. The crossing design would allow passage of normal flows through the box culvert. High flows above the capacity of the culvert would pass over the top of the crossing without substantially impeding flows and allowing debris to be carried downstream without damaging the crossing structure of backing up streamflow. A conduit for future utilities would be included in the crossing design. Streamflow in Frijoles Creek would be diverted around the construction zone during placement of the crossing structure to protect water quality. This may involve a culvert bypass, a coffer dam and pumping, or other measure. Installation of the crossing structure would occur when streamflow is low.

Approximately 200 feet of new road would be constructed from the entrance road to the new vehicular crossing following an existing clearing that provides access to a sewage lift station (See Figure 1 below). The new road design includes two 9-foot-wide travel lanes to allow two-way traffic. A stop sign would control traffic at the intersection with the entrance road with a posted speed of 10 miles per hour. About 50 feet of new road would be constructed to tie into the existing end loop of Route 202 on the west side of Frijoles Creek to restore access to parking areas, picnic areas, and trailheads previously accessed by the upstream bridge that was removed near the visitor center.

A total of about 0.22 acre of new disturbance would occur with construction of the new vehicular crossing and access road. Native trees and vegetation would be preserved to the extent possible to blend the crossing and access road into the natural landscape. Construction of the crossing and access road would require removal of 8 to 10 ponderosa pine and elm trees. Temporarily disturbed areas would be revegetated with native plants following construction.

Road Repairs and Parking Improvements Routes 201 and 202

Routes 201 and 202 (See Figure 1 below), which were damaged by flooding, would be repaired. Route 201 begins from the old bridge crossing and extends north about 1,350 feet to a loop turnaround. Route 202 also begins at the old bridge crossing and extends about 900 feet south to the proposed new vehicular crossing. Improvements to both roads include: removing flood deposited sediment and debris, pulverizing existing pavement and supplementing with aggregate base, and repaving. The pavement width would vary from 9 to 18 feet depending on site conditions. The existing road and parking areas on Route 201 would be repaired and replaced in-kind with no substantial change from the pre-flood footprint. Widening of Route 202 to about 18 feet would be needed to accommodate two-way traffic. A portion of the existing loop at the end of Route 202 would no longer be needed with the new vehicular crossing and entry road. Thus, about 2,060 square feet of the loop road near Frijoles Creek would be obliterated and revegetated. About 8 to 10 ponderosa pine trees would need to be removed on the margin of the existing road to allow road widening. New permanent disturbance from selective widening of Route 202 would impact about 0.47 acre.

Paved pullouts would be reestablished and repaired using similar methods as road work. Unpaved pullouts would remain unpaved. Head-in or diagonal parking would be used with accessible parking areas signed.

A new ¾-inch PVC water line would be buried within the footprint of the proposed road work on Routes 201 and 202 prior to road paving. It is anticipated the water line would be installed with a “Ditch Witch” type trencher to minimize the area of excavation. The approximate 1,500-foot water line would be buried to a depth of at least 42 inches to prevent freezing. The water line would connect to an existing water line on the east side of Frijoles Creek at the location of the picnic area pedestrian bridge replacement (See Figure 1 below). The water line would be encased in concrete under Frijoles Creek to protect it from damage during high streamflow. The proposed new water line would replace an old and damaged line and would serve water fountains at each end of Routes 201 and 202.

Entrance Road Repair

The flood-damaged entrance road shoulder and asphalt at an existing culvert headwall would be repaired (See Figure 1 below). The existing historic stone headwall is in good condition, but flooding has created a steep eroded drop-off. Repair options include extending the existing culvert and burying the headwall or raising the headwall (this would provide a safety clear zone for vehicular traffic). Because of the angle of the culvert outlet and existing historic stone deflectors (wing walls) at the culvert outlet, flexible plastic pipe may be used for the culvert extension to keep the flow in the channel and to minimize any erosion of the channel side slope. A stone apron would be constructed at the culvert outlet to dissipate flows. Existing debris would be removed and reshaped at the inlet. The road shoulder above the culvert would be widened slightly to accommodate a possible future bike lane. Aggregate material would be used for the road shoulder.

Picnic Area Pedestrian Bridge Replacement

The pedestrian bridge north of the visitor center that was removed because of flooding would be replaced (See Figure 1 below). This work includes removing the existing nonhistoric bridge abutments that constrict the Frijoles Creek channel and constructing new concrete abutments that allow the new bridge to span Frijoles Creek. A new timber pedestrian bridge approximately 40 feet long with a slight realignment would be constructed on the new abutments. The previous pedestrian bridge had a span of 28.5 feet. The proposed new bridge would be slightly elevated and lengthened so that higher flood and debris flows can be passed with more likelihood of survival and less flooding of historic areas. At high flows, the bridge would be designed to break away and not capture flood debris. Gravel trail connections on either side of the bridge would be reestablished. The bridge design is based off of historic photographic documentation to be similar, but not the same. The steep trail gradient to the bridge on the east side would be raised slightly to make the approach to the bridge safer to access. The proposed water line from Routes 201 and 202 would cross at this pedestrian bridge and would connect to an existing water line on the east side of the bridge.

Pedestrian Bridge at Parking Lot

The pedestrian bridge at the southwest corner of the visitor center parking lot would be replaced with a new bridge designed to be similar to historic CCC bridges (See Figure 1 below). The existing abutments are structurally sound and would require only minor repair or rebuilding to accommodate the new bridge. The proposed timber bridge would be designed to break away at high flows and not obstruct flood flow or capture debris. On the visitor center side, the bridge connects to an existing nonhistoric stone path with stone/masonry curbing. A portion of this path would be reconstructed to meet the top of the new bridge deck. An existing 4-foot-wide asphalt path that leads from Route 201 to the bridge would be rehabilitated as part of the project.

Removal of Approach to Old Bridge

The existing asphalt pavement approach to the vehicular bridge near the visitor center that was removed prior to flooding would be obliterated (See Figure 1 below). The bridge approach on the west side also would be obliterated. About 265 square feet of the obliterated area not used as a service road would be revegetated with native species. Large rocks would be placed along the old bridge approach to prevent vehicles from traveling that direction. Asphalt would be recycled elsewhere in this project or disposed of outside of the Monument.

Staging, Materials, and Disposal

Temporary staging and stockpiling areas would be needed for equipment and material storage during construction. Staging and stockpiling areas would be located within existing disturbed areas of the Monument including the stables area, a portion of the main parking area as needed, or along Routes 201 and 202. No new disturbance would be needed to support staging operations. Any fill material needed for proposed work would come from Monument-approved weed-free commercial sources outside of the Monument. Disposal of any excess material, not suitable for use as fill, would be transported outside of the Monument to a suitable commercial landfill or recycling facility.

Soil Contamination

In 1995, the NPS discovered several areas near the proposed project area that were contaminated with DDT, a pesticide used in the park in the 1950s and 60s to control insect infestations. The extent of the DDT contaminated soil is not known, but DDT or decomposition byproducts could be present in the area of the proposed new vehicular crossing structure and access road. NPS and FHWA would conduct sampling of areas where soils would be disturbed for the new crossing and road prior to construction to determine if any remedial action or safety precautions are needed.

Dust Control and Water Use

Water that would be used for dust control, compaction of base material, and incidental needs related to the construction would be trucked in from sources outside of the Monument. Water needs for this project are anticipated to be about 120,000 gallons over the duration of the project, with deliveries averaging about three or four times per week. Water transport equipment would be decontaminated prior to use.

Invasive Plant Species Control

Procedures for limiting the introduction of invasive plant species from mechanical sources will be put in place. The archeological monitor or Construction Manager would insure that all equipment has been properly cleaned of dirt from previous projects before allowing the equipment on to the Monument.

Sustainability

The NPS has adopted the concept of sustainable design as a guiding principle of facility planning and development. The objectives of sustainability are to design park facilities to minimize adverse effects on natural and cultural values, to reflect their environmental setting, and to maintain and encourage native biodiversity; to construct and retrofit facilities using energy-efficient materials and building techniques; to operate and maintain facilities to promote their sustainability; and to illustrate and promote conservation principles and practices through sustainable design and ecologically sensitive use. Essentially, sustainability is living within the environment with the least impact on the environment. The preferred alternative subscribes to and supports the practice of sustainable planning and design by installing a new low-profile vehicular crossing that would convey normal flows and pass flood flows with minimal potential for flood damage compared with other designs. The new vehicular crossing would also be designed to pass debris and minimize impacts on surrounding resources and structures during flood events. Asphalt on Routes 201 and 202 would be pulverized and recycled in place in support of conservation principles. Pedestrian bridges would be designed to break away under high flows to reduce the potential to impact other structures during flooding. To the extent possible, the design and management of facilities would emphasize environmental sensitivity in construction, use of nontoxic materials, resource conservation, recycling, and integration of visitors with natural and cultural settings. The NPS also reduces energy costs, eliminates waste, and conserves energy resources by using energy-efficient and cost-effective technology. Energy efficiency is incorporated into the decision-making process during the design and acquisition of buildings, facilities, and transportation systems that emphasize the use of renewable energy sources.

Erosion Control

This project would use filter barriers and BMPs to protect Frijoles Creek and minimize erosion and sedimentation during construction activities. A stormwater pollution prevention plan would be prepared before implementation of the project.

Traffic Control and Visitor Access

The majority of the proposed work would be conducted away from the entrance road and would not disrupt vehicle travel in and out of the Monument. Exceptions include construction of the access road to the new vehicular crossing and repair of the eroded road shoulder along the entrance road, which would require closure of one lane of the entrance road. Alternating one-way traffic controlled by flaggers would be used to control traffic during this work. Lane closure for this work is expected to take less than two weeks.

Work on Routes 201 and 202 would affect pedestrian access to trailheads on the west side of Frijoles Creek. The Monument would maintain visitor access to trailheads during construction to the extent possible, but detours and alternate access routes may need to be established depending on the location and stage of construction activity. Any trail closures would be advertised in advance.

Schedule

Construction of the new vehicular crossing and crossing access road, rehabilitation of Routes 201 and 202, construction of two pedestrian bridges, entrance road repairs, and other actions would take approximately 14 weeks to complete. It is anticipated that work would begin in April 2015 and would be completed by August 20, 2015. No night work would be allowed, but extended hours may be allowed on occasion.

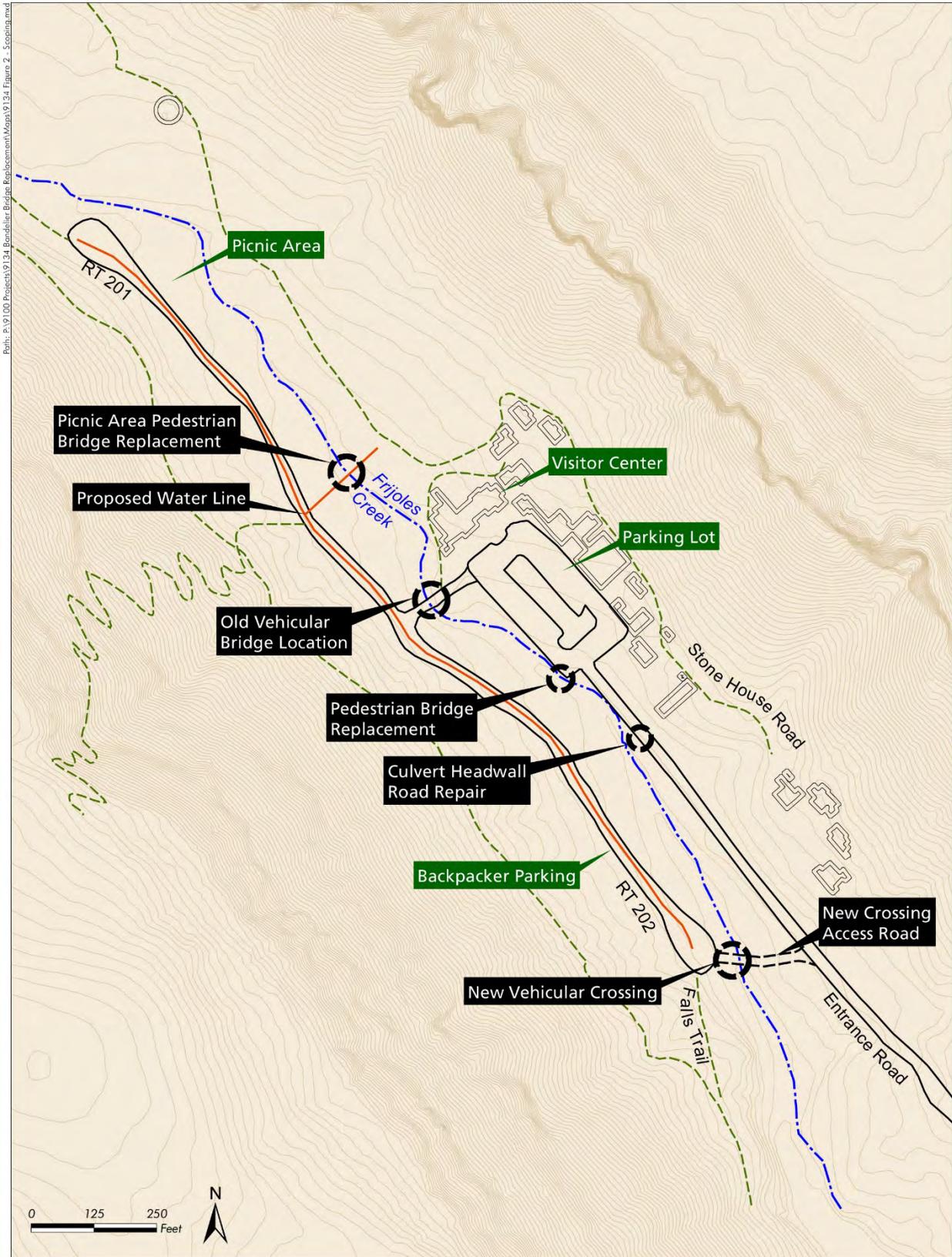
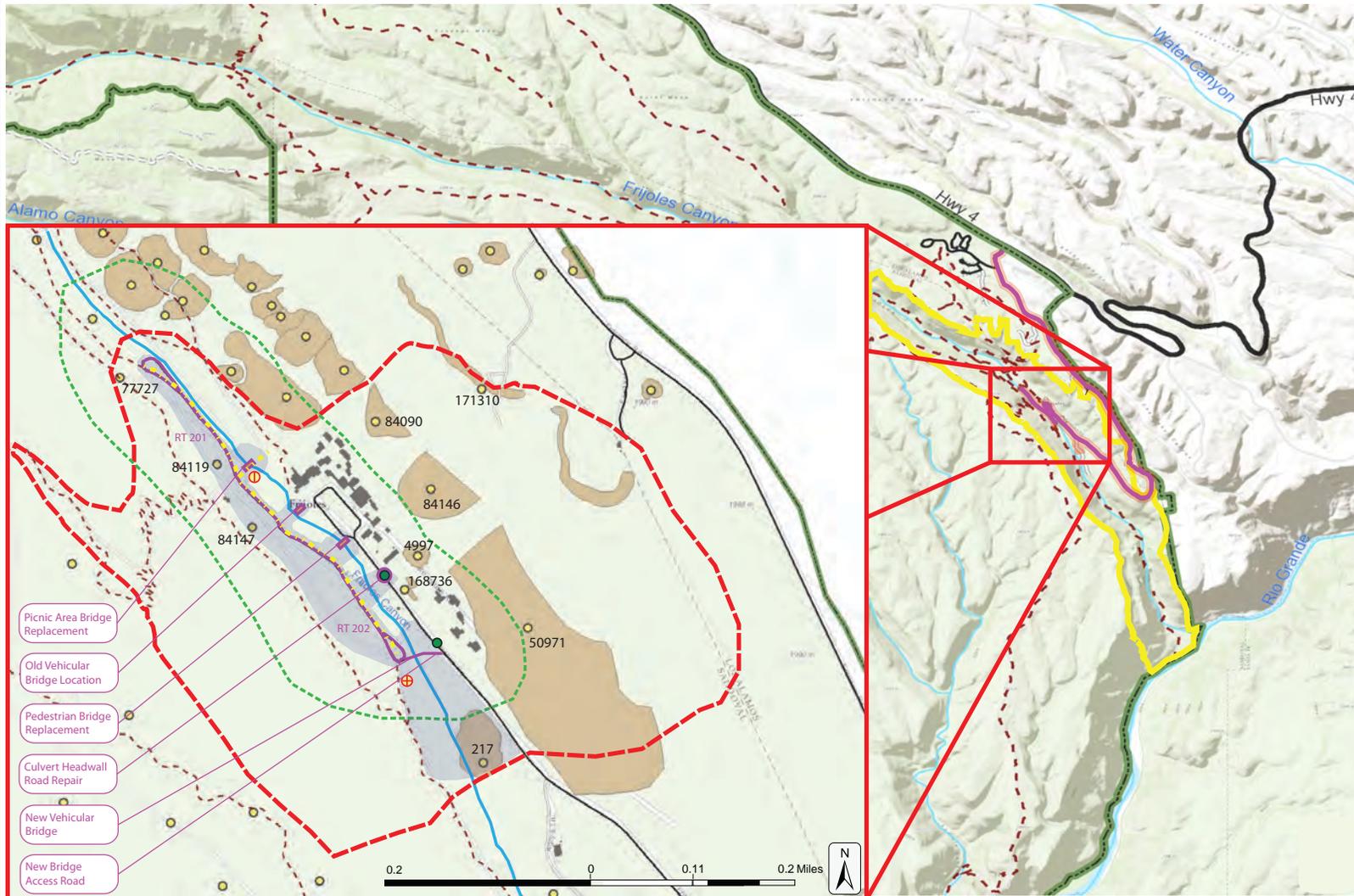


Figure 1.

APPENDIX B
AREA OF POTENTIAL EFFECT



Bandelier National Monument



- Picnic Area Bridge Replacement
- Old Vehicular Bridge Location
- Pedestrian Bridge Replacement
- Culvert Headwall Road Repair
- New Vehicular Bridge
- New Bridge Access Road



Intermountain Geographic Resources Program -- [IMGIS.NPS.GOV](http://imgis.nps.gov)
<http://insideparkatlas.nps.gov/>

Legend

- Bandelier National Monument
- Private Inholdings
- Park Trails
- Vicinity Roads**
 - Highway
 - Paved
 - Unpaved/Service
 - 4 x 4 High Clearance
- Vicinity_Major_Streams
- Cochiti Reservoir
- Structures
- CCC National Historic Landmark District Boundary
- Frijoles Canyon National Register Boundary
- Archeological Site Boundary
- Archeological Site Point
- APE for visual effects post- construction
- Potential audio effects APE during construction
- APE - Direct Effects
- Resurveyed for Cultural Resources
- Historic Culvert
- Previously Unrecorded Construction Stone
- Previously Unrecorded Rock Shelter
- Proposed Water Line (2135 ft. / 651 m.)

Notes

PEPC 52552 - "Reconstruct Flood Damaged Motor and Pedestrian Bridges"

September 26, 2014

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National Park Service
U.S. Department of the Interior

Bandelier National Monument
New Mexico



Bandelier National Monument
15 Entrance Road
Los Alamos, NM 87544