

National Park Service
U.S. Department of the Interior

Ozark National Scenic Riverways
Missouri



Big Spring Bridge Environmental Assessment



ENVIRONMENTAL ASSESSMENT
for the BIG SPRING BRIDGE
at
OZARK NATIONAL SCENIC RIVERWAYS (ONSR)
Missouri

PUBLIC COMMENT

This Environmental Assessment (EA) will be on public review from April 6, 2016 through May 6, 2016. During this 30-day period, hardcopies of the EA will be available for review at the Ozark National Scenic Riverways Visitor Center, and the Carter County Public Library located at 403 Ash Street, Van Buren, Missouri 63965. An electronic version of this document can be found on the NPS's Planning Environment and Public Comment (PEPC) website at <http://parkplanning.nps.gov/>, Big Spring Bridge Project. This site provides access to current plans, environmental impact analyses, and related documents on public review. An electronic version may also be found at the Federal Highway Administration's website at <http://flh.fhwa.dot.gov/projects/mo/big-spring/>.

If you wish to comment on the EA, you may submit comments through the PEPC website or mail comments to the name and address below. Please note that the names and addresses of people who comment become part of public record. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment. We will make all submissions from organizations, businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety.

Superintendent
Ozark National Scenic Riverways
P.O. Box 490
Van Buren, Missouri 63965

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CHAPTER 1: PURPOSE AND NEED

INTRODUCTION

This EA presents alternatives for repair or replacement of the Big Spring Bridge. Big Spring Bridge provides access to the Big Spring area, which includes a campground, canoe and boat access, Civilian Conservation Corps (CCC) cabins and dining lodge, and Big Spring, the largest spring in Missouri. In addition to presenting the alternatives, this EA also discloses the potential impacts of the implementation of those alternatives. Chapter 1 presents the purpose and need for the action, discusses the location and background of the project, identifies related plans and planning, and provides information regarding the scoping completed as a part of the project development process. Chapter 2 presents the alternatives proposed to meet the purpose and need of the action, and discusses alternatives that were dismissed from further consideration. Chapter 3 provides information regarding the resources present in the study area that would be impacted by the proposed action, and also discloses the impacts of each alternative to the resources. Chapter 4 documents the public involvement process throughout this project. Chapter 5 presents the list of references.

The preparation of an EA by a Federal agency taking an action, and the contents of an EA are the result of legislation and implementing regulations issued to date. In 1969, the United States Congress passed the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.) to establish a national policy,

“...which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; ...”

NEPA also established the Council on Environmental Quality (CEQ) as an agency of the Executive Office of the President. In enacting NEPA, Congress recognized that nearly all Federal activities affect the environment in some way. Section 102 of NEPA mandates that before Federal agencies make decisions, they must consider the effects of their actions on the quality of the human and natural environment. NEPA assigns CEQ the task of ensuring that Federal agencies meet their obligations under the Act.

The CEQ regulations (40 CFR 1500-1508) describe the means for Federal agencies to develop the Environmental Impact Statements (EIS's) mandated by NEPA in Section 102. The CEQ regulations developed the EA to be used when there is not enough information to decide whether a proposed action may have significant impacts. If an EA concludes that a Federal action will result in significant impacts, the Agency is required to prepare an EIS or alter the action proposed. Otherwise, the Agency is directed to issue a Finding of No Significant Impact (FONSI).

Section 1508.09 of the CEQ regulations states that the purposes of an EA are to:

- Briefly provide sufficient evidence and analysis for determining whether to prepare an EIS or a FONSI.
- Aid an Agency's compliance with the Act when no environmental impact statement is necessary.
- Facilitate preparation of a statement when one is necessary.

Preparation of an EA is also used to aid in an Agency's compliance with Section 102(2)E of NEPA, which requires an Agency to “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.”

This EA was prepared to meet the NEPA requirements of both the National Park Service (NPS) and Federal Highway Administration (FHWA). The NPS is an agency within the Department of Interior. The Department of the Interior issued its NEPA regulations as Part 516 of its Departmental Manual (516 DM), last revised in March 2004. In January 2011, the NPS updated the 2001 edition of Director's Order #12: Conservation Planning, Environmental Impact Analysis, and Decision-Making and the accompanying Handbook 12. The NPS released the NPS NEPA handbook in 2015. The FHWA's NEPA regulations are codified at 23 CFR Part 771.

Applicable Laws and Regulations

Applicable Federal policies, executive orders, and regulations are listed in Table 1 below by each resource for which they apply.

Resource	Relevant Laws and Regulations
Aesthetics	NPS Organic Act
Air Quality	Clean Air Act NPS Organic Act
Aquatic Resources	Fish and Wildlife Coordination Act
Caves	Cave Resource Protection Act
Cultural, Historic, and Archeological Resources	National Historic Preservation Act Archeological Resources Protection Act Director's Order #28 NPS Organic Act
Ecologically Critical Areas	Endangered Species Act
Energy Requirements and Conservation	Energy Policy Act Executive Orders 13031, 13123, 13149
Environmental Justice	Executive Order 12898
Floodplains	Executive Orders 11988 and 13690 Director's Order #77-2
Indian Sacred Sites and Indian Trust Resources	Department of the Interior (DOI) Secretarial Orders 3206 and 3175 Director's Orders #66 and #71B Executive Orders 13007 and 13175
Noise	Director's Order #47 Noise Control Act
Ozark NSR	Park enabling legislation, P.L. 88-492
Park Operations	NPS Organic Act
Prime and Unique Farmlands	Farmland Protection Policy Act Memorandum on Prime and Unique Agricultural Lands and NEPA

	(CEQ 1980)
Public Health and Safety	Architectural Barriers Act Americans with Disabilities Act Director's Orders #42 and #83 Executive Order 13045
Socioeconomic Resources	Director's Orders #2 and #12
Soils, Geology, Topography	National Cooperative Soil Survey Standards Erosion and Sedimentation Control Act
Terrestrial Resources	Migratory Bird Treaty Act Wilderness Act Executive Order 13112
Threatened and Endangered Species	Endangered Species Act NPS Organic Act
Visitor Use and Experience	NPS Organic Act Director's Order #12
Water Quality, Hydrology	Clean Water Act Rivers and Harbors Appropriation Act Executive Order 12088
Wetlands	Executive Order 11990 Clean Water Act Executive Order 12088 Director's Order #77-1 Rivers and Harbors Appropriation Act
Wildlife	Migratory Bird Conservation Act Migratory Bird Treaty Act

Regulations specific to the NPS include the NPS Organic Act and the various Director's Orders listed in the table above. NPS Management Policies 2006 was also used for guidance regarding the resources listed above.

NPS Management Policies 2006, Section 1.4: The Prohibition on Impairment of Park Resources and Values

By enacting the NPS Organic Act of 1916 (Organic Act), Congress directed the U.S. Department of Interior and the NPS to manage units “to conserve the scenery and the natural and historic objects and wild life therein and to provide for the enjoyment of the same in such a manner and by such a means as will leave them unimpaired for the enjoyment of future generations” (16 USC § 1). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that NPS must conduct its actions in a manner that will ensure no “derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress” (16 USC 1a-1).

NPS Management Policies 2006, Section 1.4.4, explains the prohibition on impairment of park resources and values:

While Congress has given the Service the management discretion to allow impacts within parks, that discretion is limited by the statutory requirements (generally enforceable by the federal courts) that the Park Service must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise. This, the cornerstone of the Organic Act, establishes the primary responsibility of the NPS. It

ensures that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them.

The NPS has discretion to allow impacts on Park resources and values when necessary and appropriate to fulfill the purposes of a Park (NPS 2006 sec. 1.4.3). However, the NPS cannot allow an adverse impact that would constitute impairment of the affected resources and values (NPS 2006 sec.1.4.3). An action constitutes an impairment when its impacts “harm the integrity of Park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values” (NPS 2006 sec.1.4.5). To determine impairment, the NPS must evaluate “the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts” (NPS 2006 sec 1.4.5). A determination of impairment will be made only for the selected alternative, and will be appended to the decision document.

PROJECT SITE DESCRIPTION

The Big Spring Bridge is located along Peavine Road in Carter County, Missouri (Figure 1). Big Spring Bridge provides access to the Big Spring area, the largest spring in Missouri and one of the largest in the world. Big Spring has an average daily discharge of 288 million gallons of cool spring water (National Park Service). In the summer, the Big Spring becomes the primary tributary to the Current River and contains a variety of rare aquatic organisms. The Big Spring area also includes a large campground, historic cabins and dining lodge, shelter house and picnic area, canoe and boat access, and trails.

The Big Spring area has been used as a gathering place for thousands of years. Archeologists have found evidence of Native Americans in the Big Spring area and European settlers were attracted to the area because of its dense forests. Railroad construction brought lumber companies to the area, and in the 20th century vacationers came for the countryside and clarity of the water. Big Spring State Park was established in 1924, becoming one of Missouri’s first state parks. The CCC helped conserve the resources, constructed visitor facilities and stabilized stream edges with stone in the 1930s (Sherry Griffin and Renee Gray). The Ozark National Scenic Riverways (ONSR) was established by Congress in 1964 to protect 134 miles of the Current and Jacks Fork rivers in the Ozark Highlands of southeastern Missouri (National Park Service). Big Spring was donated to the NPS in 1969.

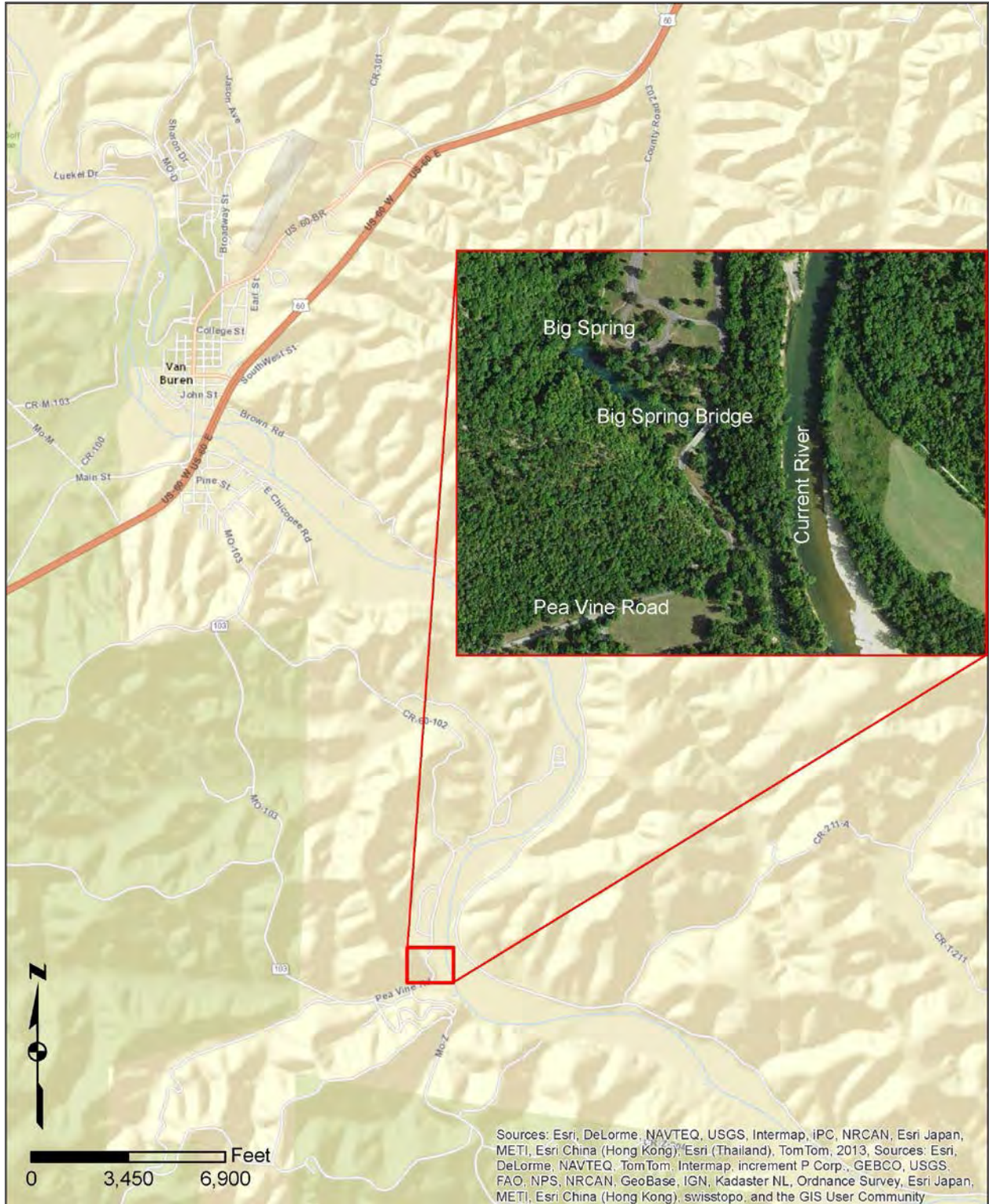


Figure 1. Location Map

PURPOSE AND NEED

The purpose of this project is to maintain the Park's ability to safely serve visitors by providing safe vehicular access to the Big Spring area while minimizing impacts to natural, cultural, and aesthetic resources.

The Big Spring Bridge across the spring branch was constructed in 1977, replacing an existing timber bridge that was constructed in the 1940s. The design of the more recent glulam timber bridge was meant to emulate the rustic features of the 1940s era bridge. The glulam timber bridge is approximately 120 feet in length. Glulam is composed of individual wood laminations that are bonded together. The six-span bridge is 33-feet in width, with a railing on each side, and carries a two-lane roadway and a six-foot-wide timber sidewalk. On the upstream side of the bridge, the 48-inch-high railing includes a 37-inch-high railing on top of a 9-inch-high sidewalk. On the downstream side of the bridge, the railing is 48 inches high and includes a timber curb. The existing bridge railing is comprised of 8-inch square timber posts and two 3-inch-by-10-inch timber rails.

Each span is approximately 20 feet in length. The five substructure units (bents) are each comprised of six timber piles and a timber bent cap (Figure 2). There are a total of 50 timber piles supporting the structure, 30 of which are in the Big Spring branch. The existing deck is a timber deck covered with asphalt pavement (Federal Highway Administration, 2014).



Figure 2. Existing timber glulam Big Spring Bridge

Several projects to repair the deterioration of the bridge have been completed. In 1990, the north abutment and approach were rehabilitated. In 2003, seven post-sections of the railing on the west side were replaced. In 2010, supports were added below the sidewalk, the sidewalk and the railing on the west side were replaced, and pile moisture readings were taken. FHWA regularly inspects the bridge every two years as part of their partnership with the NPS. The

timber bridge was most recently inspected in April 2014 and was determined to be in generally fair to poor condition. The two main problems are extensive decay of the panel overhangs, particularly at the deck drain areas, and the significant loss of backfill through the timber bulkheads which is creating sinkholes in the approach roadways (Federal Highway Administration, 2014). Additional detail regarding the deterioration is provided below:

- The east curb and railing have severe decay, including numerous posts.
- The deck panel edges show moderate to severe decay, particularly at the deck drains (Figure 3).



Figure 3. Typical decay of deck panel edges with vegetation growth present.

- Potholes in the northbound lane and moderate transverse cracks throughout the wearing surface need repair. Some cracks have been sealed but have reopened.
- The timber piles are showing significant signs of decay.

The inspection completed in 2012 recommended rehabilitation measures; however, the inspection completed in 2014 recommended replacement of the structure. Although rehabilitation is still possible, the rehabilitation would be extensive in nature. The bridge must be rehabilitated or replaced in order to ensure the safety of its users. However, since the bridge is part of a historic area and living park, it is important that the area is respected as such during construction. To preserve the cultural landscape, the bridge must maintain a look that does not conflict with its natural and historic surroundings while still being functional and aesthetically pleasing to today's users.

Related Plans and Previous Planning Efforts

General Management Plan

The Final General Management Plan / Environmental Impact Statement for the ONSR was made available to the public on December 12, 2014. The final general management plan establishes a new long-term vision for ONSR and sets forth a balanced approach for protecting

the many distinctive natural and cultural resources along the Riverways (National Park Service, 2014). The Preferred Alternative under this plan would,

“enhance opportunities for visitors to discover and learn about the natural wonders and Ozark heritage of the National Riverways, while maintaining a mix of traditional recreational and commercial activities. Emphasis would be placed on increasing opportunities for visitor education and connections to natural resources and cultural landscapes.”

Implementation of this alternative could lead to an increase in the number of private and guided traditional recreational activities such as boating, floating, horseback riding, and hiking. The repair or replacement of Big Spring Bridge should be consistent with the objectives outlined in the ONSR General Management Plan and consider the potential for increased multi-modal use of the bridge.

Scoping

The CEQ guidelines for implementing NEPA, and the NPS’s NEPA guidelines contained in Director’s Order # 12: *Conservation Planning, Environmental Impact Analysis and Decision Making Handbook* (National Park Service, 2015), provide the framework for scoping. Scoping is an early and open process to: determine important issues, eliminate issues that are not important or relevant, identify relationships to other planning efforts or documents, define a time schedule or document preparation and decision-making, and define purpose and need, agency objectives and constraints, and the range of alternatives. For further scoping and public participation information, see Chapter 4: Public Involvement and Coordination and Appendix A: Agency Coordination Letters.

Public Scoping

Information about the proposed repair or replacement of the Big Spring Bridge was made available to the public on the NPS’s Planning, Environment, and Public Comment website during the public scoping comment period, from April 21, 2014 through May 30, 2014. A scoping newsletter providing details of the proposed project and contact information for comments was sent to a mailing list comprised of Federal, State, and local agencies, elected officials, organizations, and advocacy groups. A legal notice was run in the St. Louis Post-Dispatch on April 21, 2014 announcing the public scoping comment period.

Two comments were provided. The first was from an unaffiliated individual stating that she would like the new bridge to be made of materials similar to the old one and that its design should reflect the culture of the surrounding area. The second comment was made by a representative from The Nature Conservancy. They recommend designing the bridge to handle higher flows in order conserve the biodiversity of the area and adjust to climate change.

Agency Scoping

Scoping letters were also sent to the U.S. Fish and Wildlife Service (USFWS), the State Historic Preservation Office (SHPO) and the Missouri Department of Conservation (MDC). Comments were received from each of the agencies. Copies of the agency responses are located in Appendix A: Agency Coordination Letters.

ISSUES AND IMPACT TOPICS

Issues as discussed in NEPA describe the relationships between the action being proposed and the environmental (natural, cultural and socioeconomic) resources. Issues describe an association or a link between the action and the resource. Issues are not the same as impacts, which include the intensity or results of those relationships. Internal and external scoping (defining the range of potential issues) was conducted for this EA to identify what relationships exist between the proposed action and environmental resources. Issues identified through the scoping process were:

- Big Spring Bridge is located in a 100-year floodplain.
- The Current River is an Outstanding National Resource Water.
- Big Spring Bridge is located within but is not a contributing feature to the Big Spring Historic District.
- Big Spring Bridge provides pedestrian access for the overlook trail and the spring trail.
- The United States Geologic Survey (USGS) automated gage is affixed to the bridge.
- Utility lines are attached to the bridge.

Derivation of Impact Topics

Specific impact topics were developed to address potential natural, cultural, and social impacts that might result from the proposed construction work. These topics were derived from the issues identified above and address Federal laws, regulations and orders, Park management documents, and Park knowledge of limited or easily impacted resources. Issues are not the same as impacts, which include the intensity or results of those relationships. Each impact topic relates to a specific aspect of the Park and its surrounding community, which are essential to protect.

Impact Topics Included in This Document

Cultural Landscapes

As described in Director's Order #28, a cultural landscape is "a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person, or exhibiting other cultural or aesthetic values" (DO #28, 87). Cultural landscapes are expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. Big Spring Bridge is located within the Big Spring Historic District, which is considered a cultural landscape. During construction of Big Spring area, emphasis was placed on matching the existing environment through landscaping, layout, and use of natural colors. Repair or replacement of the bridge has the potential to impact the cultural landscape. Therefore, cultural landscapes were retained as an impact topic for further analysis in this EA.

Floodplains

Executive Order 11988, "Floodplain Management," and NPS Director's Order #77-2: Floodplain Management, require an examination of impacts to floodplains and potential risk involved in placing facilities within floodplains (National Park Service, 2003). The Big Spring Bridge is located within a 100-year floodplain and any construction at this bridge would have the potential to impact floodplains. The most recent major floods took place in 2011, 2012 and 2015; where the combination of flood water and backwater covered the bridge. Therefore, this

impact topic was retained for further analysis in this EA. A Statement of Findings for Floodplains was prepared and is included in this EA as Appendix B.

Wetlands

Executive Order 11990, “Protection of Wetlands,” and NPS Director’s Order #77-1: Wetland Protection defines the NPS goal to maintain and preserve wetland areas (National Park Service, 2008). Riverine wetlands with a palustrine emergent fringe are located along the spring branch. The repair or replacement of the existing Big Spring Bridge would require work within these wetlands. Therefore, this impact topic was retained for further analysis in this EA. A Statement of Findings for Wetlands was prepared and is included in this EA as Appendix B.

Species and Areas of Special Concern

In addition to NPS policies and management guidelines, the Endangered Species Act of 1973, as amended provides for the protection of rare, threatened, and endangered species (floral and faunal). Federally-listed species, regulated by the USFWS are found in Carter County. State-listed and State-ranked species, managed by the Missouri Department of Conservation (MDC), are also identified as potentially being present in the project area. The repair or replacement of the existing bridges could impact species of concern and the Big Spring Natural Area located adjacent to the existing bridge. Therefore, this impact topic was retained for further analysis in this EA. Correspondence from the USFWS and MDC can be found in Appendix A.

Water Quality and Streamflow Characteristics

The Clean Water Act provides states with the authority to establish water quality standards. The Current River within the ONSR is designated as Outstanding National Resource Water in Missouri. In Missouri, this Outstanding National Resource Water is classified as Tier Three waters and no degradation of water quality is allowed. The pollution of surface waters and groundwater by both point and nonpoint sources can impair the natural functioning of aquatic and terrestrial ecosystems and diminish the utility of Park waters for visitor use and enjoyment. The NPS Management Policies 2006 state that the NPS will determine the quality of park surface and groundwater resources and avoid, whenever possible, the pollution of park waters by human activities occurring within and outside the parks. The proposed action would require ground disturbance during construction, which would impact water quality. Therefore, this impact topic was retained for further analysis in this EA.

Geologic Resources

The NPS Management Policies (National Park Service, 2006) states that the NPS will “...preserve and protect geologic resources as integral components of park natural systems. As used here, the term “geologic resources” includes both geologic features and geologic processes.” The karst topography in the ONSR consists of soluble dolomite. At the bridge, the Eminence Dolomite is found 28 to 30 feet deep below a 10 foot layer of fill and a layer of alluvial sandy gravel (Federal Highway Administration, 2015). It is unknown whether any voids are present within the dolomite found in the project area. The type of piles that would be used for each alternative differ in their potential to puncture any voids, if present. Therefore, this impact topic was retained for further analysis in this EA.

Visitor Use and Experience of the Park

Enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks (National Park Service, 2006). The NPS strives to provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the natural and cultural resources found in parks. Rehabilitation or replacement of the bridge would impact the ability for visitors to access Big Spring area. Delays associated with construction of a rehabilitated or new bridge structure would change the experience of visitors at the Park. Big Spring area is located alongside Peavine Road, which is a loop roadway. If the bridge is closed during rehabilitation the area can be accessed from either the west or east side of the loop. Temporary traffic control and advanced warning signs will be needed to alert the visitors of the closure and inform them of the alternative route. This impact topic was retained for further analysis in this EA.

Impact Topics Dismissed From Further Consideration

The following impact topics were initially considered but were dismissed from further analysis because the resource is not present in the project site or because the proposed action would have no impact, have a negligible impact, or have a minor impact. A brief rationale for the dismissal of each impact topic is provided below.

Air Quality

The 1963 Clean Air Act, as amended, requires land managers to protect air quality. Section 118 of the CAA further requires parks to meet all Federal, State, and local air pollution standards, and NPS 2006 Management Policies (National Park Service, 2006) addresses the need to analyze potential impacts to air quality during park planning. Although construction activities proposed would have some impacts to air quality, they would be short-term and negligible. Therefore, air quality was dismissed as an impact topic for further analysis in this EA.

Archeological Resources

The NPS defines an archeological resource as any material remains or physical evidence of past human life or activities that are of archeological interest, including the record of the effects of human activities on the environment. Archeological resources are capable of revealing scientific or humanistic information through archeological research (DO #28, 67). A Phase I Archeological Investigation was completed for the project area, and no archeological resources were found. At least seven cut-off pilings from the CCC bridge are present, as well as a possible stone pier support. Two concrete piers, likely associated with the former jon boat dock are also present on the southeastern bank. These remnants do not contribute to the Big Spring Historic District and were not recommended as eligible for the National Register of Historic Places (Espenshade, 2015). Therefore, archeological resources were dismissed as an impact topic for further analysis in this EA.

Ethnographic Resources

An ethnographic resource is defined as any “site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it” (DO #28, 157). There are no known ethnographic resources within the ONSR that would be affected by the replacement or rehabilitation of Big Spring Bridge. Therefore, ethnographic resources were dismissed as an impact topic for further analysis in this EA.

Environmental Justice

Executive Order 12898, “General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires all Federal agencies to incorporate environmental justice into their missions by identifying and addressing the disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities (President of the United States).

The Big Spring Bridge project area is located approximately 3.5 miles south of the city of Van Buren in Carter County, Missouri. Based on data taken from the 2010 US Census of Population and Housing, the population of Carter County is 6,265 persons. The majority of county residents, 96.3 percent, identify as white alone. American Indian and Alaskan Natives make up the second largest racial category with a total of 1.1 percent of the population. Additionally, African American and Asian make up 0.4 percent and 0.1 percent of the population, respectively. Of those surveyed, 1.9 percent identified as belonging to two or more races and 1.9 percent identified as Hispanic or Latino of any race.

The median household income of persons living in Carter County, taken from 2009 to 2013, is \$30,962 annually. Furthermore, the percentage of those county residents living below the poverty line, taken in the same time frame, is 21.9 percent. The number of people living below the poverty line in the county is significantly higher than the state average of 15.5 percent (U.S. Census Bureau).

Although minority and low-income groups have been identified in Carter County, it is unlikely that any would be adversely impacted by the proposed projects. Therefore, in accordance with the provisions of Executive Order 12898 and FHWA order 6640.23, no further EJ analysis is required.

Historic Structures, Districts, and Landmarks

A historic structure is defined by the NPS as “a constructed work, usually immovable by nature or design, consciously created to serve some human act” (DO #28, 113). For a structure, building to be listed on or eligible for listing on the National Register of Historic Places, it must possess historic integrity of those features necessary to convey its significance, particularly with respect to location, setting, design, feeling, association, workmanship and materials. The Big Spring Bridge is not eligible to be listed on the National Register of Historic Places. The bridge is located in the Historic District; however, the bridge is not a contributing resources in the district within which it is located. The alternatives would have no effect on the historic structures, districts or landmarks. Therefore, historic structures, districts, and landmarks was dismissed as an impact topic for further analysis in this EA.

Indian Trust Resources

Secretarial Order 3175 requires that any anticipated impacts to Indian Trust resources from a proposed action by U.S. Department of the Interior agencies be explicitly addressed in environmental documents. The Federal Indian Trust responsibility is a legally enforceable obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of Federal laws with respect to American Indian tribes. There are no known Indian Trust resources in the vicinity of the Big

Spring Bridge. Therefore, Indian trust resources were dismissed as an impact topic for further analysis in this EA.

Soils

The NPS policy is to protect the abundance and diversity of all naturally occurring soils. The 2006 NPS Management Policies (National Park Service, 2006), NPS DO #77: Natural Resources Protection and other NPS and the ONSR policies provide general direction for the protection of soils. Three soil types are found in the Big Spring Bridge project area, Alred-Rueter complex, gladden silt loam, and Wideman fine sandy loam (USDA Natural Resources Conservation Service). Alred-Rueter complex is very stony and a well-drained soil. It does not have a high water capacity. Alred-Rueter is usually found in hillslopes (USDA Natural Resources Conservation Service). Gladden silt loam is well drained and has a high water capacity. Gladden silt loam is usually found in river valleys (USDA Natural Resources Conservation Service). Wideman fine sandy loam is excessively drained soils formed in sandy alluvium (USDA Natural Resources Conservation Service). Although these soils are mapped as being present in the project area, the prior development and last two efforts to replace the bridge have resulted in there being an extensive later of fill material. Impacts to wetland soils will be discussed under the Wetlands impact topic. Impacts of installing new fill materials are discussed in the Floodplains and Wetlands impact topics. The proposed action would be constructed in an area comprised of disturbed soils and fill material from the construction of the existing Peavine Road. If the bridge is reconstructed, the existing bridge approaches will be used and the new bridge will be constructed on the existing alignment. Therefore, soils were dismissed as an impact topic for further analysis in this EA.

Stormwater Management

Stormwater is comprised of two components, quality and quantity. Stormwater quality will be addressed in the Water Quality and Streamflow Characteristics impact topic. Stormwater quantity refers to the volume of water that runs off of impervious surfaces. Impervious surfaces, such as asphalt roads and parking areas, do not allow precipitation to percolate. The rainfall collects and flows along the impervious surface. Pollutants from vehicles such as oil and emissions are concentrated in the stormwater. The proposed action would have a negligible increase of impervious surface. Therefore, this impact topic was dismissed as an impact topic for further analysis in this EA.

Soundscape

The NPS Management Policies 2006 state that the NPS will preserve, to the greatest extent possible, the natural soundscapes of parks. Park natural soundscape resources encompass all the natural sounds that occur in parks, including the physical capacity for transmitting those natural sounds and the interrelationships among park natural sounds of different frequencies and volumes. This is the basis for determining the "affected environment" and impacts on a Park soundscape. Traffic capacity would not increase as a result of this project, but there would be short-term minor impact to the soundscape from the presence of heavy equipment during construction. Therefore, soundscape was dismissed as an impact topic for further analysis in this EA.

Visual Resources

The NPS 2006 Management Policies (National Park Service, 2006) notes that the enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks. The Organic Act also states that units of the NPS are charged with conserving park scenery, along with all the natural and cultural resources which contribute to important views. In the evaluation of visual resources, both the visual character of the site and the quality of the viewshed are analyzed. A viewshed comprises the limits of the visual environment associated with the proposed action including the viewsheds within, into, and out of the site. The visual character of the ONSR would not be altered by any of the build alternatives. Impacts to views to and from the bridge are discussed under the cultural landscape impact topic. Therefore, visual resources were dismissed as an impact topic for further analysis in this EA.

CHAPTER 2: DESCRIPTION OF ALTERNATIVES

This chapter describes alternatives for the rehabilitation or replacement of the Big Spring Bridge. Alternatives for the proposed action are intended to improve the safety of motorists, bicyclists and pedestrians using the bridge. The NPS and FHWA considered a range of alternatives for the proposed rehabilitation or replacement of the Big Spring Bridge.

Alternatives were developed that would meet the project objectives. The range of alternatives considered includes five alternatives described below: a no action alternative (Alternative A) and four action alternatives (Alternative B, C, D, and E). The range of alternatives considered also includes those discussed in the Alternatives Considered but Dismissed section. A summary of the impacts of each of the alternatives is presented in Table 2.

The CEQ has provided guidance on the development and analysis of alternatives under NEPA. A full range of alternatives, framed by the purpose and need, must be developed for analysis for any Federal action. The alternatives should meet the project/proposal purpose and need, at least to a large degree. They should also be developed to minimize impacts to environmental resources. Alternatives should also be “reasonable,” which CEQ has defined as those that are economically and technically feasible, and show evidence of common sense. Alternatives that could not be implemented if they were chosen (for economic or technical reasons), or do not resolve the need for action and fulfill the stated purpose in taking action to a large degree, are therefore not considered reasonable.

ALTERNATIVE A: NO ACTION

Under Alternative A, the No Action Alternative, no substantial improvements would be performed other than in accordance with routine maintenance operations. Analysis of the No Action Alternative is required as part of the NEPA process in order to provide a basis for the comparison of other feasible alternatives.

ALTERNATIVE B: REHABILITATE EXISTING BRIDGE

The existing bridge would be rehabilitated in order to address the deterioration noted in the Bridge Inspection Report (Federal Highway Administration, 2014). The timber piles would be encapsulated with a jacket, the abutments would be retrofitted, the deck would be replaced, and the railing would be updated to a crashworthy railing. Fiberglass jackets or an equivalent jacketing system would be installed on the most deteriorated timber piles. The jacket would be filled with epoxy grout to encapsulate the timber and protect it from further deterioration (Figure 4). The wrapping would extend from the mudline to approximately two feet above the normal high water level. Sections of severely deteriorated timber piles may be replaced, if needed. It is estimated that 200 linear feet of piles would have new fiberglass jackets installed. Dewatering may also be necessary if any sections of deteriorated timber piles need to be replaced.

The glulam timber deck would also need to be replaced. The asphalt wearing surface is in fair condition, but allows runoff to drain between the asphalt and glue laminated deck, which is causing decay. The asphalt wearing surface would be removed during the deck replacement. The wearing surface would be replaced with timber running planks, which allow for better drainage and are easier and less costly to maintain.

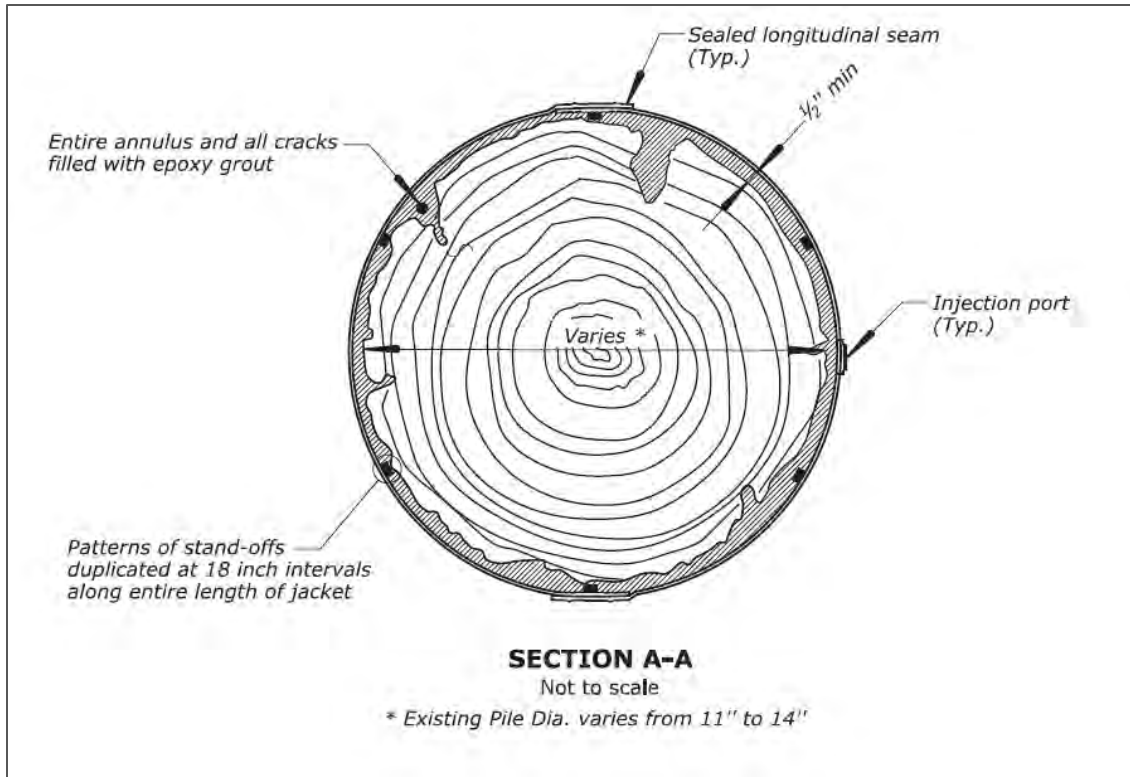


Figure 4. Cross section of a timber pile wrapped in a fiberglass jacket.

ALTERNATIVE C: REPLACE WITH TIMBER BRIDGE

The existing bridge would be removed. The asphalt pavement wearing surface and glue laminated deck would be saw cut and lifted off of the bent caps by a crane. The bent caps would be removed, and the timber piles would be snapped off or saw cut at the mudline and removed. All of the debris from the bridge removal would be disposed of off-site.

The existing bridge would be replaced in-kind with a six-span timber bridge (Figure 5). The bridge would have timber piles, glulam beams and a glulam deck. The spans would be 23.3 feet in length for a total length of 140-feet, resulting in the placement of five bents in the channel. Each bent would be supported by eight 12-inch-diameter timber piles. The timber bent caps would be constructed over the piles, upon which timber glulam beams would be placed, followed by a glulam deck (Federal Highway Administration, 2012).

The new bridge would have a 26-foot roadway width available for travel lanes and shoulders, consistent with the existing condition. The new bridge would also have a sidewalk that would be approximately 9.5 feet in width. A steel-backed timber guardrail would be installed along the bridge. The low chord elevation (LSEL), the point on a bridge which is the lowest part of the superstructure, would be 438.95 feet.

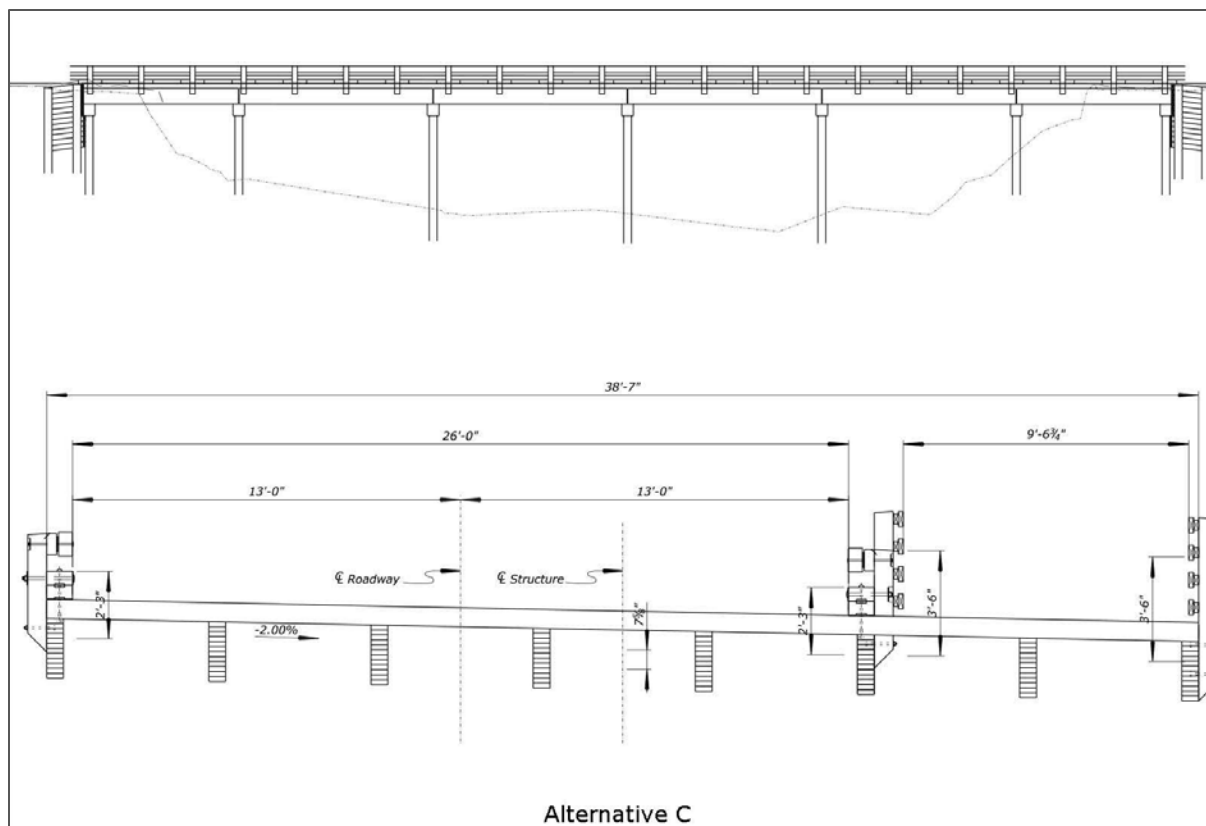


Figure 5. Profile View and Typical Section of the Timber Bridge

The bridge would be closed during construction. The Big Spring area would continue to be accessible from Peavine Road from the north. All of the facilities at Big Spring, including the campgrounds, lodges, and trails, would continue to be accessible during construction. In order to construct the bridge, a temporary causeway would be installed in the spring branch. Access from the center of the spring branch is necessary in order to reach the center of the existing bridge for demolition and the new bridge for construction of the center pier. It is not anticipated that a diversion or dewatering would be needed in order to remove the existing bridge or construct the new bridge.

Utility Relocation

Currently at the Big Spring Bridge, the Park's utility lines are suspended from the underside of the existing bridge. These utilities consist of a six inch ductile iron pipe (DIP) waterline, four inch DIP sewer line, one 4.5 inch galvanized rigid conduit (GRC), one 3.5 inch GRC, and one 1.75 inch GRC. One of the larger GRC's contains three phase 7,200 VAC (volts of alternating current) electrical conductors, the other is assumed to contain electrical conductors for the existing pump stations on the west side of the bridge. The 1.75 inch GRC contains telecom lines.

Three options are under consideration for utility relocation. The first option would reinstall the utility lines on the rehabilitated bridge. This could be done by hanging them from the underside of the bridge or routing the utilities through the support structure. Each of the utilities would be installed inside a casing pipe to protect the pipe from flood damage. While the bridge deck is being replaced, temporary bypass lines would be installed to maintain service. The second

option, which is the preferred option, would permanently remove the utility lines from the bridge and install them underground adjacent to the bridge using horizontal directional drilling (HDD) techniques. A casing pipe would also be installed under this option. The entire pipe would be below the frost line and the stream bed. In order to run them underground two directional borings would be drilled to separate the water and sewer lines. Tying into the existing utilities would require open cut trenching to lay the pipe or conduit back to the current location of the utilities to make connections. A third option for installing the power, water and sanitary underground is the jack and bore a casing pipe under the spring to allow a passage way for the utilities.

ALTERNATIVE D: REPLACE WITH CONCRETE BRIDGE

The existing bridge would be removed as described in Alternative C. The new concrete bridge would be constructed along the same alignment, and would have two 11-foot lanes, two 3-foot shoulders and a 6.8-foot sidewalk on the upstream side of the bridge. The concrete bridge would be approximately 3.5 feet wider than the existing bridge. The bridge would have a pre-cast concrete box beam. The bridge would have two spans with each being 70 feet in length, for a total length of 140 feet (Figure 6). This design would result in the placement of one pier in the channel. The pier would have a concrete micropile footing supporting a native stone faced concrete column with a concrete cap. The concrete retaining wall abutments would be supported on piles with flared wingwalls.

The pier would be faced with stone with a similar texture, color, and general character of stone in the Big Spring area. The buildings built by the CCC in the Big Spring area were made of local materials, especially rough-cut dolomite quarried nearby and lumber stained dark brown (Griffin & Gray). The stone used to face the exposed concrete, including the pier wall, would be rough-cut dolomite, and would include similar grout color and pointing.

The proposed bridge railing has a 12-inch-high timber curb and a second 10-inch-high timber rail. The bridge railing would be 42 inches high. On the upstream side, the railing would measure 42 inches from the top of the six-inch-high sidewalk.

The bridge would be replaced at approximately the same elevation. The top of the bridge deck would be constructed at approximately the same elevation as the existing bridge. The low chord elevation would be 438.95 feet, which is almost the same low chord elevation as the existing bridge (438.75 feet).

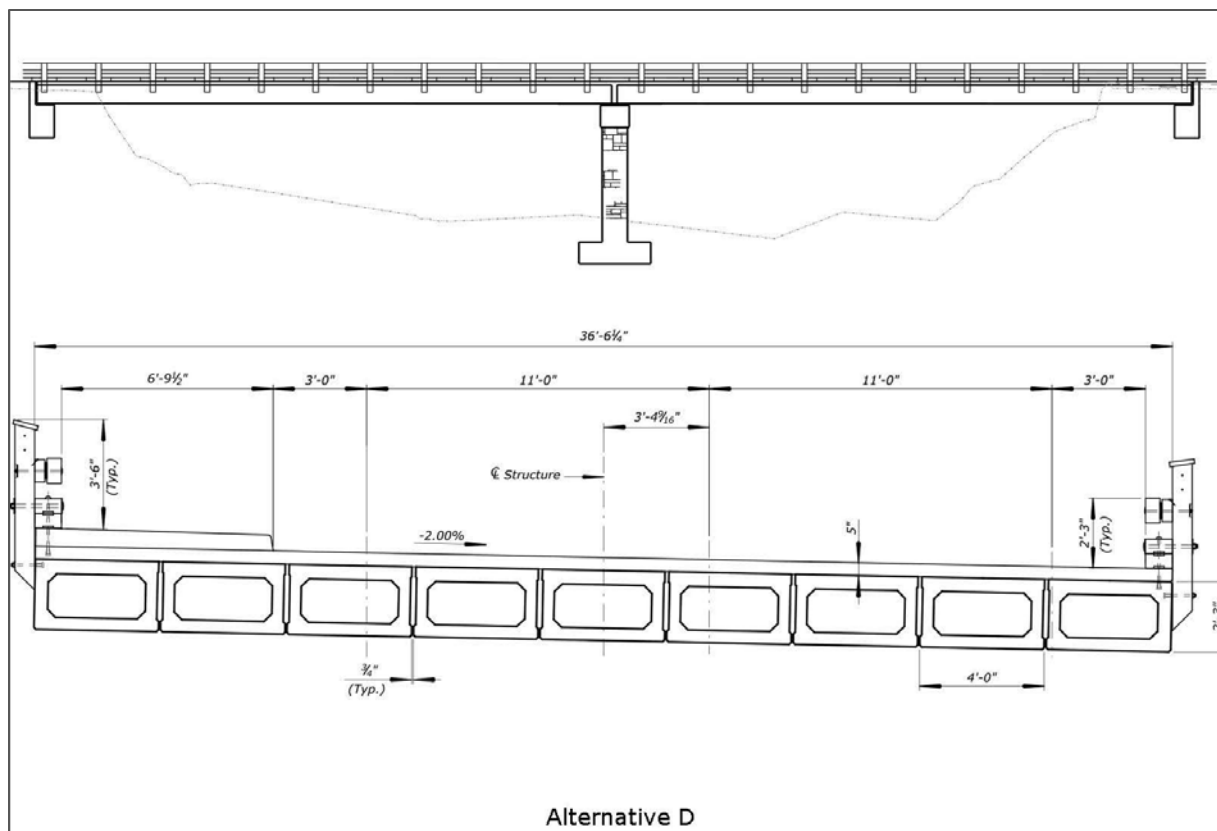


Figure 6. Profile View and Typical Section of the Concrete Bridge

The bridge and roadway approaches would be closed during construction. The Big Spring area would continue to be accessible from Peavine Road. All of the facilities at Big Spring, including the campgrounds, lodges and trails, would continue to be accessible during construction. In order to construct the bridge, a temporary causeway would be installed in the spring branch. Access from the center of the spring branch is necessary in order to reach the center of the existing bridge for demolition and the new bridge for construction of the center pier. While it is not anticipated that a diversion or dewatering would be needed in order to remove the existing bridge, a sheet pile diversion would be installed around the center pier while it is under construction.

Utility Relocation

Utilities would be relocated as described under Alternative C.

ALTERNATIVE E: REPLACE WITH STEEL BRIDGE

The existing bridge would be removed as described in Alternative C. The new steel bridge would be constructed along the same alignment as the existing bridge. The bridge would have a 140-foot long prefabricated steel truss span and two buried abutments. A steel backed timber guard rail would be installed along the bridge and a pedestrian rail would be installed (Figure 7). The design of this bridge would eliminate the need for piers in the water.

The steel truss and floor beams would be constructed off-site and set in place with a crane positioned on a temporary causeway. A form would be added to the frame of the bridge and a

cast-in-place concrete deck would be poured. The new bridge would have two 13-foot travel lanes, a 10-foot sidewalk, and would be approximately 38 feet wide (including the railing and truss width). The low steel elevation would be 437.95 feet.

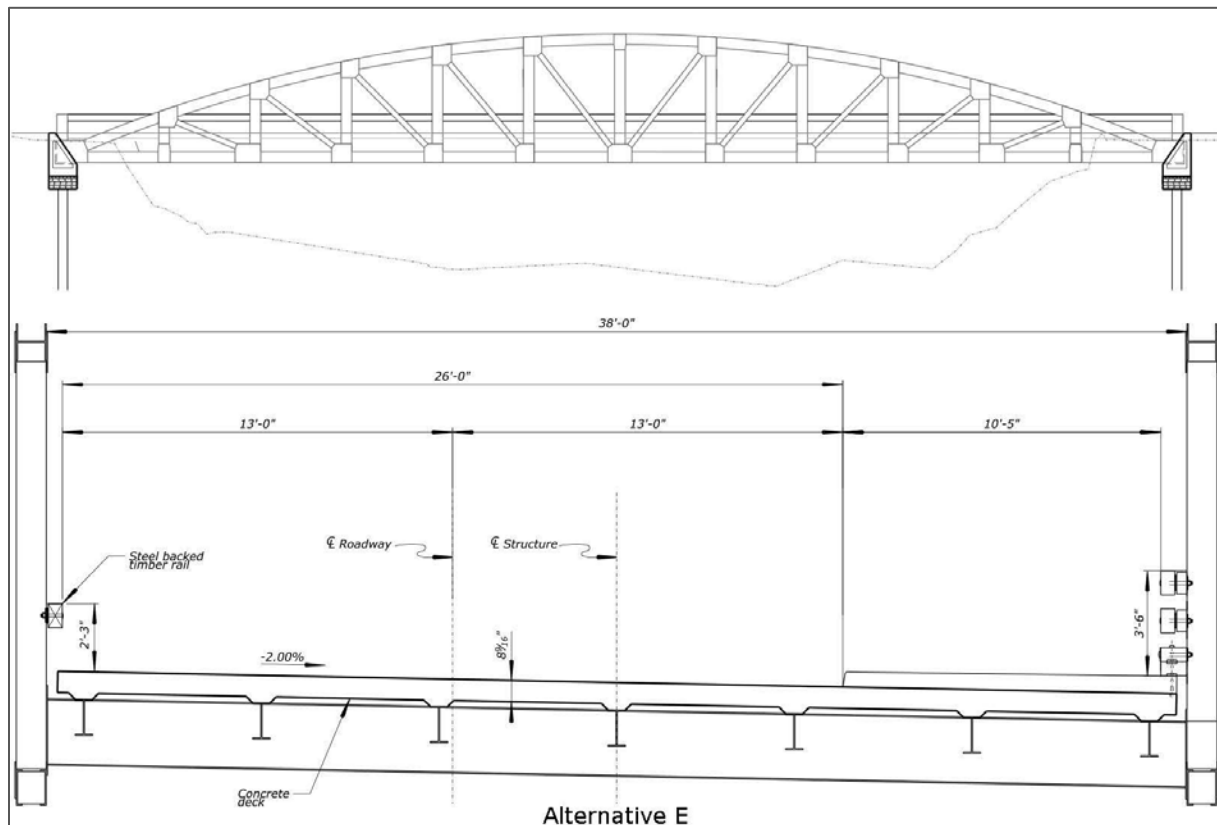


Figure 7. Profile View and Typical Section of the Steel Truss Bridge

The bridge would be closed during construction; however, the Big Spring area would continue to be accessible from Peavine Road. All of the facilities at Big Spring, including the campgrounds, lodges, and trails, would continue to be accessible during construction. In order to construct the bridge, a temporary causeway would be installed in the spring branch. Access from the center of the spring branch is necessary in order to reach the center of the existing bridge for demolition and the new bridge for construction of the center bent. It is not anticipated that a diversion or dewatering would be needed in order to remove the existing bridge or construct the new bridge.

Utility Relocation

Utilities would be relocated as described under Alternative C.

MITIGATION MEASURES

The following mitigation measures would be implemented as appropriate with all of the action alternatives.

- No work would occur in the channel from March 15 to June 15 to avoid impacts to fish spawning.

- Debris shields would be installed to capture any debris released due to repairs completed above the surface of the water.
- Tree clearing would only be done between November 1 and April 1 to avoid impacts to Indiana bats and northern long-eared bats.
- In order to minimize noise generated during the driving of piles, hammer and pile cushions would be used. Also, the impact hammer would be ramped up (slowly increasing the force of the hammer) to allow wildlife the leave the area.
- A geotextile would be placed on the bed of the spring branch prior to the placement of riprap for the installation of the temporary causeway to make removal easier. The riprap would be washed prior to being placed.
- A revegetation plan would be developed and implemented. The species planted along the banks of the spring branch would be primarily native riparian species; however, an annual nurse crop would be used to ensure timely permanent stabilization of the disturbed areas.
- Should construction unearth previously undiscovered archeological resources, work would be stopped in the area of any discovery and the Park would consult with the SHPO/Tribal Historic Preservation Officer and the Advisory Council on Historic Preservation (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 as appropriate.

BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) would be implemented and would include the following:

- Disturbance to stream banks and riparian areas would be minimized. Channel modification, flow interruption or bank modification would only occur in compliance with conditions established in permits required under the Clean Water Act.
- Temporary BMPs would be utilized to minimize erosion and sedimentation from ground disturbing activities that expose bare soil. The BMPs may include the use of silt fence, fiber rolls, erosion matting and turbidity barriers. These BMPs would be used only during construction and would be removed once the disturbed area has been permanently stabilized.
- Any soil excavated during construction would be stockpiled and reused as fill if needed. Fill material would be clean, native soils.
- Any dewatering activities would include the filtering of the water prior to reintroducing it to the spring. Pumping water directly into the spring branch would be prohibited.
- Staging areas for equipment and materials would be established away from the spring branch.
- Stationary fuel and oil storage would remain within the staging area to avoid accidental spills into the spring branch.
- Excess concrete and wash water from trucks and other concrete mixing equipment would be disposed of in designated areas where this material cannot enter the spring branch.
- Disturbed areas would be graded and seeded as soon as possible to minimize erosion. Crown vetch and *Sericea lespedeza* would be avoided.

- For construction access, the temporary access pad would avoid water impoundment and allow for fish passage.
- No equipment would be allowed to enter the spring branch. Equipment would be washed and rinsed thoroughly with hard spray or hot water (greater than 104 degrees Fahrenheit) and allowed to dry in the hot sun before use at the site.
- Mud, soil, trash, plants and animals would be removed from equipment before leaving any work area near the water.

PREFERRED ALTERNATIVE

A preferred alternative is the alternative that “would best accomplish the purpose and need of the proposed action while fulfilling [the NPS] statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors”.

At Big Spring Bridge, the four action alternatives are comprised of one alternative that would make repairs to the existing structure and three alternatives that would construct a new bridge. The alternatives were evaluated based on a number of considerations that include, but are not limited to, life cycle cost advantages, impacts to the surrounding historical district, and impacts to visitor use and experience. Alternative D has been identified as the Preferred Alternative because it would provide safe continual access to the Ozark National Scenic Riverways while minimizing impacts to natural, cultural, and aesthetic resources.

ALTERNATIVES CONSIDERED BUT DISMISSED FROM DETAILED ANALYSIS

In addition to the alternatives presented in the section above, an additional alternative was considered during the NEPA process but eliminated from detailed analysis. Alternatives may be dismissed for the following reasons: technical or economic feasibility; inability to resolve the purpose and need for taking action; duplication with other, less environmentally damaging or less expensive alternatives; the alternative conflicts with an up-to-date and valid park plan, statement of purpose and significance, or other policy, such that a major change in the plan or policy would be needed; the alternative would require a major change to a law, regulation or policy; too great of an environmental impact; the alternative addresses issues beyond the scope of the NEPA review; and, if the alternative would not be allowed by another agency from which a permit is required, it should be eliminated as “environmentally infeasible.” (National Park Service, 2015)

Alternative F, Replacement with a Steel Plate Girder or a Post-Tension Flat Slab Bridge, would replace the existing bridge with a single span bridge. The new bridge would have two travel lanes, a sidewalk, and would be approximately 38 feet wide excluding the railing width. The girder needed to span the channel would be several feet deep, and would create a much larger profile than the existing bridge. Also, although there would be no pier in the spring, falsework would need to be placed in the spring branch for forming and pouring of the cast-in-place flat slab. This design would be inconsistent with the surrounding Big Spring Historic District; therefore, this alternative was considered but dismissed.

Table 2. Impact Summary		
	Alternative A	Alternative B
Cultural Landscapes	<ul style="list-style-type: none"> • Overall impact: None • Cumulative impact: None 	<ul style="list-style-type: none"> • Overall impact: Long-term, minor, and adverse impact. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, minor, and beneficial cumulative impact.
Floodplains	<ul style="list-style-type: none"> • Overall impact: None • Cumulative impact: None 	<ul style="list-style-type: none"> • Overall impact: Long-term, negligible, and adverse impact. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, moderate, and adverse cumulative impact.
Wetlands	<ul style="list-style-type: none"> • Overall impact: None • Cumulative impact: None 	<ul style="list-style-type: none"> • Overall impact: Short-term, minor, and adverse impact. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, minor, and adverse cumulative impact.
Species and Areas of Special Concern	<ul style="list-style-type: none"> • Overall impact: None • Cumulative impact: None 	<ul style="list-style-type: none"> • Overall impact: Short-term, minor, adverse impacts. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, moderate, and adverse cumulative impact.
Water Quality and Streamflow Characteristics	<ul style="list-style-type: none"> • Overall impact: None • Cumulative impact: None 	<ul style="list-style-type: none"> • Overall impact: Short-term, minor, and adverse impact. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, minor, and adverse cumulative impact.
Geologic Resources	<ul style="list-style-type: none"> • Overall impact: None • Cumulative impact: None 	<ul style="list-style-type: none"> • Overall impact: None • Cumulative impact: None
Visitor Use and Experience	<ul style="list-style-type: none"> • Overall impact: Long-term, moderate, adverse impact. • Cumulative impact: Would contribute a noticeable, adverse increment to the long-term, minor, and beneficial cumulative impact. 	<ul style="list-style-type: none"> • Overall impact: Short-term, moderate, and adverse impact and long-term, minor, and beneficial impact. • Cumulative impact: Would contribute a noticeable, beneficial increment to the long-term, minor, and beneficial cumulative impact.

Table 2 (Continued). Impact Summary		
	Alternative C	Alternative D
Cultural Landscapes	<ul style="list-style-type: none"> • Overall impact: Short-term, moderate, and adverse impact and long-term, minor, and beneficial impact. • Cumulative impact: Would contribute a noticeable, beneficial increment to the long-term, minor, and beneficial cumulative impact. 	<ul style="list-style-type: none"> • Overall impact: Short-term, moderate, and adverse impact and long-term, minor, and adverse impact. • Cumulative impact: Would contribute a noticeable, adverse increment to the long-term, minor, and adverse cumulative impact.
Floodplains	<ul style="list-style-type: none"> • Overall impact: Short-term and long-term, minor, and adverse impact. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, moderate, and adverse cumulative impact. 	<ul style="list-style-type: none"> • Overall impact: Short-term and long-term, minor, and adverse impact. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, moderate, and adverse cumulative impact.
Wetlands	<ul style="list-style-type: none"> • Overall impact: Short-term, moderate and long-term, minor, and adverse impact. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, minor, and adverse cumulative impact. 	<ul style="list-style-type: none"> • Overall impact: Short-term, moderate, and long-term, minor adverse impact. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, minor, and adverse cumulative impact.
Species and Areas of Special Concern	<ul style="list-style-type: none"> • Overall impact: Short-term and long-term, minor, and adverse impacts. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, moderate, and adverse cumulative impact. 	<ul style="list-style-type: none"> • Overall impact: Short-term and long-term, minor, and adverse impacts. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, moderate, and adverse cumulative impact.
Water Quality and Streamflow Characteristics	<ul style="list-style-type: none"> • Overall impact: Short-term, moderate, and adverse impact and long-term, negligible, and adverse impact. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, minor, and adverse cumulative impact. 	<ul style="list-style-type: none"> • Overall impact: Short-term, moderate, and adverse impact and long-term, minor, and beneficial impact. • Cumulative impact: Would contribute an imperceptible, beneficial increment to the long-term, minor, and adverse impacts.
Geologic Resources	<ul style="list-style-type: none"> • Overall impact: Long-term, negligible, and adverse impact. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, minor, and adverse cumulative impact. 	<ul style="list-style-type: none"> • Overall impact: Long-term, moderate, and adverse impact. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, minor, and adverse cumulative impact.
Visitor Use and Experience	<ul style="list-style-type: none"> • Overall impact: Short-term, moderate, and adverse impact and long-term, moderate, and beneficial impact. • Cumulative impact: Would contribute a noticeable, beneficial increment to the long-term, minor, and beneficial cumulative impact. 	<ul style="list-style-type: none"> • Overall impact: Short-term, moderate, and adverse impact, and long-term, moderate, and beneficial impact. • Cumulative impact: Would contribute a noticeable, beneficial increment to the long-term, minor, and beneficial cumulative impact.

Table 2 (Continued). Impact Summary	
	Alternative E
Cultural Landscapes	<ul style="list-style-type: none"> • Overall impact: Short-term and long-term, moderate, and adverse impact. • Cumulative impact: Would contribute a noticeable, adverse increment to the long-term, minor, and adverse cumulative impact.
Floodplains	<ul style="list-style-type: none"> • Overall impact: Short-term and long-term, minor, and adverse impact. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, moderate, and adverse cumulative impact.
Wetlands	<ul style="list-style-type: none"> • Overall impact: Short-term, moderate, and adverse impact and long-term minor, and beneficial impact • Cumulative impact: Would contribute an imperceptible, beneficial increment to the long-term, minor, and adverse cumulative impact.
Species and Areas of Special Concern	<ul style="list-style-type: none"> • Overall impact: Short- and long-term, minor, and adverse impact. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, moderate, and adverse impact.
Water Quality and Streamflow Characteristics	<ul style="list-style-type: none"> • Overall impact: Short-term, moderate, and adverse impact and long-term, minor, and beneficial impact. • Cumulative impact: Would contribute an imperceptible, beneficial increment to the long-term, minor, and adverse impact.
Geologic Resources	<ul style="list-style-type: none"> • Overall impact: Long-term, moderate, and adverse impact. • Cumulative impact: Would contribute an imperceptible, adverse increment to the long-term, minor, and adverse cumulative impact.
Visitor Use and Experience	<ul style="list-style-type: none"> • Overall impact: Short-term, moderate, and adverse impact and long-term, moderate, and beneficial impact. • Cumulative impact: Would contribute a noticeable, beneficial increment to the long-term, minor, and beneficial cumulative impact.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing environmental conditions in and around the project area and the environmental consequences associated with the alternatives presented in Chapter 2: Alternatives. Chapter 3 is organized by impact topic, and includes the impact topics presented in Chapter 1: Purpose and Need that required further analysis: cultural landscapes, floodplains, wetlands, species and areas of special concern, water quality and streamflow characteristics, geologic resources and visitor use and experience.

For each impact topic identified in Chapter 2, a process for impact assessment was developed based on the directives of Sections 2.9 and 4.5(g) of the Director's Order #12 Handbook. The NPS units are directed to assess the extent of impacts on Park resources as defined by the context, duration, and intensity of the effect. While measurement by quantitative means is useful, it is even more crucial for the public and decision-makers to understand the implications of those impacts in the short- and long-term, cumulatively, and within context, based on an understanding and interpretation by resource professionals and specialists. With that interpretation, one can ascertain whether certain impact intensity to a park resource is "minor" compared to "major" and what criteria were used to base that conclusion.

METHODOLOGY

To determine impacts, methodologies were identified to measure the change in park resources that would occur with the implementation of each alternative. Thresholds were established for each impact topic to help understand the severity and magnitude of changes in resource conditions, both adverse and beneficial, of the various alternatives. Potential impacts are described in terms of type (Are the effects beneficial or adverse?), context (Are the effects site-specific, local, or even regional?), duration (Are the effects short-term, lasting during construction, or long-term, lasting permanently?), and intensity (Are the effects negligible, minor, moderate, or major?). Because definitions of intensity (negligible, minor, moderate, or major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed in this document.

Each alternative is compared to a baseline to determine the context, duration, and intensity of resource impacts. For purposes of impact analysis, the baseline is the continuation of current management (the No Action Alternative) projected over the next 10 years. In the absence of quantitative data, best professional judgment was used to determine impacts. In general, the thresholds used come from existing literature, Federal and State standards, and consultation with subject matter experts and appropriate agencies.

CUMULATIVE IMPACTS

The CEQ regulations (40 CFR 1508.7) require the assessment of "cumulative impacts" which 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.

In January 1997, the CEQ published a handbook entitled Considering Cumulative Effects under the National Environmental Policy Act (see <http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm>). The introduction to the handbook opens with, “Evidence is increasing that the most devastating environmental effects may result not from the direct effects of a particular action, but from the combination of individually minor effects of multiple actions over time.”

Cumulative impacts are considered for all alternatives, including the no-action alternative. They were determined by looking at each resource (impact topic), determining which past, present, and future actions would impact the resource for the determined spatial and temporal boundaries, and then combining the impacts of the alternative being considered with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects at the Park and, if applicable, the surrounding region.

These cumulative actions are evaluated in the cumulative impact analysis in conjunction with the impacts on particular resources. Because both of these cumulative actions are in the early stages, the evaluation of cumulative impacts was based on a general description of the action. Cumulative impacts are considered for all alternatives, and are presented at the end of each impact topic discussion. In defining the contribution of each alternative to cumulative impacts, the following terminology is used:

Imperceptible: The incremental effect contributed by the alternative to overall cumulative impacts is such a small increment that it is impossible or extremely difficult to discern.

Noticeable: The incremental effect contributed by the alternative, while evident and observable, is still relatively small in proportion to the overall cumulative impacts.

Appreciable: The incremental effect contributed by the alternative constitutes a large portion of the overall cumulative impact.

Past Actions

Big Spring State Park was established in 1924, one of Missouri’s first state parks. ONSR was established by Congress in 1964 to protect 134 miles of the Current and Jacks Fork rivers in the Ozark Highlands of southeastern Missouri (National Park Service). Big Spring Park was donated to the NPS in 1969 (National Park Service).

Present and Future Actions

Big Spring Divisional Storage Building: There is need for a storage facility for housing supplies and materials in the Park. Planning is in the preliminary stages for this potential project (National Park Service).

Big Spring Utility Replacement: The failing, non-sustainable utilities for the CCC cabins and lodge would be replaced.

Big Spring Historic District: Two projects are planned to rehabilitate the concession run historic district cabins and dining lodge and also to restore the landscape of the historic district.

Completion of Old Tram Road Trail: Efforts are underway to complete the Old Tram Road Trail which would connect Van Buren to Big Spring. If this trail is completed parts of it would be in

the Park and become part of the Ozark Trail (National Park Service). Any repair or replacement of the Bridge should not preclude future pedestrian related improvements planned at Big Spring trail connections.

Van Buren Economic Development Plan: The Town of Van Buren is developing an economic development plan for the town that, in part, may focus on increasing tourism in and around the town (National Park Service, 2014).

Route M from Route 60 to County Road M127: The project would include widening to add paved shoulders, flattening curves, and replacing a bridge. This project is planned to be completed in 2017 (Missouri Department of Transportation).

CULTURAL LANDSCAPE

Affected Environment

Since the 1920s, people have used the Big Spring area for camping, hiking, picnicking and other outdoor activities. The area became popular in the 1930s when the CCC began construction of amenities, such as log cabins, picnic areas, trails and campsites. This construction continued to as late as 1950 and maintenance continues to take place. Many of these buildings have become historic landmarks that are treasured by the regular campers, including the Camp Ruins, the Rock Quarry, and the fire tower. These older buildings provide insight into how people lived during the time of construction and are valued by those interested in the local history. Prior to the CCC's development of the area, there is evidence that the area was used by European Settlers and the Native Americans before them. As stated in the Cultural Landscape Inventory, "The Big Spring Historic District is a site that uniquely conveys concurrent developments in national recreation trends, CCC public works projects, and the associated architecture and landscape design." (NPS Cultural Landscape Inventory 25)

The Big Spring Trail System includes several trails located in the vicinity of Big Spring. The Spring Branch Trail connects Big Spring to the Historic Dining Lodge built by the CCC. The trail lies at the base of the dolomite cliff from which Big Spring emerges, loops around the spring, then follows the spring branch as it delivers 288 million gallons of crystal clear water into the Current River. The trail provides a hiking route around Big Spring and is accessible west of the bridge. Although there is no trail or shoulder to provide direct access to the sidewalk on the bridge, the sidewalk is a popular location to view Big Spring and take pictures. The existing bridge rail partially blocks the view of Big Spring for those in vehicles traveling across the bridge. Another popular vantage point is located at Big Spring itself looking downstream to the bridge. The existing bridge lays lightly on the landscape due to its composition and design.

The Big Spring Bridge links to the area's history through its design. Made of timber, it reflects the same "rustic" style of architecture as the buildings in the surrounding area, creating a very natural look. Today, people cross the bridge in cars, on bikes and on foot to access the recreational area. Two travel lanes carry vehicles and bikes across the bridge. A sidewalk is located on the upstream side of the bridge and provides designated pedestrian access for viewing Big Spring and taking pictures. The bridge itself provides an aesthetically pleasing mode of transportation. For those unaware of the historic background, the architecture, wildlife, and scenery alone make this area special and unique. It provides a space for gathering, play, and other outdoor activities.

Methodology

The Cultural Landscape Inventory for Big Spring Historic District was obtained to evaluate the potential for impacts to the cultural landscape. Coordination with the SHPO was completed. Impact analysis was based on the on-site inspection of the study area, review of existing literature and studies, and professional judgment.

Definition of Intensity Levels:

Negligible	Impacts would result in a change to the cultural landscape, but it would be at the lowest level of detection with no perceptible consequences.
Minor	Impacts would result in a detectable and measurable change to the cultural landscape, but the change would not diminish the integrity of the resources.
Moderate	Impacts would result in a loss of integrity that would consequently jeopardize a site's national register eligibility.
Major	Impacts would result in a change to the cultural landscape that would result in the loss of most or the entire site, to the extent that it would no longer be eligible for national register listing.

Definition of Duration. Short-term: Effects lasting up to the duration of construction and time to allow the scene to return to a more natural state (maximum of 2 years). Long-term: Effects extend after the restoration of the project area (2 years) and could be permanent.

Environmental Consequences

Alternative A – No Action

Direct and Indirect Impacts. Under Alternative A there would be no impact to the cultural landscape.

Cumulative Impacts. There can be no cumulative impacts because there are no direct impacts to the cultural landscape.

Conclusions. Under Alternative A, there would be no impact to the cultural landscape, and no cumulative impact to the cultural landscape.

Alternative B – Rehabilitate Existing Bridge

Direct and Indirect Impacts. Under Alternative B, the existing glulam timber bridge would be repaired to increase the service life of the bridge. Jacketing of a portion of the timber piles with fiberglass jackets would use new materials that would not match the present natural colors and materials found in the cultural landscape. However, this option requires the least amount of disturbance to the surrounding land. Since the existing bridge would remain with few material changes, the implementation of Alternative B would have long-term, minor and adverse impacts to the cultural landscape.

Cumulative Impacts. Past actions, such as the reconstruction of the Big Spring Bridge in 1977, have impacted the cultural landscape. The existing bridge was designed to be wider than the original bridge, making the recreational area more accessible. It was also designed to match the Historic District's architecture in order to blend in with the surrounding environment and prevent any distraction from the Historic District. The combined past, present and

reasonably foreseeable future action would have a long-term, minor, and beneficial cumulative impact to the Historic District. The implementation of Alternative B would contribute an imperceptible, adverse increment to the cumulative impacts.

Conclusions. Alternative B would have long-term, minor, and adverse impacts to the cultural landscape. Implementation of Alternative B would contribute an imperceptible, adverse impact to the long term, minor, and beneficial cumulative impacts to the cultural landscape.

Alternative C – Replace with Timber Bridge

Direct and Indirect Impacts. The existing bridge would be replaced with a glulam timber bridge on the existing alignment and at a similar profile, which would result in no change to the relation of the bridge to the surrounding landscape. Since the bridge is located within the Big Spring Historic District, it would be designed to look similar to the existing bridge to match the Park’s “rustic” architecture. The new bridge would minimize any distraction from the cultural landscape. Since the new bridge would have a similar configuration of travel lanes and sidewalk, circulation patterns would not change. The new crashworthy bridge railing would be different in appearance from the existing railing, which would be noticeable while on the bridge. Several large sycamore trees that are next to the bridge would have to be removed in order to replace the bridge. After the new bridge is constructed, the view of the bridge from Big Spring would be similar to the existing view.

This alternative has a longer, more involved construction period than Alternative B, during which a temporary causeway and construction equipment and materials would be present to impact the cultural landscape. The implementation of Alternative C would have long-term, minor and beneficial impacts as well as short-term, moderate, and adverse impacts to the cultural landscape.

Cumulative Impacts. Past actions, such as the construction of the Big Spring Bridge in 1977, have impacted the cultural landscape. The existing bridge was designed to match the Historic District and the Park’s “rustic” architecture. The bridge conformed to the surrounding environment and was accepted as a new part of the cultural landscape. The combined past, present and reasonably foreseeable future action would have a long-term, minor, and beneficial cumulative impact to the cultural landscape. The implementation of Alternative C would contribute a noticeable, beneficial increment to the cumulative impacts.

Conclusions. Alternative C would have short-term, moderate, and adverse and long-term, minor, and beneficial impacts to the cultural landscape. Implementation of Alternative C would contribute a noticeable, beneficial increment to the long term, minor, and beneficial cumulative impacts to the cultural landscape.

Alternative D – Replace with Concrete Bridge

Direct and Indirect Impacts. The new concrete bridge would be constructed on the existing alignment and at a similar profile, which would result in no change to the relation of the bridge to the surrounding landscape. The configuration of two travel lanes and a sidewalk on the upstream side of the bridge would also be present in the new bridge, and so circulation patterns would not change. The new bridge would be noticeably newer than the surrounding features, and the more modern design may distract from the rustic qualities of the area. The bridge would have one solid pier wall, rather than five timber pile bents. The superstructure would be

of a similar depth; however, it would be constructed of concrete instead of timber. Since the bridge is located within the Big Spring Historic District, aesthetic treatments, such as facing the bridge with native natural stone would help to blend the new bridge into the surrounding Historic District. Also, timber rail elements would be incorporated into the design of the new bridge. Although the new bridge rail would not be noticeably higher, the new rail would include a steel-backed timber vehicle rail in combination with a timber and cable pedestrian rail. Views experienced by those in vehicles on the bridge would be noticeably different. At the sight line of the driver, visitors would look through cables and the timber handrail to see Big Spring. Several large sycamore trees that are next to the bridge would have to be removed in order to replace the bridge. The clearing of vegetation and presence of a different looking bridge would change the views of the bridge experienced by visitors looking downstream from Big Spring.

Alternative D would have impacts during construction similar to those described for Alternative C. The implementation of Alternative D would have long-term, minor and adverse impacts as well as short-term, moderate, and adverse impacts to the cultural landscape.

Cumulative Impacts. Past actions, such as the construction of the Big Spring Bridge in 1977, have impacted the cultural landscape. The existing bridge was designed to match the Historic District and the Park's "rustic" architecture. The existing bridge blended in with the surrounding environment to prevent any distraction from the cultural landscape whereas a concrete bridge might seem out of place. The combined past, present and reasonably foreseeable future action would have a long-term, minor, and adverse cumulative impact to the cultural landscape. The implementation of Alternative D would contribute a noticeable, adverse increment to the cumulative impacts.

Conclusions. Alternative D would have short-term, moderate, and adverse and long-term, minor, and adverse impacts to the cultural landscape. Implementation of Alternative D would contribute a noticeable, adverse increment to the long term, minor, and adverse cumulative impacts to the cultural landscape.

Alternative E – Replace with Steel Bridge

Direct and Indirect Impacts. The new steel truss bridge would be constructed on the existing alignment and at a similar profile, which would result in no change to the relation of the bridge to the surrounding landscape. The configuration of two travel lanes and a sidewalk on the upstream side of the bridge would also be present in the new bridge, and so circulation patterns would not change. However, the new steel bridge would not match the natural materials of the surrounding landscape in the Big Spring Historic District. The change in material could prevent the new bridge from being integrated into the cultural landscape, and may cause confusion if visitors associate the bridge with other steel truss bridges in ONSR. The design may also distract from the rustic qualities of the area. The new structure would also be considerable deeper (16 feet at midspan to six feet at the ends), becoming a focal point when viewing Big Spring from the bridge rather than blending into the surrounding landscape. Views of Big Spring from the bridge would also be impacted, since visitors would have to look through the railing and truss. Several large sycamore trees that are next to the bridge would have to be removed in order to replace the bridge. The clearing of vegetation and presence of a different looking bridge would change the views of the bridge experienced by visitors looking downstream from Big Spring.

This alternative has a longer, more involved construction period than Alternative B, during which a temporary causeway and construction equipment and materials would be present to impact the cultural landscape. The implementation of Alternative E would have long-term, moderate and adverse impacts as well as short-term, moderate, and adverse impacts to the cultural landscape.

Cumulative Impacts. Past actions, such as the construction of the Big Spring Bridge in 1977, have impacted the cultural landscape. The existing bridge was designed to match the Historic District and the Park’s “rustic” architecture. The existing bridge blended in with the surrounding environment to prevent any distraction from the cultural landscape whereas a steel bridge might seem out of place. The combined past, present and reasonably foreseeable future action would have a long-term, minor, and adverse cumulative impact to the cultural landscape. The implementation of Alternative E would contribute a noticeable, adverse increment to the cumulative impacts.

Conclusions. Alternative E would have short- and long-term, moderate, and adverse impacts to the cultural landscape. Implementation of Alternative E would contribute a noticeable, adverse increment to the long term, minor, and adverse cumulative impacts to the cultural landscape.

FLOODPLAINS

Affected Environment

Floodplains are a vital part of our environment and their flooding is a natural occurrence. During high precipitation events flooding of the land (or floodplain) adjoining a waterbody occurs. The floodplain then acts to convey and store this water. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps show that the project areas are within the 100-year floodplain, Zone A (Figure 8).

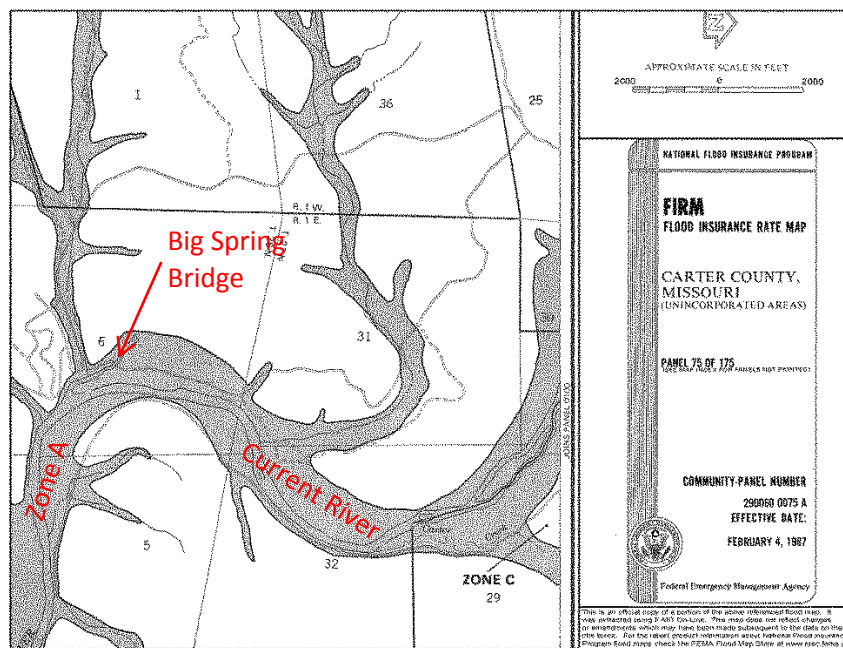


Figure 8. FEMA Floodplain Map of Big Spring Bridge

Zone A flood zones are areas subject to a one percent annual chance of a flood event (FEMA). Big Spring is located in FEMA mapped floodplain Zone A where the base flood elevations have not been determined.

Floodplain functions include sediment storage, floodwater storage, groundwater recharge, channel stability, water quality, and habitat. Flooding is critical to maintaining vegetation because the flood waters transport sediment and nutrients from the river to the connecting floodplain. The Current River is a free-flowing river that flood frequently, washing nutrient-rich mud and silt onto the surrounding floodplains.



Figure 9. USGS Gage

A USGS stream gage attached to the bridge (Figure 9). The project area frequently floods, primarily due to its low elevation and proximity to the Current River. During high flow at Big Spring and the Current River, the discharge of Big Spring increases well before the flow increases in the Current River. During this period, no backwater occurs in the spring branch and the stage in the spring branch slowly rises in response to the increased flow in from the spring. Hours later, the flow in the Current River at the mouth of the spring branch begins to rapidly increase, causing the stage of the spring branch to rise quickly and eventually causing backwater conditions in the spring branch (Imes, 2007).

Methodology

A FEMA Flood Insurance Rate Map (2900600075A) was obtained and evaluated for the study area. The area was surveyed to determine the ground elevations. Impact analysis was based on the on-site inspection of the study area, review of existing literature and studies, hydraulic and hydrologic analysis, and professional judgment. The proposed action was found to be in an applicable regulatory floodplain. There is no land outside of the floodplain upon which Peavine Road could be relocated in the study area. Therefore, flood conditions and associated hazards must be quantified as a basis for management decision making and a formal Statement of Findings (SOF) for Floodplains has been prepared. The SOF can be found in Appendix B.

The low chord elevation (bottom of the superstructure) of the existing bridge is submerged during the two-year return period. Raising the profile of the bridge and roadway approaches in order to provide freeboard for the 50-year event (FHWA design standard) would not be feasible. Therefore, the bridge would be designed in order to withstand being overtopped during flood events.

Definition of Intensity Levels:

Negligible	Impacts would result in a change to floodplain functions and values, but the change would be so slight that it would not be of any measurable or perceptible consequence.
Minor	Impacts would result in a detectable change to floodplain functions and values, but the change would be expected to be small, of little consequence, and localized. There would be no appreciable increased risk to life or property. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Impacts would result in a change to floodplain functions and values that would be readily detectable and relatively localized. Location of operations in floodplains would increase risk to life or property. Mitigation measures, if needed to offset adverse effects, would be extensive, but would likely be successful.
Major	Impacts would result in a change to floodplain functions and values that would have substantial consequences on a regional scale. Location of operations would increase risk to life or property. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Definition of Duration. Short-term: Effects lasting up to the duration of construction (maximum of 6 months). Long-term: Effects extend after the construction of the project is completed (6 months) and could be permanent.

Environmental Consequences

Alternative A – No Action

Direct and Indirect Impacts. Under Alternative A there would be no additional impact to floodplains. The bridge would continue to alter the flow of flood waters during minor flood events. During the two-year event, the water is roughly at the height of the bridge deck. The existing bridge is completely under water during the 10-year event, and is vulnerable to debris accumulation due to the number of bents that are present.

Cumulative Impacts. There can be no cumulative impacts because there are no direct impacts to floodplains.

Conclusions. Under Alternative A, there would be no impact to floodplains, and no cumulative impact to floodplains.

Alternative B – Rehabilitate Existing Bridge

Direct and Indirect Impacts. Jacketing of a portion of the timber piles with fiberglass jackets would place additional material in the floodplain; however, the amount of new material would be negligible. The decrease in floodwater storage capacity of the floodplain would not be noticeable. The existing bridge would be completely under water during the 10-year event. The bridge would continue to be vulnerable to debris accumulation due to the number of bents. Alternative B would have long-term, negligible, and adverse impact to floodplains.

Cumulative Impacts. Past actions, such as the placement of fill material to construct Big Spring Bridge and recreation area, have impacted floodplains from the reduction in floodwater storage capacity. The combined past, present and reasonably foreseeable future action would have a long-term, moderate, and adverse cumulative impact to floodplains. The

implementation of Alternative B would contribute an imperceptible, adverse increment to the cumulative impacts.

Conclusions. Alternative B would have long-term, negligible, and adverse impacts to floodplains. Implementation of Alternative B would contribute an imperceptible, adverse increment to the cumulative impacts to floodplains.

Alternative C – Replace with Timber Bridge

Direct and Indirect Impacts. The new bridge would be located within the floodplain and under the 100-year flood elevation. The new bridge would be a larger structure and would have an additional pile per bent, resulting in a small increase in the volume of material in the floodplain. The entire bridge would be underwater during the 10-year event. The bridge would continue to be vulnerable to debris accumulation due to the number of bents.

In order to construct the bridge, a riprap causeway would be constructed across half of the spring in order to provide access for a crane. Approximately 675 cubic yards of riprap would be placed in the floodplain; however, after construction is completed, the material would be removed. The implementation of Alternative C would have short- and long-term, minor and adverse impacts to floodplains.

Cumulative Impacts. Past actions, such as the placement of fill material to construct the Big Spring Bridge and recreation area, have impacted floodplains from the reduction in floodwater storage capacity. The combined past, present and reasonably foreseeable future action would have a long-term, moderate, and adverse cumulative impact to floodplains. The implementation of Alternative C would contribute an imperceptible, adverse increment to the cumulative impacts.

Conclusions. Alternative C would have short- and long-term, minor, and adverse impacts to floodplains. Implementation of Alternative C would contribute an imperceptible, adverse increment to the cumulative impacts to floodplains.

Alternative D – Replace with Concrete Bridge

Direct and Indirect Impacts. The new bridge would all be located within the floodplain and under the 100-year flood elevation. The concrete bridge would be a larger structure than the existing bridge; however, the concrete bridge would have four less bents than the existing bridge. Large debris would be able to pass under the bridge more easily since there would be larger openings between the abutments and the pier, although during the 10-year event the entire bridge would be under water. In addition to the impacts described for Alternative C during construction, the construction of the solid pier would require the installation of a sheet pile diversion. The implementation of Alternative D would have short- and long-term, minor and adverse impacts to floodplains.

Cumulative Impacts. Past actions, such as the placement of fill material to construct the Big Spring Bridge and recreation area, have impacted floodplains from the reduction in floodwater storage capacity. The combined past, present and reasonably foreseeable future action would have a long-term, moderate, and adverse cumulative impact to floodplains. The implementation of Alternative D would contribute an imperceptible, adverse increment to the cumulative impacts.

Conclusions. Alternative D would have short- and long-term, minor, and adverse impacts to floodplains. Implementation of Alternative D would contribute an imperceptible, adverse increment to the cumulative impacts to floodplains.

Alternative E – Replace with Steel Bridge

Direct and Indirect Impacts. The new bridge would be located within the floodplain and under the 100-year flood elevation. During the two-year flood event, the low chord elevation would be under 4.09 feet of water, and during the 10-year event the entire bridge would be under water. The steel bridge is a larger structure than the timber or concrete bridge, and has a deeper superstructure. The truss is approximately 16 feet deep at midspan and six feet deep at the ends. The composition of the truss and lack of freeboard makes the bridge highly vulnerable to damage and debris accumulation during floods. Alternative E would have similar impacts during construction as Alternative C. The implementation of Alternative E would have short- and long-term, minor and adverse impacts to floodplains.

Cumulative Impacts. Past actions, such as the placement of fill material to construct the Big Spring Bridge and recreation area, have impacted floodplains from the reduction in floodwater storage capacity. The combined past, present and reasonably foreseeable future action would have a long-term, moderate, and adverse cumulative impact to floodplains. The implementation of Alternative E would contribute an imperceptible, adverse increment to the cumulative impacts.

Conclusions. Alternative E would have short- and long-term, minor, and adverse impacts to floodplains. Implementation of Alternative E would contribute an imperceptible, adverse increment to the cumulative impacts to floodplains.

WETLANDS

Affected Environment

In ONSR, wetlands exist throughout the forests and in the bottomlands of the rivers and springs (National Park Service). Areas that are classified as a wetland according to the USFWS's "Classification of Wetlands and Deepwater Habitats of the United States" are subject to Director's Order #77-1 and its implementing procedures. National Wetland Inventory Maps show that Big Spring is classified as an R3UBH wetland. R3UBH wetlands are riverine, upper perennial, unconsolidated bottom, and permanently flooded. The riverine system includes all wetland and deepwater habitat contained within the channel; and at the spring branch, is bounded on the landward side by the channel bank (L.M. Cowardin, 1979). The project area is located in the Current watershed (HUC 11010008).

On-site investigation confirmed the presence of the R3UBH wetland with a palustrine emergent fringe along portions of the banks (Figure 10).



Figure 10. Wetlands Associated with the Big Spring Branch

Methodology

Available information on wetlands potentially impacted by the proposed alternatives was compiled by viewing National Wetland Inventory Maps. Predictions about short-term and long-term impacts to wetlands were based on previous experience with projects of similar scope and characteristics. Analyses of the potential intensity of impacts on wetlands were derived from the available information and the professional judgment of the resource specialists. A Wetland Statement of Findings (SOF) has been prepared. The SOF can be found in Appendix B.

Definition of Intensity Levels:

Negligible Wetlands would not be affected or the effects would be at or below the level of detection. There would be no measurable or perceptible effects on wetland plant and animal populations, soils, or hydrology. The effects would be below or at the lower levels of

	detection (0.0 to 0.01 acres).
Minor	Effects on wetland plant and animal populations, soils, or hydrology would be measurable or perceptible. Mortality of individual plants and animals might occur, but the viability of wetland populations and habitats would not be affected and the community, if left alone, would recover. Changes in wetland soils or hydrology might occur but if left alone, the wetland would recover in time. The effects to wetlands would be detectable and relatively small in terms of area (0.01 to 0.05 acres) and the nature of the change. The action would affect a limited number of individuals of plant or wildlife species within the wetland.
Moderate	A readily measurable change in abundance, distribution, quantity, or quality of populations of plants and animals would occur. Readily measurable changes in soils or hydrology would occur. The wetland would be slow to recover from these changes, or might not recover fully over time. Mitigation measures would be necessary to offset adverse effects, and would likely be successful. The effects to wetlands would be readily apparent over a relatively small area (0.05 acres to 0.5 acre) but the impact could be mitigated by restoring previously degraded wetlands. The action would have a measurable effect on plant or wildlife species within the wetland, but all species would remain indefinitely viable.
Major	Effects on wetland plant and animal populations, soils, or hydrology would be readily apparent, and measurable. Extensive mitigation would be needed to offset adverse effects, and the success of mitigation measures could not be assured. The effects to wetlands would be readily apparent over a relatively large area (0.5 acre or more). The action would have measurable consequences for the wetland area that could not be mitigated. Wetland species dynamics would be upset, and plant and/or animal species would be at risk of extirpation from the area.

Definition of Duration. Short-term: Effects lasting the duration of construction, plus the time it takes for wetland vegetation to establish (maximum of 9 months). Long-term: Effects extend after the construction of the project is completed (9 months) and could be permanent.

Environmental Consequences

Alternative A – No Action Alternative

Direct and Indirect Impacts. Alternative A would have no additional impact to wetlands.

Cumulative Impacts. There can be no cumulative impacts because there are no direct impacts to wetlands.

Conclusions. Under Alternative A, there would be no additional impact to wetlands, and no cumulative impact to wetlands.

Alternative B – Rehabilitate Existing Bridge

Direct and Indirect Impacts. The installation of fiberglass jackets on a portion of the existing timber piles would have a negligible impact to the R3UBH wetlands. Dewatering may also be necessary if any sections of deteriorated timber piles need to be replaced. Any dewatering activities would include the filtering of the water prior to reintroducing it to the spring. Pumping water directly into the spring branch would be prohibited. The wetland functions of fish and wildlife habitat would be minimally impacted by the implementation of Alternative B. Alternative B would have a short-term, minor, and adverse impact to wetlands.

Cumulative Impacts. Continued development of Carter County would likely impact wetlands. The other past, present, and future actions would have a long-term, minor, and

adverse cumulative impact to wetlands. Implementation of Alternative B would contribute an imperceptible, adverse increment to the cumulative long-term, minor, and adverse impacts to wetlands.

Conclusions. Alternative B would have short-term, minor, and adverse impacts to wetlands. Implementation of Alternative B would contribute an imperceptible, adverse increment to the cumulative impacts to wetlands.

Alternative C – Replace with Timber Bridge

Direct and Indirect Impacts. Under Alternative C, the existing bridge would be replaced with a timber bridge. The existing timber piles would be removed, most likely by being snapped off or saw-cut at the mud line. The new bridge would have eight piles at each of the five bents, compared to the existing bridge which has six piles at each of the five bents. The new bridge would likely have 10 more piles than the existing bridge, impacting an additional four square feet of R3UBH wetlands. The bents would not require dewatering, but would require the installation of a temporary causeway during construction. The temporary causeway is needed so that a crane can access the work areas and would impact approximately 2600 square feet (0.06 acres) of wetlands. Construction access to the temporary causeway would impact approximately 110 square feet (0.003 acres) of the palustrine emergent fringe; however, after construction these areas would be restored. The abutments would be replaced 10 feet behind the existing abutments, so there would be no permanent impacts to the palustrine emergent fringe. The wetland functions of fish and wildlife habitat would be minimally impacted by the implementation of Alternative C. Alternative C would have a short-term, moderate, and adverse impact and a long-term, minor, and adverse impact to wetlands.

Cumulative Impacts. Continued development of Carter County would likely impact wetlands. The other past, present, and future actions would have a long-term, minor, and adverse cumulative impact to wetlands. Implementation of Alternative C would contribute an imperceptible, adverse increment to the cumulative long-term, minor, and adverse impacts to wetlands.

Conclusions. Alternative C would have short-term, moderate and long-term, minor, and adverse impacts to wetlands. Implementation of Alternative C would contribute an imperceptible, adverse increment to the cumulative impacts to wetlands.

Alternative D – Replace with a Concrete Bridge

Direct and Indirect Impacts. Under Alternative D, the existing bridge would be replaced by a new bridge with one solid pier instead of five exposed pile bents. The existing timber piles would be removed. The new pier would permanently impact approximately 125 square feet (0.003 acres) of R3UBH wetlands, and the removal of the piles would restore 13.5 square feet of R3UBH wetlands. The installation of the causeway, access to the causeway and the sheet pile diversion installed around the center pier during construction would temporarily impact approximately 2710 square feet (0.06 acres) of R3UBH wetlands. Abutments for the new bridge would be set ten feet behind the existing abutments, and so there would be no long-term impacts to the palustrine emergent fringe. The wetland functions of fish and wildlife habitat would be minimally impacted by the implementation of Alternative D. Alternative D would have a short-term, moderate, and long-term, minor and adverse impact to wetlands.

Cumulative Impacts. Continued development of Carter County would likely impact wetlands. The other past, present, and future actions would have a long-term, minor, and adverse cumulative impact to wetlands. Implementation of Alternative D would contribute an imperceptible, adverse increment to the cumulative long-term, minor, and adverse impacts to wetlands.

Conclusions. Alternative D would have short-term, moderate, and long-term minor and adverse impacts to wetlands. Implementation of Alternative D would contribute an imperceptible, adverse increment to the cumulative impacts to wetlands.

Alternative E – Replace with a Steel Bridge

Direct and Indirect Impacts. Under Alternative E, the existing bridge would be replaced by a new bridge that spans the spring branch. The implementation of this alternative would restore approximately 13.5 square feet of wetlands through the removal of the existing timber piles. A temporary causeway would be installed for the demolition of the existing bridge and construction of the new bridge, impacting approximately 0.06 acres of wetlands. Abutments for the new bridge would be set ten feet behind the existing abutments, and so there would be no long-term impacts to the palustrine emergent fringe. The wetland functions of fish and wildlife habitat would be minimally impacted by the implementation of Alternative E. Alternative E would have a short-term, moderate, and adverse impact and a long-term, minor, and beneficial impact to wetlands.

Cumulative Impacts. Continued development of Carter County would likely impact wetlands. The other past, present, and future actions would have a long-term, minor, and adverse cumulative impact to wetlands. Implementation of Alternative E would contribute an imperceptible increment to the cumulative long-term, minor, and adverse impacts to wetlands.

Conclusions. Alternative E would have short-term, moderate, and adverse impacts and long-term, minor, and beneficial impacts to wetlands. Implementation of Alternative E would contribute an imperceptible, adverse increment to the cumulative impacts to wetlands.

SPECIES AND AREAS OF SPECIAL CONCERN

Affected Environment

Species of special concern, for the purposes of this EA, include those species that have been designated for additional Federal or State protection. Federally protected species are those species listed by the USFWS as endangered, threatened, or candidate species per the Endangered Species Act. The terms “endangered” and “threatened” are classifications provided to an animal or plant in danger of extinction within the foreseeable future throughout all or significant portion of its range and any species which is likely to become an endangered, respectively. State protected species are those species identified by the state of Missouri as endangered, threatened, rare, or an unusual species. Areas of special concern include natural areas which are designated by the Missouri Natural Areas Program.

The following species of special concern have been identified as potentially occurring in the study area through coordination with USFWS and MDC:

Table 3. Species of Special Concern		
Species	Scientific Name	Status
Plants		
A Liverwort	<i>Riccardia multifida</i>	S1; Critical
Star duckweed	<i>Lemna trisulca</i>	S2; Imperiled
A Liverwort	<i>Nowellia curvifolia</i>	S?; Unranked
A Liverwort	<i>Metzgeria furcata</i>	S?; Unranked
Broad waterweed	<i>Elodea canadensis</i>	SU; Unrankable
Mussels		
Ouachita kidneyshell	<i>Ptychobranthus occidentalis</i>	S3; Vulnerable
Amphibians		
Ozark hellbender	<i>Cryptobranchus alleganiensis bishopi</i>	Federal & State - Endangered
Mammals		
Gray bat	<i>Myotis grisescens</i>	Federal & State - Endangered
Indiana bat	<i>Myotis sodalis</i>	Federal & State - Endangered
Northern long-eared bat	<i>Myotis septentrionalis</i>	Federal - Threatened

The MDC Natural Heritage records identified the Ozark hellbender as a federal and state-listed endangered species within this portion of the Current River. State-ranked species were also identified within the project area. The state-ranked species are listed above and are comprised of species found in wet or aquatic environments. The Ouachita kidneyshell is a medium-sized mussel species found on the south and west sides of the Ozark Plateaus. Star duckweed is an aquatic plant with a small green floating body with a single root that extends into the water, but is not rooted to the soil. It can be found in still and slow moving waters (University of Wisconsin-Green Bay). Liverworts grow in wet areas and usually very close to the ground. They appear as nearly flat green surfaces. Liverworts are bryophytes which have no stems or roots, and so they absorb nutrients directly through surface tissues (National Park Service). Broad waterweed is a perennial aquatic plant that is native to most of North American. These plants sometimes occur as tangled masses, and individual plants vary in appearance based on growing conditions from being bushy and robust to long trailing stems with few leaves and weak stems. Broad waterweed provides food and habitat for fish, waterfowl and other wildlife (Washington Department of Ecology).

Gray bats, Indiana bats and northern long-eared bats were noted as potentially occurring in the project area. Summer and winter habitat surveys were completed to determine if any species are present or whether suitable habitat exists. The gray bat has monochromatic gray fur and weighs about 0.35 ounces at maturity. Missouri contains about 20 percent of the total population of gray bats. Gray bats require caves for winter hibernation and summer roosting (HDR, 2015). They hibernate in large numbers in a few vertical caves and in the summer they move to caves in river valleys or near lakes. They are highly vulnerable to disturbance during all seasons. Disturbance to the maternity colonies create panic and mortality of the young (Elliot & Clawson).

Indiana bats are very small and only weigh about a quarter of an ounce with a wing span of 9 to 11 inches. Indiana bats have dark brown to black fur with lighter belly fur than back fur. They have a pink nose which is flattened. Indiana bats form dense clusters of sometimes hundreds of thousands of bats. They are vulnerable to disturbance during hibernation because the

disturbance causes depletion in their fat reserves. They are also not found in caves in the summer (Elliot & Clawson). Missouri contains about 26 percent of the total population of hibernating Indiana bats. Female Indiana bats form nursery colonies under exfoliating bark of dead, dying and living trees in a variety of habitat types (HDR, 2015).

The northern long-eared bat is a medium-sized bat (weighing 0.17 to 0.28 ounces) with a body length of three to 3.7 inches but a wingspan of nine to 10 inches. Their fur color can be medium to dark brown on the back and tawny to pale-brown on the underside. This bat is distinguished by its long ears, particularly as compared to other bats in its genus (U.S. Fish and Wildlife Service, 2015). In Missouri, northern long-eared bats are considered common and likely occur statewide wherever forested habitat occurs (HDR, 2015). The Final 4(d) Rule for the northern long-eared bat took effect in February 2015 and may have an impact on management of this species in ONSR. The habitat surveys completed in the summer and winter of 2015 found no evidence of use of the bridge by bats; however, suitable roost trees for Indiana and northern long-eared bats were identified within and directly adjacent to the project area.

The Ozark hellbender also has the potential to occur in the project area. The Ozark hellbender is a strictly aquatic salamander found in clear, clean, cold, high oxygen levels, and spring fed rivers of the Ozarks. They have flattened bodies that range from one to two feet long. The fleshy folds of skin along their sides provide surface area so that they can breathe underwater. They are nocturnal and feed primarily on crayfish (U.S. Fish and Wildlife Service). Hellbenders life span lasts up to 30 years and reproduction doesn't begin until hellbenders are five to eight years old (U.S. Fish and Wildlife Service). In May of 2015, the NPS and MDC completed a survey of the Big Spring Branch in order to assess habitat and identify any individuals present in the project area. Suitable habitat was found in the project area; however, no individuals were observed.

In addition to Federal- and State-listed species in the project area, Missouri has designated natural areas, which represent some of the best and last examples of original landscape. These areas feature rare plants, animals and geologic features (Missouri Department of Conservation). Big Spring Natural Area, designated on February 14, 1983, is a 17 acre area extending from the spring down to the upstream side of the bridge.

Methodology

Early coordination was completed with the USFWS and the MDC - Resource Science Division. Impact analysis was based on the on-site inspection of the study area, review of existing literature and studies, and professional judgment. A biological assessment was prepared to analyze the impacts of the project and initiate complete consultation. Endangered Species Act Section 7 consultation was completed with the USFWS for the Preferred Alternative. Copies of the consultation correspondence can be found in Appendix A.

Definition of Intensity Levels:

- | | |
|------------|--|
| Negligible | The actions would result in a change to a population or individuals of a species, but the change would be of barely perceptible consequence and would be well within natural variability. In the case of Federally-listed species, this impact intensity equates to a USFWS determination of "may affect, not likely to adversely affect". |
| Minor | The action would result in a change to a population or individuals of a species. The change would be measurable, but small and localized, and not outside the range of natural variability. |

	Mitigation measures, if needed, would be simple and successful. In the case of Federally-listed species, this impact intensity equates to a USFWS determination of “may affect, not likely to adversely affect.”
Moderate	Impacts on special status species, their habitats, or the natural processes sustaining them would be detectable and occur over a large area. Breeding animals of concern are present, and animals are present during particularly vulnerable life stages; mortality or interference with activities necessary for survival would be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the park unit or conservation zone. Mitigation measures would be extensive and likely successful. In the case of Federally-listed species, this impact intensity equates to a USFWS determination of “may affect, likely to adversely affect.”
Major	The action would result in noticeable effects to the viability of the population or individuals of a species. Impacts on special status species or the natural processes sustaining them would be detectable, both inside and outside of the park. Loss of habitat might affect the viability of at least some special status species. Extensive mitigation measures would be needed to offset any adverse effects and their success could not be guaranteed. In the case of Federally-listed species, the impact intensity equates to a USFWS determination of “may affect, likely to jeopardize the continued existence” of the species.

Definition of Duration. Short-term: Effects lasting the duration of construction or less (maximum of 6 months). Long-term: Effects extend after the construction of the project is completed (6 months) and could be permanent.

Environmental Consequences

Alternative A – No Action

Direct and Indirect Impacts. Alternative A would have no impact to species and areas of special concern.

Cumulative Impacts. There can be no cumulative impacts because there are no direct impacts to species and areas of special concern.

Conclusions. Under Alternative A, there would be no impact to species and areas of special concern, and no cumulative impact to species and areas of special concern.

Alternative B – Rehabilitate Existing Bridge

Direct and Indirect Impacts. Rehabilitation would include jacketing of a portion of the timber piles with fiberglass jackets and the glulam timber deck would be replaced. Short-term impacts to the Ozark hellbender would be minor because the FRP jacketing would cause a limited amount of sediment resuspension in the water during their installation. The in-water work is not anticipated to create large sediment plumes that could impact the Ouachita kidneyshell, liverworts, duckweed or waterweed. Tree clearing would not be necessary in order to complete the repairs, and so the associated impacts to bats would be avoided. The rehabilitation of the existing bridge would have no impact on the Big Spring Natural Area. Alternative B would have a short-term, minor, and adverse impact to species and areas of special concern.

Cumulative Impacts. The other past, present, and future actions would have a long-term, moderate, and adverse cumulative impact to species and areas of special concern.

Implementation of Alternative B would contribute an imperceptible, adverse increment to the cumulative long-term, moderate, and adverse impacts to species and areas of special concern.

Conclusions. Alternative B would have short-term, minor, adverse impacts to species and areas of special concern. Implementation of Alternative B would contribute an imperceptible, adverse increment to the cumulative impacts to species and areas of special concern.

Alternative C – Replace with Timber Bridge

Direct and Indirect Impacts. The construction of a new bridge would result in an increase in the overall number of piles in the spring branch, since the new bridge has more piles than the existing bridge. The new piles would cause a negligible reduction in amount aquatic habitat available in the area. The driving of timber piles may create underwater noise that may cause hellbenders to leave or avoid the surrounding area. In order to reduce the amount of underwater noise generated by pile driving, hammer and pile cushions would be used. The impact hammer would also be ramped up to allow species to leave the area. Ramping up is done by lightly tapping the pile with the impact hammer and slowly increasing its force.

The temporary impacts associated with the construction activities have the potential to impact the species of special concern. The removal of the existing bridge piles and construction of the new bridge would create an increase in suspended sediment. Ground disturbing activities associated with the construction of the abutments and roadway approaches would expose bare soil to erosion. However, in order to minimize to erosion of bare soil and sedimentation of the spring branch, BMPs would be implemented. The BMPs would include the use of silt fence or fiber rolls and installation of turbidity curtains.

A temporary causeway would be constructed within the spring branch in order to provide construction access for demolition of the existing bridge and construction of the new bridge. Riprap would be placed on top of a geotextile on the streambed to aid in material removal and restoration of the stream bed after construction. Mats would be placed on top of the riprap to provide a level surface and drip pans would be used to collect pollutants prior to them entering the spring. The presence of the temporary causeway would cause a temporary reduction in available temporary habitat and may increase water flow velocities that could cause erosion along the stream bank opposite the causeway. Bank protection would be installed to minimize the potential for erosion. Impacts to the Ozark hellbender would be minor. The in-water work is not anticipated to create large sediment plumes that could impact the Ouachita kidneyshell, liverworts, duckweed or waterweed.

Tree clearing would be necessary in order to replace the bridge, and it is estimated that three large trees, primarily American sycamore (*Plantanus occidentalis*), would be cleared. Tree clearing would be completed between November 1 and April 1 during the time when bats are hibernating. The new timber bridge would be six feet wider than the existing bridge and would extend three feet into the Big Spring Natural Area. Alternative C would have a short-term and long-term, minor, and adverse impact to the species and areas of special concern.

Cumulative Impacts. The other past, present, and future actions would have a long-term, moderate, and adverse cumulative impact to species and areas of special concern. Implementation of Alternative C would contribute an imperceptible, adverse increment to the cumulative long-term, moderate, and adverse impacts to species and areas of special concern.

Conclusions. Alternative C would have short-term and long-term, minor, and adverse impacts to species and areas of special concern. Implementation of Alternative C would contribute an

imperceptible, adverse increment to the cumulative impacts to species and areas of special concern.

Alternative D – Replace with Concrete Bridge

Direct and Indirect Impacts. The impacts associated with the removal of the existing bridge, ground disturbance, tree clearing and temporary causeway for Alternative D would be similar to those described for Alternative C. Alternative D would also have impacts related to the construction of the cast-in-place pier. The driving of steel sheet piling for the temporary diversion may create a small amount of sediment redistribution, and would create underwater noise that may cause hellbenders to leave or avoid the surrounding area. In order to reduce the amount of underwater noise generated by pile driving, hammer cushions would be used. The impact hammer would also be ramped up to allow species to leave the area. Ramping up is done by lightly tapping the pile with the impact hammer and slowly increasing its force. Use of an impact hammer would only be necessary for the sheet piling, since the micropiles for the pier and abutments would be drilled into the ground. The replacement of the timber piles with one solid center pier would impact approximately 112 square feet of potential hellbender habitat. The in-water work is not anticipated to create large sediment plumes that could impact the hellbender, kidneyshell, liverworts, duckweed or waterweed.

Tree clearing would be necessary in order to replace the bridge, and it is estimated that three large trees, primarily American sycamore (*Plantanus occidentalis*), would be cleared. Tree clearing would be completed between November 1 and April 1 during the time when bats are hibernating. The new concrete bridge would be 3.5 feet wider than the existing bridge and would extend 1.75 feet into the Big Spring Natural Area. Alternative D would have a short-term and long-term, minor, and adverse impact to the species and areas of special concern.

Cumulative Impacts. The other past, present, and future actions would have a long-term, moderate, and adverse cumulative impact to species and areas of special concern. Implementation of Alternative D would contribute an imperceptible, adverse increment to the cumulative long-term, moderate, and adverse impacts to species and areas of special concern.

Conclusions. Alternative D would have short-term and long-term, minor, and adverse impacts to species and areas of special concern. Implementation of Alternative D would contribute an imperceptible, adverse increment to the cumulative impacts to species and areas of special concern.

Alternative E – Replace with Steel Bridge

Direct and Indirect Impacts. The construction of a new steel bridge on the same alignment as the existing bridge would result in the removal of all of the piles in the spring, creating a minimal amount of potential hellbender habitat. The impacts resulting from the removal of the existing bridge would be similar to those described for Alternative C. Since a temporary causeway would be needed to set the steel truss, the temporary construction-related impacts for Alternative E would be similar to those described for Alternative C. The new steel bridge would be eight feet wider than the existing bridge and would extend four feet into the Big Spring Natural Area. Alternative E would have a short-term and long-term, minor, and adverse impact to the species and areas of special concern.

Cumulative Impacts. The other past, present, and future actions would have a long-term, moderate, and adverse cumulative impact to species and areas of special concern. Implementation of Alternative E would contribute an imperceptible, adverse increment to the cumulative long-term, moderate, and adverse impacts to species and areas of special concern.

Conclusions. Alternative E would have short-term and long-term, minor, and adverse impacts to species and areas of special concern. Implementation of Alternative E would contribute an imperceptible, adverse increment to the cumulative impacts to species and areas of special concern.

WATER QUALITY AND STREAMFLOW CHARACTERISTICS

Affected Environment

Karst topography is found throughout ONSR. Water has worn away passages in the soluble dolomite, forming springs and caves. As a result of this, the surface water and the groundwater have enhanced interactions. The subsurface watershed adds 23 percent to the size of its surfaced watershed (National Park Service, 2006). Rainfall and snowmelt will either flow along the surface to the Current Rivers or will flow into the subsurface watershed. Once the water enters the subsurface it might flow beyond the surface drainage basin and can flow in an unpredicted route (National Park Service, 2006).

Upstream of the project area is Big Spring, which flows into the Current River, an Outstanding National Resource Water (Figure 11). Springs are small and delicate ecosystems making them sensitive to disturbances. Springs have a uniform water temperature that is equal to the mean annual air temperature of the region (National Park Service). Many of the parks wildlife species are dependent on the high water quality of the Park. Any activities that adversely affect the water quality could have a significant impact on the park resources (National Park Service, 2006).

Water quality is defined by several parameters, including turbidity. Ground disturbance and the pumping of water increases the amount of sediment suspended in the water. The amount of suspended solids is typically measured by turbidity. Higher levels of turbidity pose several problems for stream systems. Turbidity blocks out the light needed by submerged aquatic vegetation. It also can raise surface water temperatures above normal because suspended particles near the surface facilitate the absorption of heat from sunlight. Suspended soil particles may also bury eggs and benthic invertebrates when they settle. Turbid waters may also be low in dissolved oxygen (Missouri Department of Natural Resources).



Figure 11. The dissolved dolomite in the karst topography gives the water a unique color.

Although the existing bridge abutments are exposed and experiencing material loss, during normal water levels the water surface elevation does not reach the abutments. The width of the spring is not confined by the bridge abutments; however, the channel is somewhat incised at the bridge. At the bridge, the banks of the spring branch are comprised primarily of fill material that is likely associated with the construction of the existing bridge to a depth of 9 to 10 feet. The fill consisted primarily of loose to dense brown silty sand with various amounts and sizes of gravel. Underneath the fill material, loose to medium dense light brown sandy gravel, with some silt and clay was encountered from approximately 9 to 30 feet. The existing channel is stable and there has been relatively little change in the stream bed elevation since the measurements have been taken as part of the bridge inspections for this bridge in 1983 (Federal Highway Administration, 2014).

Methodology

Predictions about short-term and long-term impacts to water quality and streamflow characteristics were based on previous experience with projects of similar scope and characteristics. Analyses of the potential intensity of impacts on to surface water and groundwater quality were derived from the available information and the professional judgment of the resource specialists.

Definition of Intensity Levels:

Negligible	Impacts would result in a change to water quality and streamflow characteristics, but the change would be so slight that it would not be of any measurable or perceptible consequence.
Minor	Impacts would result in a detectable change to water quality and streamflow characteristics, but the change would be expected to be small, of little consequence, and localized. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Impacts would result in a change to water quality and streamflow characteristics that would be readily detectable and relatively localized. Mitigation measures, if needed to offset adverse effects, would be extensive, but would likely be successful.
Major	Impacts would result in a change to water quality and streamflow characteristics that would

have substantial consequences on a regional scale. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Definition of Duration. Short-term: Effects lasting up to the duration of construction (maximum of 6 months). Long-term: Effects extend after the construction of the project is completed (6 months) and could be permanent.

Environmental Consequences

Alternative A – No Action Alternative

Direct and Indirect Impacts. Alternative A would have no additional impact to water quality or streamflow characteristics. Material behind the abutment would continue to wash out during high water events. Pollutants from the driving surface of the bridge would continue to flush into the spring branch during rain events.

Cumulative Impacts. There can be no cumulative impacts because there are no direct impacts to water quality or streamflow characteristics.

Conclusions. Under Alternative A, there would be no additional impact to water quality or streamflow characteristics, and no cumulative impact to water quality and streamflow characteristics.

Alternative B – Rehabilitate Existing Bridge

Direct and Indirect Impacts. The installation of fiberglass jackets on a portion of the existing timber piles and the replacement of the bridge deck would impact the spring branch. When the fiberglass jackets are installed, the jackets are set in place and then the epoxy is grouted between the jacket and the pile, displacing the water. Debris shields would be installed during the rehabilitation to minimize the amount of materials that would enter the spring. An erosion and sediment control plan utilizing BMPs would be implemented during construction to reduce the potential for impacts to the water quality. The length of the bridge would remain the same, and so stream morphology would not change. Utilities would not be relocated under this alternative. Alternative B would have a short-term, minor, and adverse impact to water quality and streamflow characteristics.

Cumulative Impacts. The other past, present, and future actions would have a long-term, minor, and adverse cumulative impact to water quality and streamflow characteristics. Implementation of Alternative B would contribute an imperceptible, adverse increment to the cumulative long-term, minor, and adverse impacts to water quality and streamflow characteristics.

Conclusions. Alternative B would have short-term, minor, and adverse impacts to water quality and streamflow characteristics. Implementation of Alternative B would contribute an imperceptible, adverse increment to the cumulative impacts to water quality and streamflow characteristics.

Alternative C – Replace with Timber Bridge

Direct and Indirect Impacts. Under Alternative C, the existing bridge would be replaced with another timber glulam bridge. The existing timber piles would be removed, most likely by

being snapped off or saw-cut at the mud line. The new bridge would have more piles than the existing bridge, creating a minor increase in local scour. The new timber bridge would not have scuppers; instead, runoff would be directed to the roadway approach and shoulder areas. The impact of placing new bents in the spring branch would be offset for the most part by the removal of the existing timber piles. A revegetation plan would be developed and implemented in order to permanently stabilize the disturbed banks of the spring branch. The new bridge would be 20 feet longer than the existing bridge, and so the abutments would be set approximately 10 feet back from the bank on each side. Since the spring branch is not currently constrained by the existing abutments, it is not anticipated that major changes to the bank morphology would occur. Under the preferred option to relocate the utilities underground, the potential for sewage leaks into the spring branch would be minimized, as the sewage line would run under the spring branch in a casing. Alternative C would have a long-term, negligible, and adverse impact to water quality and streamflow as a result of the additional piles in the spring branch.

In order to construct the bridge, a riprap causeway would be constructed across half of the spring in order to provide access for a crane. Although the large rock riprap would allow for some water to flow through the causeway, flow of the spring branch would be constrained at the causeway and the velocity (and potential for scour) may increase slightly as a result. An erosion and sediment control plan utilizing BMPs would be implemented during construction to reduce the potential for impacts to the water quality. Turbidity would be monitored during construction to ensure BMPs are effective. Alternative C would have a short-term, moderate, and adverse impact to water quality and streamflow characteristics.

Cumulative Impacts. The other past, present, and future actions would have a long-term, minor, and adverse cumulative impact to water quality and streamflow characteristics. Implementation of Alternative C would contribute an imperceptible, adverse increment to the cumulative long-term, minor, and adverse impacts to water quality and streamflow characteristics.

Conclusions. Alternative C would have short-term, moderate and long-term, negligible, and adverse impacts to water quality and streamflow characteristics. Implementation of Alternative C would contribute an imperceptible, adverse increment to the cumulative impacts to water quality and streamflow characteristics.

Alternative D – Replace with Concrete Bridge

Direct and Indirect Impacts. Under Alternative D, the existing bridge would be replaced by a new bridge with one pier. The existing timber piles would be removed. The new bridge would have a solid center pier. Alternative D would not have scuppers like the existing bridge that allow water to drain directly into the spring branch. Instead, the runoff from the bridge would be directed to the roadway approaches and shoulder area. The new bridge would be 20 feet longer than the existing bridge, and so the abutments would be set approximately 10 feet back from the bank on each side. Since the spring branch is not currently constrained by the existing abutments, it is not anticipate that major changes to the bank morphology would occur. The abutment design includes wingwalls that are turned back from the spring branch to minimize impacts to streamflow. Under the preferred option to relocate the utilities underground, the potential for sewage leaks into the spring branch would be minimized, as the sewage line would run under the spring branch in a casing.

In order to remove the existing bridge and construct the new bridge a temporary causeway would be installed. The impacts from the causeway are similar to those described under Alternative C. Alternative D would have short-term, moderate, and adverse impact and long-term, minor, and beneficial impact to water quality and streamflow characteristics.

Cumulative Impacts. The other past, present, and future actions would have a long-term, minor, and adverse cumulative impact to water quality and streamflow characteristics. Implementation of Alternative D would contribute an imperceptible, beneficial increment to the cumulative long-term, minor, and adverse impacts to water quality and streamflow characteristics.

Conclusions. Alternative D would have short-term, moderate, and adverse impacts and long-term, minor and beneficial impacts to water quality and streamflow characteristics. Implementation of Alternative D would contribute an imperceptible, beneficial increment to the cumulative impacts to water quality and streamflow characteristics.

Alternative E – Replace with Steel Bridge

Direct and Indirect Impacts. Under Alternative E, the existing bridge would be replaced by a new bridge that spans the spring branch. The existing timber piles would be removed. Alternative E would not have scuppers that allow stormwater to drain directly into the spring branch. Runoff would be directed to the roadway approaches and shoulder area. The new bridge would be 20 feet longer than the existing bridge, and so the abutments would be set approximately 10 feet back from the bank on each side. Since the spring branch is not currently constrained by the existing abutments, it is not anticipated that major changes to the bank morphology would occur. Under the preferred option to relocate the utilities underground, the potential for sewage leaks into the spring branch would be minimized, as the sewage line would run under the spring branch in a casing.

In order to removal the existing bridge and construct the new bridge a temporary causeway would be installed. The impacts from the causeway are similar to those described under Alternative C. Alternative E would have short-term, moderate, and adverse impact and long-term, minor, and beneficial impact to water quality and streamflow characteristics.

Cumulative Impacts. The other past, present, and future actions would have a long-term, minor, and adverse cumulative impact to water quality and streamflow characteristics. Implementation of Alternative E would contribute an imperceptible, beneficial increment to the cumulative long-term, minor, and adverse impacts to water quality and streamflow characteristics.

Conclusions. Alternative E would have short-term, moderate, and adverse impacts and long-term, minor, and beneficial impacts to water quality and streamflow characteristics. Implementation of Alternative E would contribute an imperceptible, beneficial increment to the cumulative impacts to water quality and streamflow characteristics.

GEOLOGIC RESOURCES

Affected Environment

The areas surrounding Big Spring have karst terrain that is characterized by the presence of caves, sinkholes, losing streams, and springs (National Park Service). These features form over long periods of time as groundwater dissolves soluble dolomite that is found underground. This process has resulted in the formation of a complex network of subterranean passages that allow water to travel over long distances. Potentiometric mapping and dye-trace investigations have been conducted to define the recharge area of Big Spring. The general extent of this recharge area consists of several hundred square miles of land west of Big Spring within the Mark Twain National Forest (Imes, 2007). The waters of Big Spring emerge from an exposed hydraulic conduit at the base of a dolostone bluff and flow in a southeasterly direction for approximately 2,000 feet to the main channel of the Current River.

Geologic maps show that the site is predominantly underlain by the Emminence Dolomite Foundation. At the bridge, the dolomite is found 28 to 30 feet deep. Soil maps show the presence of the Alred-Rueter complex at the south abutment and the Gladden silt loam and the Wideman fine sandy loam at the north abutment. These soils can be described as slope alluvium over residuum derived from dolomite, with profiles including gravelly, sandy silt loam and gravelly silty clay. A 10-foot deep layer of fill material is also present in the vicinity of the bridge, covering the alluvial layer and dolomite (Federal Highway Administration, 2015). It is unknown whether any voids are present within the dolomite found in the project area.

Methodology

Available information regarding geologic resources was compiled from available geologic and soil maps. Geotechnical testing was completed by drilling borings along the alignment. Field testing and laboratory testing was conducted to aid in the classification and evaluation of the engineering properties of soils present at the site. Seismic refraction lines were also performed at the sites to further evaluate subsurface conditions. Predictions about short-term and long-term impacts to geologic resources were based on previous experience of projects of similar scope and characteristics. Analyses of the potential intensity of impacts to geologic resources were derived from the available information, best professional judgment, and previous project investigations.

Definition of Intensity Levels:

Negligible	Impacts would result in a change to geologic resources, but the change would be so slight that it would not be of any measurable or perceptible consequence.
Minor	Impacts would result in a detectable change to geologic resources, but the change would be expected to be small, of little consequence, and localized. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Impacts would result in a change to geologic resources that would be readily detectable and relatively localized. Mitigation measures, if needed to offset adverse effects, would be extensive, but would likely be successful.
Major	Impacts would result in a change to geologic resources that would have substantial consequences on a regional scale. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Definition of Duration. Short-term: Effects lasting up to the duration of construction (maximum of 6 months). Long-term: Effects extend after the construction of the project is completed (6 months) and could be permanent

Environmental Consequences

Alternative A – No Action Alternative

Direct and Indirect Impacts. Alternative A would have no additional impact to geologic resources.

Cumulative Impacts. There can be no cumulative impacts because there are no direct impacts to geologic resources.

Conclusions. Under Alternative A, there would be no additional impact to geologic resources, and no cumulative impact to geologic resources.

Alternative B – Rehabilitate Existing Bridge

Direct and Indirect Impacts. Although sections of deteriorated piles may need to be replaced in order to complete the rehabilitation work, it is not anticipated that any new piles would need to be driven to support the bridge. Ground excavation or the placement of fill material that could impact soils in the project area would also not be necessary. Alternative B would have no impact on geologic resources.

Cumulative Impacts. There can be no cumulative impacts because there are no direct impacts to geologic resources.

Conclusions. Under Alternative, there would be no additional impact to geologic resources, and no cumulative impact to geologic resources.

Alternative C – Replace with Timber Bridge

Direct and Indirect Impacts. Under Alternative C, the bridge would be replaced on the existing alignment. The removal of the existing bridge would require excavation of the abutments and roadway approaches. The impacts would be primarily to the non-native fill material. The construction of the new timber bridge would require the installation of new timber piles. Timber piles would be driven into the substrate; however, the timber piles would only be driven to refusal. Refusal would occur prior to reaching the layer of dolomite, so there is no potential to puncture a void located in the dolomite. Alternative C would have a long-term, negligible, and adverse impact to geologic resources.

Cumulative Impacts. Past actions, such as the development of the Big Spring area and construction of the existing bridge in 1977, impacted geologic resources through the placement of fill material. The combined past, present and reasonably foreseeable future actions would have a long-term, minor, and adverse cumulative impact to geologic resources. Implementation of Alternative C would contribute a negligible, adverse increment to the cumulative long-term, minor, and adverse impacts to geologic resources.

Conclusions. Alternative C would have long-term, negligible, and adverse impacts to geologic resources. Implementation of Alternative C would contribute a negligible, adverse increment to the cumulative impacts to geologic resources.

Alternative D – Replace with Concrete Bridge

Direct and Indirect Impacts. The removal of the existing bridge would have impacts similar to those described under Alternative C. Under Alternative D, micropiles would be used to construct the substructure of the concrete bridge. Micropiles can be advanced through hard strata and socketed into competent bedrock using subsurface grouting. The drilling, rather than driving, of micropiles allows them to advance more easily through the substrate (Dotson, 2003). It is anticipated that the 12-inch diameter micropiles would extend a minimum of 10 feet into the dolomite bedrock, and that 46 micropiles would be installed. In order to construct the solid center pier, a temporary sheet pile diversion would be installed. Sheet piling would be driven into the alluvial layer of the stream bed; however, the sheet piling would not penetrate the dolomite bedrock. Alternative D would have long-term, moderate, and adverse impacts to geologic resources.

Cumulative Impacts. Past actions, such as the development of the Big Spring area and construction of the existing bridge in 1977, impacted geologic resources through the placement of fill material. The combined past, present and reasonably foreseeable future actions would have a long-term, minor, and adverse cumulative impact to geologic resources. Implementation of Alternative D would contribute an imperceptible, adverse increment to the cumulative long-term, minor, and adverse impacts to geologic resources.

Conclusions. Alternative D would have long-term, moderate, and adverse impacts to geologic resources. Implementation of Alternative D would contribute an imperceptible, adverse increment to the cumulative impacts to geologic resources.

Alternative E – Replace with Steel Bridge

Direct and Indirect Impacts. The removal of the existing bridge would have impacts similar to those described under Alternative C. Although the steel truss would not require any piles to be installed in the spring branch, approximately 46 micropiles would likely be used at the bridge abutments in order to obtain the capacity necessary to support the truss. Alternative E would have a long-term, moderate, and adverse impact to geologic resources.

Cumulative Impacts. Past actions, such as the development of the Big Spring area and construction of the existing bridge in 1977, impacted geologic resources through the placement of fill material. The combined past, present and reasonably foreseeable future actions would have a long-term, minor, and adverse cumulative impact to geologic resources. Implementation of Alternative E would contribute a noticeable, adverse increment to the cumulative long-term, minor, and adverse impacts to geologic resources.

Conclusions. Alternative E would have long-term, moderate, and adverse impacts to geologic resources. Implementation of Alternative E would contribute an imperceptible, adverse increment to the cumulative impacts to geologic resources.

VISITOR USE AND EXPERIENCE

Affected Environment

Approximately 1,280,000 people visited the ONSR in 2015 (National Park Service). Visitation is spread throughout the year, although visitation is reduced in the winter months. There are no entrance fees. Visitation to the ONSR has remained fairly steady since the mid-1970s with around 1,500,000 visitors each year (National Park Service). A visitor survey was conducted in 2006 revealing that most people visit the park with friends or family, with groups averaging eight people, day visitors spend about six hours in the park and camping visitors spend about four days, and 73 percent of people surveyed rented canoes, tubes or rafts (National Park Service, 2014).

Numerous recreational opportunities are available for park visitors in the project area. Big Spring area contains the Big Spring, a campground, a picnic area, a dining lodge, trails, and housekeeping cabins. Swimming is not allowed in the Big Spring. The spring is visible from the parking area and a wheelchair accessible walkway provides access to the spring (National Park Service). The spring is also visible from the bridge, and the sidewalk on the bridge provides an area for visitors to take pictures of the spring.

Methodology

Available information regarding visitor use was compiled by talking to Park staff. Predictions about short-term and long-term impacts to visitor use and experience were based on previous experience of projects of similar scope and characteristics. Analyses of the potential intensity of impacts to visitor use and experience were derived from the available information, best professional judgment, and previous project investigations.

Definition of Intensity Levels:

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

Definition of Duration. Short-term: Effects lasting up to the duration of construction (maximum of 6 months). Long-term: Effects extend after the construction of the project is completed (6 months) and could be permanent

Environmental Consequences

Alternative A – No Action Alternative

Direct and Indirect Impacts. The Big Spring Bridge would continue to deteriorate over time, limiting the types of vehicles that could cross the bridge; however, the spring is accessible from

both sides of the bridge. Load restrictions would likely be placed on the bridge as the deterioration worsens over time. Alternative A would have a long-term, moderate, and adverse impact to visitor use and experience.

Cumulative Impacts. Past actions, such as the establishment of the park unit, preserved natural resources for the appreciation of the public. The combined past, present and reasonably foreseeable future actions would have a long-term, minor, and beneficial cumulative impact to visitor use and experience. Implementation of Alternative A would contribute a noticeable, adverse increment to the cumulative long-term, minor, and beneficial impacts to visitor use and experience.

Conclusions. Alternative A would have long-term, moderate, adverse impacts to visitor use and experience. Implementation of Alternative A would contribute a noticeable, adverse increment to the cumulative impacts to visitor use and experience.

Alternative B – Rehabilitate Existing Bridge

Direct and Indirect Impacts. The elements of the bridge that would be rehabilitated would be accessed both from a crane near the approaches and from the bridge deck. The placement of equipment on the bridge deck would require the full closure of travel lanes on the bridge. Travel delays may impact visitors entering and leaving the Big Spring area. A detour would be set up to route traffic around to the Big Spring campgrounds, lodges, and trails. Pedestrians and bicyclists would also have to use the detour. The construction period for rehabilitating the bridge would be about three and a half months. The noise and presence of construction equipment would detract from the natural setting and may deter visitors. Alternative B would have short-term, moderate, and adverse impacts to visitor use and experience. Rehabilitation of the bridge would likely defer the need for additional maintenance on the bridge, and reduce the possible future inconveniencing of visitors. Alternative B would have long-term, minor, and beneficial impacts to visitor use and experience as less intensive repair projects would be required in the future.

Cumulative Impacts. Past actions, such as the establishment of the park unit, preserved natural resources for the appreciation of the public. The combined past, present and reasonably foreseeable future actions would have a long-term, minor, and beneficial cumulative impact to visitor use and experience. Implementation of Alternative B would contribute a noticeable, beneficial increment to the cumulative long-term, minor, and beneficial impacts to visitor use and experience.

Conclusions. Alternative B would have short-term, moderate, and adverse and long-term, minor, and beneficial impacts to visitor use and experience. Implementation of Alternative B would contribute a noticeable, beneficial increment to the cumulative impacts to visitor use and experience.

Alternative C – Replace with Timber Bridge

Direct and Indirect Impacts. Under Alternative C, the bridge would be replaced on the existing alignment. This would require that the bridge and approach areas be closed to traffic so that it can be demolished, and a new structure constructed in its place. A detour would be set up to route traffic around to the Big Spring campgrounds, lodges, and trails. Pedestrians and bicyclists would be required to use the detour too. The construction period would last

about six months. Alternative C would have short-term, moderate, and adverse impacts to visitor use and experience.

After the bridge is completely replaced the need for maintenance and inconvenience to visitors would be reduced. The new railing and sidewalk would improve accessibility of visitors. The new bridge would defer need for bridge repairs for a longer time period with the same detour length of time as Alternative B. Alternative C would have a long-term, moderate, and beneficial impact to visitor use and experience.

Cumulative Impacts. Past actions, such as the establishment of the park unit, preserved a historic structure for the appreciation of the public. The combined past, present and reasonably foreseeable future actions would have a long-term, minor, and beneficial cumulative impact to visitor use and experience. Implementation of Alternative C would contribute a noticeable, beneficial increment to the cumulative long-term, minor, and beneficial impacts to visitor use and experience.

Conclusions. Alternative C would have short-term, moderate, and adverse and long-term, moderate, and beneficial impacts to visitor use and experience. Implementation of Alternative C would contribute a noticeable, beneficial increment to the cumulative impacts to visitor use and experience.

Alternative D – Replace with Concrete Bridge

Direct and Indirect Impacts. Under Alternative D, the bridge would be replaced on the existing alignment. This would require that the bridge and approach areas be closed to traffic so that it can be demolished, and a new structure constructed in its place. A detour would be set up to route traffic around to the Big Spring campgrounds, lodges, and trails. Pedestrians and bicyclists would be required to use the detour too. The construction period would last about six months. Alternative D would have impacts similar to Alternative C. Alternative D would have short-term, moderate, and adverse impacts to visitor use and experience.

After the bridge is completely replaced the need for maintenance and inconvenience to visitors would be reduced. The new railing and sidewalk would improve accessibility of visitors. Alternative D would have a long-term, moderate, and beneficial impact to visitor use and experience.

Cumulative Impacts. Past actions, such as the establishment of the park unit, preserved a historic structure for the appreciation of the public. The combined past, present and reasonably foreseeable future actions would have a long-term, minor, and beneficial cumulative impact to visitor use and experience. Implementation of Alternative D would contribute a noticeable, beneficial increment to the cumulative long-term, minor, and beneficial impacts to visitor use and experience.

Conclusions. Alternative D would have short-term, moderate, and adverse and long-term, moderate, and beneficial impacts to visitor use and experience. Implementation of Alternative D would contribute a noticeable, beneficial increment to the cumulative impacts to visitor use and experience.

Alternative E – Replace with Steel Bridge

Direct and Indirect Impacts. Under Alternative E, the bridge would be replaced on the existing alignment, resulting in short term impacts similar to Alternative B. This would require that the bridge be closed to traffic so that it can be demolished, and a new structure constructed in its place. A detour would be set up to route traffic around to the Big Spring campgrounds, lodges, and trails. Pedestrians and bicyclists would be required to use the detour too. The construction period would last about six months. Alternative E would have repeated short-term, moderate, and adverse impacts to visitor use and experience.

After the bridge is completely replaced the need for maintenance and inconvenience to visitors would be reduced. The new railing and sidewalk would improve accessibility of visitors. Alternative E would have a long-term, moderate, and beneficial impact to visitor use and experience.

Cumulative Impacts. Past actions, such as the establishment of the park unit, preserved a historic structure for the appreciation of the public. The combined past, present and reasonably foreseeable future actions would have a long-term, minor, and beneficial cumulative impact to visitor use and experience. Implementation of Alternative E would contribute a noticeable, beneficial increment to the cumulative long-term, minor, and beneficial impacts to visitor use and experience.

Conclusions. Alternative E would have short-term, moderate, and adverse and long-term, moderate, and beneficial impacts to visitor use and experience. Implementation of Alternative E would contribute a noticeable, beneficial increment to the cumulative impacts to visitor use and experience.

CONCLUSIONS

Alternative A (No-Action)

Implementation of Alternative A (No-Action) would have no impact on the cultural landscape, floodplains, species and areas of special concern, water quality and streamflow characteristics, geologic resources or wetlands. There would be long-term, moderate, adverse impacts to visitor use and experience as the Big Spring Bridge continues to deteriorate and require emergency repairs. The cumulative impacts would be noticeable and adverse.

Alternative B (Rehabilitate Existing Bridge)

Implementation of Alternative B (Rehabilitate Existing Bridge) would have short-term, minor, and adverse impacts to wetlands and species and areas of special concern and due to the installation of FRP jackets around deteriorating bridge piles. There would be long-term minor adverse impacts to cultural landscape; and long-term negligible adverse impacts to floodplains. Alternative B would contribute an imperceptible, adverse increment to the cumulative impacts on those resources.

There would be short-term, moderate, and adverse impacts to visitor use and experience due to lane closures during construction. Alternative B would have long-term, minor, and beneficial impacts to visitor use and experience because it would extend the life of the bridge and reduce the need for maintenance and repair. Cumulative impacts to these resources would be noticeable and adverse. Alternative B would have no impact to geologic resources.

Alternative C (Replace with Timber Bridge)

Implementation of Alternative C (Replace with Timber Bridge) would have short-term, moderate and adverse impacts and long-term, minor, and beneficial impacts to the cultural landscape of the Big Spring area. The construction of a new timber bridge would be similar to the existing bridge and compliment the rustic architecture of the Big Spring Historic District. Alternative C would contribute a noticeable, beneficial increment to the cumulative impacts of those resources.

Additionally, Alternative C would have long-term, minor, and adverse impacts to floodplains, wetlands, and species and areas of special concern due to the placement of additional bents in the spring branch and the reduction of potential habitat. There would also be short-term minor (and moderate for wetlands) impacts during construction for these impact topics. Geologic resources would experience a long-term, negligible and adverse impact.

Alternative C would also contribute a short-term, moderate, and adverse impact to visitor use and experience and long term, moderate, and beneficial impacts to visitor use. The short-term, adverse, impacts would be associated with construction activities and closure of the Bridge and the long-term, beneficial, impacts would be due to a decrease in required maintenance and inspection, improved lifespan of the new bridge, and a bridge design that meets current AASHTO bridge design specifications.

Alternative D (Replace with Concrete Bridge)

Implementation of Alternative D (Replace with Concrete Bridge) would have short-term, moderate and long-term, minor, and adverse impacts to the cultural landscape of the Big Spring area due to the potential of its more modern design to distract from the rustic qualities of the Historic District. Alternative D would contribute a noticeable, adverse increment to the long-term, minor, and beneficial cumulative impact to this resource.

Additionally, Alternative D would have long-term, minor, and adverse impacts to floodplains, wetlands and species and areas of special concern due to its impacts to aquatic habitat and presence in the floodplain. Alternative D would also have short-term, moderate, and adverse impacts to wetlands and water quality and streamflow characteristics as a result of the ground disturbance and temporary causeway and long-term, minor, and beneficial impacts. Geologic resources would experience a long-term, moderate and adverse impact. Alternative D would contribute an imperceptible increment to the cumulative impacts for these resources.

Alternative D would have long-term, moderate, and beneficial impacts to visitor use and experience due to decreased visitor inconvenience caused by bridge maintenance, a design that meets AASHTO bridge design specifications and improvements to operational efficiency, and would contribute a noticeable beneficial increment to the cumulative impact to this resource.

Alternative E (Replace with Steel Bridge)

Implementation of Alternative E (Replace with Steel Bridge) would have a short- and long-term, moderate, and adverse impacts to the cultural landscape of the Big Spring area. The more modern design of a steel bridge could distract from the rustic qualities of the surrounding Historic District. Alternative E would contribute a noticeable, adverse increment to the long-term, minor, and adverse cumulative impact.

Additionally, Alternative E would have long-term, minor, and adverse impacts to floodplains, wetlands, species and areas of special concern and water quality and streamflow characteristics. The presence of the bridge within the floodplain contributes to these adverse impacts. Short term impacts would generally be minor and adverse. Geologic resources would experience a long-term, moderate and adverse impact. Alternative E would contribute an imperceptible increment to the cumulative impacts for these resources.

Alternative E would have short-term, moderate and adverse and long-term, moderate, and beneficial impacts to visitor use and experience due to decreased visitor inconvenience caused by bridge maintenance, a design that meets AASHTO bridge design specifications and improvements to operational efficiency and would contribute a noticeable beneficial increment to the cumulative impact to this resource.

CHAPTER 4: PUBLIC INVOLVEMENT AND COORDINATION

This chapter documents the public involvement process for this project and includes the official list of recipients for the document. As required by NPS policies and planning documents, it is the Park's objective to work with State, Federal, and local governmental and private organizations to ensure that the Park and its programs are coordinated with theirs, and are supportive of their objectives, as far as proper management of the Park permits, and that their programs are similarly supportive of Park programs.

PUBLIC INVOLVEMENT

Comments from the public are solicited at two stages in the project planning process, public scoping and the public comment period. Information about the proposed project was made available to the public on the NPS's Planning, Environment, and Public Comment website during the public scoping comment period, from April 21, 2014 through May 30, 2014. A scoping newsletter providing details of the proposed project and contact information for comments was sent to a mailing list comprised of Federal, State, and local agencies, elected officials, organizations, and advocacy groups. A legal notice was run in the St. Louis Post-Dispatch on April 21, 2014 announcing the public scoping comment period.

Two comments were provided. The first was by an unaffiliated individual. She stated that she would like the new bridge to be made of materials similar to the old one and that its design should reflect the culture of the surrounding area. The second comment was made by a representative from The Nature Conservancy. They recommend designing the bridge to handle higher flows in order to conserve the biodiversity of the area and adjust to climate change.

This EA will be available for public review from April 6, 2016 through May 6, 2016. During this 30-day period, hardcopies of the EA will be available for review at the Ozark National Scenic Riverways Headquarters and Visitor Information Center, and the Carter County Public Library located at 403 Ash Street, Van Buren, Missouri 63965. An electronic version of this document can be found on the NPS's PEPC website at <http://parkplanning.nps.gov/ozar>, Big Spring Bridge Project. This site provides access to current plans, environmental impact analyses, and related documents on public review. An electronic version may also be found on the FHWA's website at <http://flh.fhwa.dot.gov/projects/mo/big-spring/>.

Comments on this EA will be summarized and responded to in an appendix to the decision document.

AGENCY COORDINATION AND PERMITS

Agency Coordination

Other Federal, State, and local governments were contacted during the planning process. Appendix A contains copies of written correspondence with those agencies.

Early coordination letters were sent to the USFWS, MDC – Resource Science Division, SHPO, and the U.S. Army Corps of Engineers in March of 2014 to solicit input regarding the proposed bridge repair or replacement. Comments were received from the USFWS and MDC. The SHPO stated in a letter dated March 28, 2014 that they concurred that the Big Spring Bridge is

not a contributing property to the Big Spring Historic District. Copies of the agency responses are located in Appendix A: Agency Coordination Letters.

Informal consultation per Section 7 of the Endangered Species Act of 1973, as amended was completed with the USFWS. A species list was requested from the USFWS for the Big Spring Bridge action area. A species list provided by the USFWS in their letter dated May 1, 2014. A Biological Assessment was prepared to analyze the impacts of the proposed action on the Federally-listed species and provided to the USFWS by letter dated December 7, 2015. In this letter, concurrence was requested that the project may affect, but is not likely to affect any Federally-listed species or their critical habitats. On December 23, 2015, the USFWS provided concurrence with the determination via email.

Consultation per Section 106 of the National Historic Preservation Act was completed with the SHPO. In a letter dated January 30, 2015, the FHWA and NPS requested concurrence with the finding that the preferred alternative to replace the existing bridge with a concrete bridge would not adversely affect the Big Spring Historic District. The letter indicated that design elements would be incorporated to minimize interference with the landscape around Big Spring and remain consistent with the rustic architecture of the surrounding historic district. These design elements would include a low profile design, timber railings and a natural stone facing. The SHPO responded by letter dated February 9, 2015, concurring that the Big Spring Bridge is not a contributing property to the Big Spring Historic District and that the proposed new bridge will have no adverse effect.

Permits

If the action alternatives were implemented, several permits would be required in order to construct the project. These permits include:

Clean Water Act Section 404 Permit/ Section 10 of the Rivers and Harbors Act

The Rivers and Harbors Appropriation Act of 1899 prohibits the creation of any obstruction to the navigable capacity of any of the waters of the United States. The Federal Water Pollution Control Act, more commonly known as the "Clean Water Act," under Section 404, directs the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill material into waters of the United States at specified disposal sites. This project would discharge dredged or fill material into the waters of the United States, including a nearby Outstanding National Resource Water. The proposed project would most likely qualify for coverage under Nationwide Permit 3, Maintenance, or Nationwide Permit 14, Linear Transportation Projects. There is no associated fee, and the review period is typically 45 calendar days for Nationwide Permits.

NPDES (National Pollutant Discharge Elimination System) Permit

This project would likely disturb greater than one acre of bare soil, and therefore would need a Land Disturbance General Permit (MOAA00000). This general permit regulates stormwater discharges at land disturbance construction sites, and must be obtained prior to conducting any land disturbance activity. The removal of vegetation leaves bare soil which is more vulnerable to erosion. As stormwater flows over a construction site, it can pick up pollutants like sediment, debris and chemicals and transport these to a water body. Polluted stormwater runoff can harm or kill fish and other wildlife (Missouri Department of Natural Resources, 2012).

401 Water Quality Certification

The 401 Water Quality Certification is a “certification,” needed for any Federal permit involving impacts to water quality. Most 401 Certifications are triggered by Section 404 Permits issued by the U.S. Army Corps of Engineers. Typical types of projects involve filling in surface waters or wetlands. Section 401 of the Clean Water Act delegates authority to the States to issue a 401 Water Quality Certification for all projects that require a Federal permit (such as a Section 404 Permit). The "401" is essentially verification by the State that a given project will not remove or degrade existing, designated uses of “Waters of the State,” or otherwise violate water quality standards. Mitigation of unavoidable impacts and inclusion of stormwater management features are two of the most important aspects of water quality review. This certification is issued by the Missouri Department of Natural Resources – Water Pollution Control Program. Missouri DNR normally reviews 401 Certification within five days of receipt of a complete application

LIST OF PREPARERS AND REVIEWERS

The following individuals contributed to the development of this document:

Federal Highway Administration

Lisa Landers, Environmental Protection Specialist

Kevin Rose, Environmental Team Leader

Kimberly McCool, Project Manager

Alazar Feleke, Highway Design Manager

Phillip Boinske, Bridge Design Team Leader

Jose Ortiz, Civil Engineer (Structural)

National Park Service, Ozark National Scenic Riverways

Eric Daniels, Chief of Resources Management

Joe Strenfel, Environmental Protection Specialist

Victoria Grant, Natural Resource Manager

Allison Young, Park Archeologist

Kimberly Houf, Terrestrial Ecologist

Rusty Rawson, Chief of Maintenance

Richard Halbert, Roads and Trails

National Park Service, Midwest Regional Office

Bob Kammel, Federal Lands Transportation Program Manager

Dan Jackson, Landscape Historian, Cultural Resources Division

CHAPTER 5: REFERENCES

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APPENDIX A
AGENCY COORDINATION LETTERS



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

MAR 13 2014 In Reply Refer to: HFPP-15

Ms. Amy Salveter
Field Supervisor
U.S. Fish and Wildlife Service
Columbia Ecological Service Field Office
101 Park DeVille Drive, Suite A
Columbia, MO 65203-0057

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways

Dear Ms. Salveter:

The National Park Service, in cooperation with the Federal Highway Administration (FHWA), is initiating an Environmental Assessment for the repair and/or replacement of the Big Spring Bridge located in Carter County, Missouri. Big Spring Bridge provides access to the Big Spring area, the largest spring in Missouri. The existing glulam timber bridge was constructed in 1977, and has deteriorated. The Environmental Assessment will analyze a range of bridge repair and replacement alternatives. Repair alternatives would include replacement of the bridge deck and installing fiberglass jackets on the piles. Replacement alternatives would include replacing the bridge with a two-span concrete slab bridge and replacing the bridge in-kind with a timber bridge.

According to the U.S. Fish and Wildlife Service species list, the following species may occur within Carter County: eastern prairie fringed orchid (*Platanthera leucophaea*), running buffalo clover (*Trifolium stoloniferum*), western prairie fringed orchid (*Platanthera praeclara*), Ozark hellbender (*Cryptobranchus alleganiensis bishopi*), gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalists*), and American burying beetle (*Nicrophorus americanus*). In-water work would be necessary in order to repair or replace the existing bridge. The Ozark hellbender is known from the Current River, but it is not known to be present in Big Spring. No tree clearing would be necessary in order to repair and/or replace the existing bridge.

Please provide us with information regarding potential impacts to any federally-listed species, which will assist us in the development of the Environmental Assessment. If possible, please identify specific areas where concerns are present, and include any required or suggested measures to avoid or minimize impacts. A quad map indicating the study area is enclosed.

If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,



Kevin S. Rose
Environmental Compliance Specialist

Enclosure

cc:

Mr. William Black, Superintendent, Ozark National Scenic Riverways, NPS (hardcopy only)
Mr. Wayne Vander Tuin, FLTP Coordinator, Midwest Region, NPS
Mr. Eric Daniels, Ozark National Scenic Riverways, NPS



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Missouri Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-0057
Phone: (573) 234-2132 Fax: (573) 234-2181



May 1, 2014

Kevin Rose
U.S. Department of Transportation
Federal Highway Administration
Eastern Federal Lands Highway Division
21400 Ridgetop Circle
Sterling, Virginia 20166-6511

Dear Mr. Rose:

This letter is in response to your March 13, 2014 request for information regarding potential impacts to federally-listed species from the proposed repair and/or replacement of the Big Spring Bridge in Carter County, Missouri. This letter is provided by the U.S. Fish and Wildlife Service (Service) under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4327), and the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

According to information you provided your letter, the bridge crossing Big Spring has deteriorated and is in need of repair. The National Park Service (NPS), in cooperation with the Federal Highway Administration (FHWA), is initiating an Environmental Assessment for the project in order to evaluate a range of bridge repair and replacement alternatives. Repair alternatives would include replacement of the bridge deck and installing fiberglass jackets on the piles; while replacement alternatives would include replacing the bridge with a two-span concrete slab bridge or replacing the bridge in-kind with a timber bridge. Both repair and replacement alternatives will require in-water work.

Endangered Species

The list of federally endangered, threatened or candidate species potentially occurring within the project area include the Ozark Hellbender (*Cryptobranchus alleganiensis bishopi*), gray bat (*Myotis grisescens*) and Indiana bat (*Myotis sodalis*). In addition, the northern long-eared bat (*Myotis septentrionalis*) has recently been proposed for listing as endangered and could be present within the project area.

While the eastern prairie fringed orchid (*Platanthera leucophaea*), running buffalo clover (*Trifolium stoloniferum*), western prairie fringed orchid (*Platanthera praeclara*), and American burying beetle (*Nicrophorus americanus*) could be present in Carter County, these species are not known to occur within the vicinity of the proposed project and are unlikely to be impacted by

project activities.

Indiana bat (Endangered) and northern long-eared bat (Proposed Endangered) - In your letter you stated that tree clearing will not be necessary in order to repair and/or replace the existing bridge. Therefore, we do not anticipate adverse effects to the Indiana bat or northern long-eared bat, both of which roost under peeling tree bark or within cracks or crevices of trees.

Gray bat (Endangered) – Because gray bats have been found roosting under bridges, the Big Spring bridge should be examined prior to project activities to determine if bats are roosting under the bridge. If gray bats or other federally-listed bats are discovered, please contact our office for further coordination and to discuss appropriate avoidance and minimization measures to include in the Environmental Assessment. Otherwise, we also do not expect any adverse effects to the gray bat as no caves are likely to be impacted by project activities.

Ozark Hellbender (Endangered) - The Ozark Hellbender occurs in the Current River downstream of the confluence with Big Spring and could be impacted by project activities if pollutants from equipment (e.g., oil, fuel, and other fluids) and/or excessive sediment are allowed to enter the stream during project activities. We recommend that you incorporate the attached Best Management Practices for Construction Projects Affecting Missouri Streams and Rivers into the project's Environmental Assessment. To ensure that these measures are implemented by contractors working at the site, we strongly recommend that a NPS or FHWA representative be present during all project activities. Because surveys for Ozark Hellbenders have never been conducted in Big Spring itself, we also recommend that habitat within the vicinity of the bridge and downstream to the confluence of the Current River be assessed to determine suitability for the species. If suitable habitat is present, surveys should be conducted by a qualified biologist to determine if Ozark Hellbenders occur within the area. Given that the presence of Ozark Hellbenders within or near the project site would influence project planning, we recommend that the habitat assessment be conducted prior to development of the Environmental Assessment.

No other threatened or endangered species or critical habitat occurs within the area or is likely to be impacted by project activities.

We appreciate the opportunity to provide comments on the proposed work and request that we be contacted when the Environmental Assessment is available for review. If you have questions or need additional information in the meantime, please contact Trisha Crabill of my staff at 573-234-2132, extension 121.

Sincerely,



Amy Salveter
Field Supervisor

Cc: ONSR, Van Buren, MO (Attn: Bill Black)
MDC, Jefferson City, MO (Attn: Emily Clancy, Jeffrey Briggler)



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

MAR 13 2014

In Reply Refer to: HFPP-15

Ms. Emily Clancy
Natural Heritage Review Coordinator
Missouri Department of Conservation
Attn: Resource Science Division
P.O. Box 180
Jefferson City, MO 65102-0180

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways
Natural Heritage Review

Dear Ms. Clancy:

The National Park Service, in cooperation with the Federal Highway Administration (FHWA), is initiating an Environmental Assessment for the repair and/or replacement of the Big Spring Bridge located in Carter County, Missouri. Big Spring Bridge provides access to the Big Spring area, the largest spring in Missouri. The existing glulam timber bridge was constructed in 1977, and has deteriorated. Big Spring Bridge is located in the Big Spring Historic District; which includes cabins, a dining lodge, and picnic shelters.

The Environmental Assessment will analyze a range of bridge repair and replacement alternatives. Repair alternatives would include replacement of the bridge deck and installing fiberglass jackets on the piles. Replacement alternatives would include replacing the bridge with a two-span concrete slab bridge and replacing the bridge in-kind with a timber bridge.

Enclosed you will find a Big Spring Quadrangle topographic map, location map, and a copy of the online Natural Heritage Report. Please review the proposed project and provide us with comments and information in regard to potential impacts to species and natural communities of conservation concern. If possible, please identify specific areas where concerns are present, and include any required or suggested measures to avoid or minimize impacts. A letter has also been sent to the U.S. Fish and Wildlife Service.

If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,



Kevin S. Rose
Environmental Compliance Specialist

Enclosures

cc:

Mr. William Black, Superintendent, Ozark National Scenic Riverways, NPS (hardcopy only)
Mr. Wayne Vander Tuin, FLTP Coordinator, Midwest, NPS
Mr. Eric Daniels, Ozark National Scenic Riverways, NPS



MISSOURI DEPARTMENT OF CONSERVATION

Headquarters

2901 West Truman Boulevard, P.O. Box 180, Jefferson City, Missouri 65102-0180

Telephone: 573-751-4115 ▲ www.MissouriConservation.org

ROBERT L. ZIEHMER, Director

April 22, 2014

Kevin S. Rose
Environmental Compliance Specialist
21400 Ridgetop Circle
Sterling, VA 20166-6511

**RE: PRA-OZAR 10(2) – BIG SPRING BRIDGE PROJECT, OZARK NATIONAL SCENIC RIVERWAYS
NATURAL HERITAGE REVIEW**

Dear Mr. Rose:

The Missouri Department of Conservation (Department) is in receipt of your request for information on rare species and/or habitats pertaining to the repair and/or replacement of the Big Spring Bridge located in Carter County, Missouri. The Big Spring Bridge was constructed in 1977 and provides access to public accommodations as well as viewing opportunities of Big Spring. This response is to the National Park Service, in cooperation with the Federal Highway Administration (FHWA) initiation of an Environmental Assessment.

The Natural Heritage Review Website is used for project review with the intent to aid in providing general information on the potential presence and/or absence of Missouri's species and communities of conservation concern (SOCC). The Big Spring Bridge project received a Level 3 response from the Natural Heritage Review Website. The Level 3 response reflects information provided from the Missouri Natural Heritage Database (MONHD). The MONHD compiles information from many state, federal, academic and private sector experts then, provides the most comprehensive set of SOCC records.

The Level 3 response received reflects the known range for federal and state listed endangered Ozark hellbender (*Cryptobranchus alleganiensis bishop*). As stated within the Natural Heritage Review Report (NHRR), coordination with the U.S. Fish and Wildlife Service is recommended. The project area also received a Level 2 response which reflects state rank plants and mussel species within the area (see the NHRR for further details and/or concerns). I have also provided some general information on how to minimize impacts to SOCC.

These comments and recommendations do not reflect what should be included in the final project review, and further coordination with the Department is recommended as the project develops.

COMMISSION

DON C. BEDELL
Sikeston

JAMES T. BLAIR, IV
St. Louis

MARILYNN J. BRADFORD
Jefferson City

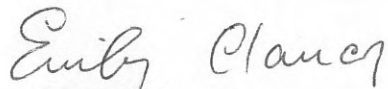
J. KENT EMISON
Higginsville

RECEIVED
2014 APR 28 PM 2:07
EASTERN FEDERAL LANDS
HIGHWAY DIVISION
STERLING, VA

MISSOURI DEPARTMENT OF CONSERVATION

Thank you for your efforts to conserve Missouri's most at-risk wildlife, fish and habitats. If you have any questions, please contact me at (573) 522-4115, Ext. 3182 or by email at Emily.Clancy@mdc.mo.gov.

Sincerely,



EMILY CLANCY
NATURAL HERITAGE REVIEW COORDINATOR

Enclosures

cc: Amy Salveter, U.S. Fish and Wildlife Service
Alan Leary, Missouri Department of Conservation



Missouri Department of Conservation Natural Heritage Review Report

April 22, 2014 -- Page 1 of 3

Resource Science Division
P. O. Box 180
Jefferson City, MO 65102
Prepared by: Emily Clancy
Emily.Clancy@mdc.mo.gov
(573) 522 - 4115 ext. 3182

U.S. DEPARTMENT OF
TRANSPORTATION
ATTN: KEVIN S. ROSE
21400 RIDGETOP CIRCLE
STERLING, VA 20166-6511

Project type:

Bridge

Location/Scope:

Section 6 of T26N R01E

County:

Carter

Query reference:

Ozark National Scenic Riverways – Big Spring Bridge EA

Query received:

March 17, 2014

This NATURAL HERITAGE REVIEW is not a site clearance letter. Rather, it identifies public lands and sensitive resources known to have been located close to and/or potentially affected by the proposed project. On-site verification is the responsibility of the project. Natural Heritage records were identified at some date and location. This report considers records near but not necessarily at the project site. Animals move and, over time, so do plant communities. To say "there is a record" does not mean the species/habitat is still there. To say that "there is no record" does not mean a protected species will not be encountered. These records only provide one reference and other information (e.g. wetland or soils maps, on-site inspections or surveys) should be considered. Look for additional information about the biological and habitat needs of records listed in order to avoid or minimize impacts. More information may be found at <http://mdc.mo.gov/discover-nature/places-go/natural-areas> and mdc4.mdc.mo.gov/applications/mofwis/mofwis_search1.aspx. Contact information for the department's Natural History Biologist is online at <http://mdc.mo.gov/contact-us>.

Level 3: Records of federal-listed (these are also state-listed) species or critical habitats near the project site:

Natural Heritage records identify Ozark hellbender (*Cryptobranchus alleganiensis bishop*), state listed endangered and federal listed endangered) within this portion of the Current River. Hellbenders are strictly aquatic salamanders whose well-being is dependent on high-quality water systems with constant levels of dissolved oxygen, temperature, and flow. Sediment and erosion control measures should be implemented. Take all necessary precautions to prevent petroleum products from entering the stream. **Since this is a federal listed species, coordination with U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132) is recommended.**

Streams in the area should be protected from soil erosion, water pollution and in-stream activities that modify or diminish aquatic habitats. See insert regarding *Management Recommendations for Construction Projects Affecting Missouri Streams and Rivers*.

- ◆ Avoid disturbance to stream banks and riparian areas. Channel modification, flow interruption or bank modification should occur only in compliance with conditions established in permits required under the federal Clean Water Act.
- ◆ Grade and seed disturbed areas as soon as possible to minimize erosion. Native grasses and wildflowers are recommended for plantings compatible with the local native landscape and wildlife needs. Annuals like ryegrass may be combined with native perennials for quicker green-up. Avoid aggressive exotic perennials such as crown vetch and sericea lespedeza.
- ◆ All temporary in-channel fills that could impound water should be culverted. Culverts should (a) maintain at least six inches of water and (b) not create water velocities in excess of two feet per second during average annual discharges. A drop between the downstream end of the culverts and the downstream water surface should not occur at any time.
- ◆ Avoid work in the channel from March 15 until June 15, a time when many fish are spawning and eggs need minimal disturbance.

Level 2: Records of state-listed (not federal-listed) endangered species AND / OR state-ranked (not state-listed endangered) species and natural communities of conservation concern. The Department tracks these species and natural communities due to population declines and/or apparent vulnerability.

Natural Heritage records identify no state-listed endangered species within one mile of the site.

Natural Heritage records identify Ouachita kidneyshell (*Ptychobranchus occidentalis*, state-rank S3) at the confluence of the Current River. Mussels are relatively immobile animals that are vulnerable to pollutants, sediment discharges, channel alterations and other activities destructive to mussel habitat. Activities that alter or destabilize stream bottoms or banks or introduce silt, chemical or organic pollutants should be avoided. Avoid crossing flowing water but, if unavoidable, minimize crossing distance and use temporary crossings that do not restrict water flow.

The following state-ranked plant Natural Heritage records are located within the area of the bridge project. These plant species may occur if suitable habitat is present.

Scientific Name	Common Name	State-rank	Habitat	Last Observed
<i>Riccardia multifida</i>	A Liverwort	S1	wetland matrix	9/22/1990
<i>Lemna trisulca</i>	Star Duckweed	S2	spring/spring branch, river/stream, marsh	9/14/1990
<i>Nowella curvifolia</i>	A Liverwort	S?	forest matrix	9/22/1990
<i>Metzgeria furcata</i>	A Liverwort	S?	bluff, glade complex, forest matrix	9/22/1990
<i>Elodea canadensis</i>	Broad Waterweed	SU	spring/spring branch	9/14/1990

Definitions of each state-rank:

- S1: Critically imperiled in the state because of extreme rarity of or because of some factor(s) making it especially vulnerable to extirpation from the state. Typically 5 or fewer occurrence or very few remaining individuals.
- S2: Imperiled in the state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. (6 to 20 occurrences or few remaining individuals).
- S3: Vulnerable in the state means this species is rare and uncommon, or found only in a restricted range (even if abundant in some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.
- S?: Unranked – species is not yet ranked in the state.
- SU: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

MISSOURI

See http://mdc.mo.gov/sites/default/files/resources/2010/04/2014_species_concern.pdf for a complete list of species and communities of conservation concern.

STATE ENDANGERED species are listed in and protected under the [Wildlife Code of Missouri \(3CSR10-4.111\)](#).

General recommendations related to this project or site, or based on information about the historic range of species (unrelated to any specific heritage records):

- The Current River (from the lower National Parks Service to Montauk) is considered a spawning stream segment. Activities that alter or destabilize stream bottoms or banks should be avoided from March 15 to June 15 in order not to disrupt spawning (laying and fertilizing fish eggs). At all times, avoid habitat destruction or introducing heavy sediment loads, chemical or organic pollutants. Spawning stream segments were designated because they are important to maintaining, restoring, or avoiding future listing of species of conservation concern.
- Big Spring Natural Area is in close proximity to the bridge project. More information about this Natural Area may be found at: <http://mdc.mo.gov/discover-nature/places-go/natural-areas/big-spring>.
- Indiana bats (*Myotis sodalis*, federally and state listed endangered) hibernate during winter months in caves and mines. During the summer months, they roost and raise young under the bark of trees in riparian forests and upland forests near perennial streams. During project activities, avoid degrading stream quality and where possible leave snags standing and preserve mature forest canopy. Do not enter caves known to harbor Indiana bats, especially from September to April. **If any trees need to be removed by your project, please contact the U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132).**
- Gray bats (*Myotis grisescens*, federal and state-listed endangered) are likely to occur in the project area, as they forage over streams, rivers, and reservoirs in this part of Missouri. Avoid entry or disturbance of any cave inhabited by gray bats and when possible retain forest vegetation along the stream and from the gray bat cave opening to the stream. See <http://mdc.mo.gov/104> for best management recommendations.
- Carter County has known karst geologic features (e.g. caves, springs, and sinkholes, all characterized by subterranean water movement). Few karst features are recorded in Natural Heritage records, and ones not noted here may be encountered at the project site or affected by the project. Cave fauna (many of which are species of conservation concern) are influenced by changes to water quality, so check your project site for any karst features and make every effort to protect groundwater in the project area. See http://mdc.mo.gov/nathis/caves/manag_construc.htm for best management information.
- Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, and larvae may be moved to new sites on boats or construction equipment, so inspect and clean equipment thoroughly before moving between project sites.
 - ◆ Remove any mud, soil, trash, plants or animals from equipment before leaving any water body or work area.
 - ◆ Drain water from boats and machinery that has operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
 - ◆ When possible, wash and rinse equipment thoroughly with hard spray or HOT water ($\geq 104^{\circ}$ F, typically available at do-it-yourself carwash sites), and dry in the hot sun before using again.

These recommendations are ones project managers might prudently consider based on a general understanding of species needs and landscape conditions. Natural Heritage records largely reflect only sites visited by specialists in the last 30 years. This means that many privately owned tracts could host unknown remnants of species once but no longer common.

Management Recommendations for Construction Projects Affecting Missouri Streams and Rivers

MISSOURI DEPARTMENT OF CONSERVATION



Introduction

The streams and rivers of Missouri support a wide and diverse community of wildlife that includes many species of mammals, birds, fishes, mussels, crayfish, and insects. The continued diversity and health of this community is dependent upon how well Missourians manage and protect this resource. While water quality is essential, maintaining a diverse array of habitat features also is essential for aquatic wildlife to persist. Since implementation of the Clean Water Act, point source pollution has been greatly reduced, but polluted and sediment-laden runoff (non-point source) from rural and urban development is still a serious problem.

There are management practices that can be implemented to prevent degradation of our streams and rivers. By adapting these best management practices we can prevent the loss of species diversity and maintain the quality of our lives as well. Preventative measures may require extra effort initially, but they provide long-term dividends by eliminating costly damage resulting from poor management practices.

Access and Staging Area Management Recommendations

Staging areas are those short- or long-term sites within a construction or development area where most equipment and materials are stored. These areas often are accessed frequently; and when fuel and oil are stored here, the potential for runoff and erosion in these areas may be high.

- Erosion and sediment controls should be installed and maintained to prevent discharge from the site.
- Staging areas for crew, equipment, and materials should be established well away from streams and rivers or highly erodible soils.
- Stationary fuel and oil storage containers should remain within a staging area or another confined area to avoid accidental spills into the stream systems.
- Excess concrete and wash water from trucks and other concrete mixing equipment should be disposed of where this material cannot enter the stream systems.
- If temporary roadways must be built, ensure that roadways are of low gradient with sufficient roadbed and storm water runoff drains and outlets. Containment basins, silt fences, filter strips, etc. should be included for retention of storm water runoff for reducing sediment introduction into natural waterways.

→ Avoid stream crossings. If unavoidable, temporary crossings should be used. Temporary crossings should not restrict or interrupt natural stream flow. If temporary in-channel fill is necessary, culverts of sufficient size should be employed to avoid water impoundment and allow for fish passage.

Riparian Corridor Management Recommendations

The riparian corridor is the vegetation adjacent to a stream or river. This area is critical to the health and quality of the aquatic environment because of its ability to slow and reduce sediment and chemical runoff into the stream or river channel. A riparian corridor with a minimum width of 100 feet from the edge of the stream or river should be maintained along both sides of streams and rivers.

- Limit clearing of vegetation, including both standing and downed timber, to that which is absolutely necessary for construction purposes.
- Heavy equipment use within the riparian corridor should be restricted to minimize vegetation destruction and compaction of soils. Flagging or fencing areas that are not to be disturbed is helpful in alerting construction personnel.
- General application of pesticides, herbicides, or fertilizers within the riparian corridor should be prohibited to avoid water contamination due to overspray or runoff. Fertilizer use or spot application of pesticides and herbicides is acceptable if appropriate non-restricted chemicals are used.
- Riparian areas located down slope of construction zones should be physically screened with sediment controls, such as silt fences or filter strips. Sediment controls should be monitored after rain and maintained for the duration of the project.
- All riparian corridors disturbed by the project should be revegetated immediately following or concurrent with project implementation. Appropriate native bottomland or riparian trees, shrubs, and grasses should be planted to ensure long-term stability in areas where the soil erosion threat is not critical. Annual non-native grasses such as rye or wheat may be planted in conjunction with native species to provide short-term erosion control. Areas judged to be subject to immediate soil loss due to steep slopes or other factors causing critical erosion conditions may be planted with non-native mixtures to assure rapid establishment and erosion control.

→ Post-construction evaluation of vegetation establishment should be conducted at one month intervals for at least three months after completion of the project. Any recommended sediment controls should be inspected at these times. If determined beneficial to soil stability and not adversely impacting site function and/or aesthetics, recommended sediment controls should remain permanent.

→ All temporary erosion and sediment controls should be removed (unless removal would cause further disturbance) and properly disposed of within 30 days after final site stabilization is achieved or after temporary practices are no longer needed.

Bank and Channel Management Recommendations

The structure of a bank is an important feature of a stream or river. It defines and provides stability for the channel.

→ Bank stability will vary depending on height, slope, and soil conditions. Project engineers and hydrologists should thoroughly investigate the physical properties and hydrologic record of the proposed site before construction begins.

→ Limit clearing of vegetation, including both standing and downed timber, to that which is absolutely necessary for construction purposes.

→ Projects in which bank alteration is necessary should employ, to the highest degree possible, erosion prevention measures before actual excavation activities begin. These preventative measures should be monitored regularly and maintained for the duration of the project.

→ Use of riprap for stream bank stabilization should be limited to those areas that could experience substantial erosion before adequate vegetation becomes established. The material for the rock blanket should consist of durable stone or broken concrete that is well graded. It is preferable that 40-60 percent of the material be as large as the thickness of the blanket, with enough smaller pieces of various sizes to fill the larger voids. It should not contain more than 10 percent of earth, sand, shale, and non-durable rock. Bank stabilization materials should allow for continuous passage of fish and other aquatic species.

→ No permanent fill materials, other than design-approved structures and related bank stabilization materials, should be placed in the stream channel. Avoid channelization. Excavated materials should not be stored or stockpiled below the high bank.

→ Work should be conducted during low flow periods when possible.

→ Care should be taken to keep machinery out of the waterway as much as possible.

→ Do not alter or remove natural stream features, such as riffles and pools.

→ Large woody debris is an important habitat component of a stream and should not be removed unless absolutely necessary for construction and maintenance purposes.

Information Contacts

For further information regarding regulations for development near streams and rivers, contact:

Missouri Department of Conservation
Policy Coordination Section
P.O. Box 180
2901 W. Truman Blvd.
Jefferson City, MO 65102-0180
Telephone: 573/751-4115

Missouri Department of Natural Resources
Division of Environmental Quality
P.O. Box 176
Jefferson City, MO 65102-0176
Telephone: 573/526-3315

U.S. Army Corps of Engineers
Regulatory Branch
700 Federal Building
Kansas City, MO 64106-2896
Telephone: 816/983-3990

U.S. Environmental Protection Agency
Water, Wetlands, and Pesticides Division
901 North 5th Street
Kansas City, KS 66101
Telephone: 913/551-7307

U.S. Fish and Wildlife Service
Ecological Services Field Office
608 E. Cherry Street, Room 200
Columbia, MO 65201
Telephone: 573/876-1911

Disclaimer

These Best Management Practices were prepared by the Missouri Department of Conservation with assistance from other state agencies, contractors, and others to provide guidance to those people who wish to voluntarily act to protect wildlife and habitat. Compliance with Best Management Practices is not required by the Missouri wildlife and forestry law nor by any regulation of the Missouri Conservation Commission. Other federal, state or local laws may affect construction practices.



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

MAR 13 2014

In Reply Refer to: HFPP-15

Mr. Mark Miles
Director, State Historic Preservation Office
Missouri Department of Natural Resources
State Historic Preservation Office
P.O. Box 176
Jefferson City, MO 65102-0176

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways

Dear Mr. Miles:

The National Park Service, in cooperation with the Federal Highway Administration (FHWA), is initiating an Environmental Assessment for the repair and/or replacement of the Big Spring Bridge located in Carter County, Missouri. Big Spring Bridge provides access to the Big Spring area, the largest spring in Missouri. The existing glulam timber bridge was constructed in 1977, and has deteriorated. Big Spring Bridge is located in the Big Spring Historic District; which includes cabins, a dining lodge, and picnic shelters. These buildings were built in the 1930s by the Civilian Conservation Corps (CCC). Big Spring Bridge is not listed as contributing to the district.

The Environmental Assessment will analyze a range of bridge repair and replacement alternatives. Repair alternatives would include replacement of the bridge deck and installing fiberglass jackets on the piles. Replacement alternatives would include replacing the bridge with a two-span concrete slab bridge and replacing the bridge in-kind with a timber bridge.

Enclosed you will find a location map. Please review the proposed project and provide us with comments in regard to potential impacts to cultural resources. If possible, please identify specific areas where concerns are present, and include any required or suggested measures to avoid or minimize impacts. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,

Kevin S. Rose
Environmental Compliance Specialist

Enclosures



Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

March 28, 2014

Kevin S. Rose
Environmental Compliance Specialist
Federal Highway Administration
Eastern Federal Lands Highway Division
21400 Ridgetop Circle
Sterling, Virginia 20166-6511

RECEIVED
2014 APR -3 PM 12:24
EASTERN FEDERAL LANDS
HIGHWAY DIVISION
STERLING, VA

Re: PRA-OZAR 10(2), Big Spring Bridge Project, Ozark National Scenic Riverways (FHWA) Carter County, Missouri

Dear Mr. Rose:

Thank you for submitting information on the above referenced project for our review pursuant to Section 106 of the National Historic Preservation Act (P.L. 89-665, as amended) and the Advisory Council on Historic Preservation's regulation 36 CFR Part 800, which requires identification and evaluation of cultural resources.

We have reviewed the information provided concerning the above referenced project. We concur that the Big Spring Bridge, constructed in 1977, is not a contributing property to the Big Spring Historic District, a property listed in the National Register of Historic Places. However, before we can comment on the effect on historic properties, we would appreciate receiving photographs, design drawings and any other information that would allow us to comment on the possible effects of this project.

Please be advised that, should project plans change, information documenting the revisions should be submitted to this office for further review. In the event that cultural materials are encountered during project activities, all construction should be halted, and this office notified as soon as possible in order to determine the appropriate course of action.

If you have any questions, please write Judith Deel at State Historic Preservation Office, P.O. Box 176, Jefferson City, Missouri 65102 or call 573/751-7862. Please be sure to include the SHPO Log Number (006-CT-14) on all future correspondence or inquiries relating to this project.

Sincerely,

STATE HISTORIC PRESERVATION OFFICE

Mark A. Miles
Director and Deputy State
Historic Preservation Officer

MAM:jd

c William Black, Superintendent, ONSR
Don Stevens, NPS/Omaha

Celebrating 40 years of taking care of Missouri's natural resources. To learn more about the Missouri Department of Natural Resources visit dnr.mo.gov.



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

APR 11 2014

In Reply Refer to: HFPP-15

Dr. Richard Allen
Cherokee Nation
P.O. Box 948
Tahlequah, OK 74465

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways

Dear Dr. Allen:

The National Park Service, in cooperation with the Federal Highway Administration (FHWA), is initiating an Environmental Assessment for the improvement of the Big Spring Bridge located in Carter County, Missouri. The existing glulam timber bridge was constructed in 1977, and has deteriorated. Big Spring Bridge provides access to the Big Spring area, the largest spring in Missouri. The Environmental Assessment will analyze a range of bridge repair and replacement alternatives. Repair alternatives would include replacement of the bridge deck and installing fiberglass jackets on the piles. Replacement alternatives would include replacing the bridge with a two-span concrete slab bridge and replacing the bridge in-kind with a timber bridge.

Enclosed you will find a location map. Please review the proposed project and provide us with comments in regard to potential impacts to cultural resources. If possible, please identify specific areas where concerns are present, and include any required or suggested measures to avoid or minimize impacts. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,

Kevin S. Rose
Environmental Compliance Specialist

Enclosure



U.S. Department
of Transportation

**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

APR 11 2014

In Reply Refer to: HFPP-15

Mr. Joseph Blanchard
Absentee Shawnee Tribe of Indians of Oklahoma
2025 South Gordon Cooper Drive
Shawnee, OK 74801

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways

Dear Mr. Blanchard:

The National Park Service, in cooperation with the Federal Highway Administration (FHWA), is initiating an Environmental Assessment for the improvement of the Big Spring Bridge located in Carter County, Missouri. The existing glulam timber bridge was constructed in 1977, and has deteriorated. Big Spring Bridge provides access to the Big Spring area, the largest spring in Missouri. The Environmental Assessment will analyze a range of bridge repair and replacement alternatives. Repair alternatives would include replacement of the bridge deck and installing fiberglass jackets on the piles. Replacement alternatives would include replacing the bridge with a two-span concrete slab bridge and replacing the bridge in-kind with a timber bridge.

Enclosed you will find a location map. Please review the proposed project and provide us with comments in regard to potential impacts to cultural resources. If possible, please identify specific areas where concerns are present, and include any required or suggested measures to avoid or minimize impacts. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,

Kevin S. Rose
Environmental Compliance Specialist

Enclosure



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

APR 11 2014

In Reply Refer to: HFPP-15

Ms. Robin Dushane
Eastern Shawnee Tribe
P.O. Box 350
Seneca, MO 64865

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways

Dear Ms. Dushane:

The National Park Service, in cooperation with the Federal Highway Administration (FHWA), is initiating an Environmental Assessment for the improvement of the Big Spring Bridge located in Carter County, Missouri. The existing glulam timber bridge was constructed in 1977, and has deteriorated. Big Spring Bridge provides access to the Big Spring area, the largest spring in Missouri. The Environmental Assessment will analyze a range of bridge repair and replacement alternatives. Repair alternatives would include replacement of the bridge deck and installing fiberglass jackets on the piles. Replacement alternatives would include replacing the bridge with a two-span concrete slab bridge and replacing the bridge in-kind with a timber bridge.

Enclosed you will find a location map. Please review the proposed project and provide us with comments in regard to potential impacts to cultural resources. If possible, please identify specific areas where concerns are present, and include any required or suggested measures to avoid or minimize impacts. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,

Kevin S. Rose
Environmental Compliance Specialist

Enclosure



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

APR 11 2014

In Reply Refer to: HFPP-15

Ms. Tamara Francis
Delaware Nation
P.O. Box 825
Anadarko, OK 73005

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways

Dear Ms. Francis:

The National Park Service, in cooperation with the Federal Highway Administration (FHWA), is initiating an Environmental Assessment for the improvement of the Big Spring Bridge located in Carter County, Missouri. The existing glulam timber bridge was constructed in 1977, and has deteriorated. Big Spring Bridge provides access to the Big Spring area, the largest spring in Missouri. The Environmental Assessment will analyze a range of bridge repair and replacement alternatives. Repair alternatives would include replacement of the bridge deck and installing fiberglass jackets on the piles. Replacement alternatives would include replacing the bridge with a two-span concrete slab bridge and replacing the bridge in-kind with a timber bridge.

Enclosed you will find a location map. Please review the proposed project and provide us with comments in regard to potential impacts to cultural resources. If possible, please identify specific areas where concerns are present, and include any required or suggested measures to avoid or minimize impacts. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,

Kevin S. Rose
Environmental Compliance Specialist

Enclosure



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

APR 11 2014

In Reply Refer to: HFPP-15

Dr. Andrea Hunter
Osage Nation of Oklahoma
627 Grandview Avenue
Pawhuska, OK 74056

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways

Dear Dr. Hunter:

The National Park Service, in cooperation with the Federal Highway Administration (FHWA), is initiating an Environmental Assessment for the improvement of the Big Spring Bridge located in Carter County, Missouri. The existing glulam timber bridge was constructed in 1977, and has deteriorated. Big Spring Bridge provides access to the Big Spring area, the largest spring in Missouri. The Environmental Assessment will analyze a range of bridge repair and replacement alternatives. Repair alternatives would include replacement of the bridge deck and installing fiberglass jackets on the piles. Replacement alternatives would include replacing the bridge with a two-span concrete slab bridge and replacing the bridge in-kind with a timber bridge.

Enclosed you will find a location map. Please review the proposed project and provide us with comments in regard to potential impacts to cultural resources. If possible, please identify specific areas where concerns are present, and include any required or suggested measures to avoid or minimize impacts. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,

Kevin S. Rose
Environmental Compliance Specialist

Enclosure



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

APR 11 2014

In Reply Refer to: HFPP-15

Ms. Kim Jumper
Shawnee Tribe
29 South Highway 69 A
Miami, OK 74355

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways

Dear Ms. Jumper:

The National Park Service, in cooperation with the Federal Highway Administration (FHWA), is initiating an Environmental Assessment for the improvement of the Big Spring Bridge located in Carter County, Missouri. The existing glulam timber bridge was constructed in 1977, and has deteriorated. Big Spring Bridge provides access to the Big Spring area, the largest spring in Missouri. The Environmental Assessment will analyze a range of bridge repair and replacement alternatives. Repair alternatives would include replacement of the bridge deck and installing fiberglass jackets on the piles. Replacement alternatives would include replacing the bridge with a two-span concrete slab bridge and replacing the bridge in-kind with a timber bridge.

Enclosed you will find a location map. Please review the proposed project and provide us with comments in regard to potential impacts to cultural resources. If possible, please identify specific areas where concerns are present, and include any required or suggested measures to avoid or minimize impacts. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,

Kevin S. Rose
Environmental Compliance Specialist

Enclosure



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

APR 11 2014

In Reply Refer to: HFPP-15

Ms. Lisa LaRue-Baker
United Keetoowah Band of Cherokee
P.O. Box 746
Tahlequah, OK 74465

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways

Dear Ms. LaRue-Baker:

The National Park Service, in cooperation with the Federal Highway Administration (FHWA), is initiating an Environmental Assessment for the improvement of the Big Spring Bridge located in Carter County, Missouri. The existing glulam timber bridge was constructed in 1977, and has deteriorated. Big Spring Bridge provides access to the Big Spring area, the largest spring in Missouri. The Environmental Assessment will analyze a range of bridge repair and replacement alternatives. Repair alternatives would include replacement of the bridge deck and installing fiberglass jackets on the piles. Replacement alternatives would include replacing the bridge with a two-span concrete slab bridge and replacing the bridge in-kind with a timber bridge.

Enclosed you will find a location map. Please review the proposed project and provide us with comments in regard to potential impacts to cultural resources. If possible, please identify specific areas where concerns are present, and include any required or suggested measures to avoid or minimize impacts. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,

Kevin S. Rose
Environmental Compliance Specialist

Enclosure



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

APR 11 2014

In Reply Refer to: HFPP-15

Dr. Brice Obenneyer
Delaware Tribe of Indians
1420 C of E Drive
Emporia, KS 66801

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways

Dear Dr. Obenneyer:

The National Park Service, in cooperation with the Federal Highway Administration (FHWA), is initiating an Environmental Assessment for the improvement of the Big Spring Bridge located in Carter County, Missouri. The existing glulam timber bridge was constructed in 1977, and has deteriorated. Big Spring Bridge provides access to the Big Spring area, the largest spring in Missouri. The Environmental Assessment will analyze a range of bridge repair and replacement alternatives. Repair alternatives would include replacement of the bridge deck and installing fiberglass jackets on the piles. Replacement alternatives would include replacing the bridge with a two-span concrete slab bridge and replacing the bridge in-kind with a timber bridge.

Enclosed you will find a location map. Please review the proposed project and provide us with comments in regard to potential impacts to cultural resources. If possible, please identify specific areas where concerns are present, and include any required or suggested measures to avoid or minimize impacts. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,

Kevin S. Rose
Environmental Compliance Specialist

Enclosure

Landers, Lisa (FHWA)

From: Lisa LaRue-Baker - UKB THPO <ukbthpo-larue@yahoo.com>
Sent: Wednesday, April 23, 2014 3:59 PM
To: Landers, Lisa (FHWA)
Cc: verna; Ernestine Berry
Subject: PRA-OZAR 10(2) - Big Spring Bridge Project, Ozark National Scenic Riverways

The United Keetoowah Band of Cherokee Indians in Oklahoma has reviewed your project under Section 106 of the NHPA, and at this time, have no comments or objections. However, if any inadvertent discoveries of human remains are made, please cease work and contact us immediately.

Lisa C. Baker

Acting THPO
United Keetoowah Band of Cherokee Indians in Oklahoma
PO Box 746
Tahlequah, OK 74465

c 918.822.1952
ukbthpo-larue@yahoo.com

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RECEIVED

2014 MAY 12 PM 1:39

EASTERN FEDERAL LANDS
HIGHWAY DIVISION
STERLING, VA



TRIBAL HISTORIC PRESERVATION OFFICE

Date: May 7, 2014

File: 1314-1409MO-R

RE: FWHA NPS Carter County Big Spring Bridge Project Ozark National Scenic Riverways; PRA-OZAR 10(2)

Eastern Federal Lands Highway Division
Kevin S. Rose
21400 Ridgetop Circle
Sterling, VA 20166-6511


Dear Mr. Rosa,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed project listed as FWHA NPS Carter County Big Spring Bridge Project Ozark National Scenic Riverways; PRA-OZAR 10(2). The Osage Nation requests that a cultural resources survey be conducted for this project.

In accordance with the National Historic Preservation Act, (NHPA) [16 U.S.C. 470 §§ 470-470w-6] 1966, undertakings subject to the review process are referred to in S101 (d)(6)(A), which clarifies that historic properties may have religious and cultural significance to Indian tribes. Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U.S.C. 4321 and 4331-35 and 40 CFR 1501.7(a) of 1969).

The Osage Nation has a vital interest in protecting its historic and ancestral cultural resources. The Osage Nation anticipates reviewing and commenting on the planned Phase I cultural resources survey report for the proposed FWHA NPS Carter County Big Spring Bridge Project Ozark National Scenic Riverways; PRA-OZAR 10(2).

Should you have any questions or need any additional information please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.


Zuzana Chovanec, Ph.D.
Archaeologist



EASTERN SHAWNEE TRIBE OF OKLAHOMA

70500 E. 128 Road, Wyandotte, OK 74370
Tribal Annex (918) 666-2435, Fax: (918) 666-2186

April 24, 2014

Kevin S. Rose
Environmental Compliance Specialist
U.S. Department of Transportation
Federal Highway Administration
21400 Ridgetop Circle
Sterling, VA 20166-6511

RE: HFPP-15. PRA-OZAR 10(2) – Big Spring Bridge Project, Ozark National Scenic Riverways

Dear Mr. Rose,

Thank you for the opportunity to review the project referenced above. The Eastern Shawnee Tribe is aware of historic Shawnee occupation within the Ozark National Scenic Riverways, therefore this project may possibly affect cultural resources located near to such an important spring. We recommend a large APE when performing construction around this bridge replacement, as this construction will most likely involve a large staging area. We look forward to hearing back from you regarding the established APE.

If discoveries of archaeological resources, including human remains, are inadvertently uncovered while implementing this project we require your office contact the Eastern Shawnee Tribe.

If this office can be of further assistance to you in reviewing future projects please don't hesitate to contact us.

Best regards,

Robin Dushane
Eastern Shawnee Tribe
Historic Preservation Officer



The Delaware Nation
Cultural Preservation Office
P.O. Box 825 - 31064 State Highway 281- Anadarko, OK 73005
Phone: 405/247-2448 – Fax: 405/247-8905

NAGPRA ext. 1180
Section 106 ext. 1181
Museum ext. 1181
Library ext. 1196
Clerk ext. 1182

May 9, 2014

RE: PRA-OZAR 10(2)
Big Spring Bridge Project
Ozark National Scenic Riverways

Dear Lisa Landers,

The Delaware Nation Cultural Preservation Department received correspondence regarding the above referenced project. Our office is committed to protecting sites important to tribal heritage, culture and religion. Furthermore, the tribe is particularly concerned with archaeological sites that may contain human burials or remains, and associated funerary objects.

As described in your correspondence and upon research of our database(s) and files, we find that the Lenape people occupied this area either prehistorically or historically. However, the location of the project does not endanger cultural or religious sites of interest to the Delaware Nation. Please continue with the project as planned. However, should this project inadvertently uncover an archaeological site or object(s), we request that you halt all construction and ground disturbance activities and immediately contact the appropriate state agencies, as well as our office (within 24 hours).

Please Note the Delaware Nation, the Delaware Tribe of Indians, and the Stockbridge Munsee Band of Mohican Indians are the only Federally Recognized Delaware/Lenape entities in the United States and consultation must be made only with designated staff of these three tribes. We appreciate your cooperation in contacting the Delaware Nation Cultural Preservation Office to conduct proper Section 106 consultation. Should you have any questions regarding this email or future consultation feel free to contact our offices at 405-247-2448 or by email tfrancis@delawarenation.com.

Sincerely,

Mrs. Tamara Francis Fourkiller
Cultural Preservation Director

CC: Kandess Botone (Director's Assistant)
kbotone@delawarenation.com



OCT 28 2014 In Reply Refer to: HFPP-15

FEDERAL EXPRESS

Ms. Amy Salveter
Field Supervisor
U.S. Fish and Wildlife Service
Columbia Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, MO 65203-0057

Subject: PRA-OZAR 10(2), Big Spring Bridge Project
Ozark National Scenic Riverways

Dear Ms. Salveter:

The Eastern Federal Lands Highway Division, of the Federal Highway Administration (FHWA), in cooperation with the National Park Service, is preparing an Environmental Assessment (EA) for the rehabilitation or replacement of Big Spring Bridge located in the Ozark National Scenic Riverways in Carter County, Missouri. The preferred alternative in the EA would remove the existing timber glulam bridge and replace it with a concrete bridge on the same alignment. The existing bridge would be removed by saw cutting the asphalt pavement wearing surface and glue laminated deck and lifting them off of the bent caps by crane. The bent caps and timber piles would also be removed so that no remains of the existing piles would be present above the mudline. All of the debris from the bridge removal would be disposed of off-site. The new concrete bridge would have a pre-cast concrete box beam and one bent in the Spring. The bridge deck would be cast offsite and then set in place with a crane. Riprap would be placed in the Spring to provide temporary construction access in order to remove the existing bridge and construct the new bridge. Best Management Practices (BMPs) would be implemented to minimize the impacts to the Spring. Geo-textile would be placed prior to placing the riprap, turbidity curtains would be installed, and the riprap would be washed prior to placement.

Thank you for your letter, dated May 1, 2014, in which you provided information regarding potential impacts to federally-listed species from the proposed repair/replacement of the Big Spring Bridge. This letter indicates that the following federally-listed threatened/endangered species could be located in the project area.

- Ozark Hellbender (*Cryptobranchus alleganiensis bishop*)
- Gray bat (*Myotis grisescens*)
- Indiana bat (*Myotis sodalis*)

The FHWA understands that Ozark Hellbender populations occur in the Current River downstream of the confluence with Big Spring. In order to avoid impacts to the Ozark Hellbender, the FHWA would observe the BMPs for Construction Projects Affecting Missouri Streams and Rivers. A FHWA project engineer would also be present at the project site throughout the life of the project to ensure that all Best Management Practices are followed.

In order to minimize impacts to federally-listed bat species, the FHWA would observe Bats in Bridges BMPs. A bat presence/absence inventory would also be performed on the bridge in the winter and summer and also immediately prior to the start of construction activities. If bats are found to be present, consultation will be re-initiated. After subsequent review of the project on-site, it is likely that several trees located at the bridge abutments would need to be cleared in order to replace the bridge. In order to avoid the potential for adverse effects, these trees would be cleared between October 15 and April 15.

FHWA would like to request an informal conference regarding the potential for adverse effects to the northern long-eared bat. The BMPs and tree clearing restrictions for the project, as listed above, would also serve to avoid adverse impacts to the northern long-eared bat. The proposed project would not adversely affect the northern long-eared bat.

The FHWA has determined that the project may affect, but is not likely to adversely affect any federally-listed species or their critical habitats. The FHWA respectfully requests your review of the proposed project and concurrence with our determination within 30 days of receipt of this letter. Enclosed you will find a topographic map of the project site and photographs taken during the March 2013 scoping trip. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,



Kevin S. Rose
Environmental Compliance Specialist

Enclosures

cc:

Mr. William Black, Superintendent, Ozark National Scenic Riverways, NPS (hardcopy only)
Mr. Bob Kammel, Acting FLTP Coordinator, Midwest Region, NPS
Mr. Eric Daniels, Ozark National Scenic Riverways, NPS



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

JAN 30 2015

In Reply Refer to: HFPP-15

Mr. Mark Miles
Director, State Historic Preservation Office
Missouri Department of Natural Resources
State Historic Preservation Office
P.O. Box 176
Jefferson City, MO 65102-0176

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways
Request for Concurrence

Dear Mr. Miles:

The Eastern Federal Lands Highway Division, of the Federal Highway Administration (FHWA), in cooperation with the National Park Service, is preparing an Environmental Assessment (EA) for the rehabilitation or replacement of Big Spring Bridge located in the Ozark National Scenic Riverways in Carter County, Missouri. The preferred alternative in the EA would remove the existing timber glulam bridge and replace it with a concrete bridge on the same alignment. The existing bridge would be removed by saw cutting the asphalt pavement wearing surface and glue laminated deck and lifting them off of the bent caps by crane. The bent caps and timber piles would also be removed so that no remains of the existing piles would be present above the mudline. All of the debris from the bridge removal would be disposed of off-site. The new concrete bridge would have a pre-cast concrete box beam and one bent in the spring. The bridge deck would be cast-in-place. The undertaking's area of potential effect has been defined as the existing Big Spring Bridge and the area within which all construction and ground disturbing activity would be confined. Enclosed you will find a topographic map showing the project's coordinates and an aerial photograph showing the area of potential effect.

Substantial development of the area surrounding Big Spring began in 1934 following the establishment of the Civilian Conservation Corps (CCC). The CCC helped conserve natural resources surrounding Big Spring, constructed visitor/recreational facilities, and built much of the area's early infrastructure. Much of the work done by the CCC was preserved and is now the Big Spring Historic District; an area that is considered to contain one of the most impressive collections of Depression era public works projects in the state of Missouri. Enclosed you will find *Big Spring Branch Bridge Developments, 1924-1977*, a historical overview of the bridges constructed at Big Spring.

The Big Spring Bridge, constructed in 1977, is not considered to be a contributing property to the Big Spring Historic District. However, the repair/replacement of the existing bridge does have the potential to impact the cultural landscape. In order to minimize these impacts, design elements would be incorporated to minimize interference with the landscape around Big Spring and remain consistent with the rustic architecture of the surrounding historic district. These design elements would include a low profile bridge design, timber railings and natural stone facing. The new bridge would be constructed on the same alignment as the existing bridge, so circulation patterns would not change. All ground disturbing activities would occur within the area previously disturbed by the construction of the bridge in the 1970's. Therefore, the proposed undertaking would not adversely affect the Big Spring Historic District or any historic properties.

The FHWA respectfully requests your review of the proposed project and concurrence with our determination within 30 days of receipt of this letter. Enclosed you will also find photographs of the project area and preliminary project plans. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,



Kevin S. Rose
Environmental Compliance Specialist

Enclosures

cc:

Mr. Larry Johnson, Acting Superintendent, Ozark National Scenic Riverways, NPS (hardcopy only)

Mr. Bob Kammel, FLTP Coordinator, Midwest, NPS

Mr. Eric Daniels, Ozark National Scenic Riverways, NPS

Mr. Joe Strenfel, Ozark National Scenic Riverways, NPS



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

JAN 30 2015 In Reply Refer to: HFPP-15

CERTIFIED MAIL

Ms. Kim Jumper
Shawnee Tribe
29 South Highway 69 A
Miami, OK 74355

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways
Section 106 Consultation

Dear Ms. Jumper:

The Eastern Federal Lands Highway Division, of the Federal Highway Administration (FHWA), in cooperation with the National Park Service (NPS), is continuing to prepare an Environmental Assessment (EA) for the rehabilitation or replacement of Big Spring Bridge located in the Ozark National Scenic Riverways in Carter County, Missouri. A preferred alternative has now been identified. The preferred alternative would remove the existing timber glue laminated (glulam) bridge and replace it with a concrete bridge on the same alignment. The existing bridge would be removed by saw cutting the asphalt pavement wearing surface and glue laminated deck and lifting them off of the bent caps by crane. The bent caps and timber piles would also be removed so that no remains of the existing piles would be present above the mudline. All of the debris from the bridge removal would be disposed of off-site. The new concrete bridge would have a pre-cast concrete box beam and one bent in the spring. The bridge deck would be cast-in-place.

The undertaking's area of potential effect has been defined as the existing Big Spring Bridge and the area within which all construction and ground disturbing activity would be confined. The existing bridge and roadway approaches would be closed to traffic and used for staging during construction. Enclosed you will find a topographic map with the project's coordinates and an aerial photograph showing the area of potential effect.

The new bridge would be constructed on the same alignment as the existing bridge, keeping all ground disturbing activities within the area previously disturbed by the construction of the bridge in the 1970's. Therefore, the FHWA and NPS have determined that there would be no adverse effects to cultural resources as a result of the proposed action.

The FHWA respectfully requests your review of the proposed project and concurrence with our determination within 30 days of receipt of this letter. Enclosed you will find a topographic map, photographs of the project area, and preliminary project plans. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,



Kevin S. Rose
Environmental Compliance Specialist

Enclosures

cc:

Mr. Larry Johnson, Acting Superintendent, Ozark National Scenic Riverways, NPS (hardcopy only)
Mr. Bob Kammel, FLTP Coordinator, Midwest, NPS
Mr. Eric Daniels, Ozark National Scenic Riverways, NPS
Mr. Joe Strenfel, Ozark National Scenic Riverways, NPS



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

JAN 30 2015 In Reply Refer to: HFPP-15

CERTIFIED MAIL

Ms. Lisa Baker
Acting THPO
United Keetoowah Band of Cherokee Indians in Oklahoma
P.O. Box 746
Tahlequah, OK 74465-0746

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways
Section 106 Consultation

Dear Ms. Baker:

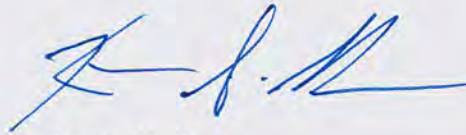
The Eastern Federal Lands Highway Division, of the Federal Highway Administration (FHWA), in cooperation with the National Park Service (NPS), is continuing to prepare an Environmental Assessment for the rehabilitation or replacement of Big Spring Bridge located in the Ozark National Scenic Riverways in Carter County, Missouri. Thank you for your email dated April 23, 2014, in which you provided us with your comments regarding the proposed project.

A preferred alternative has now been identified. The preferred alternative would remove the existing timber glue laminated (glulam) bridge and replace it with a concrete bridge on the same alignment. The existing bridge would be removed by saw cutting the asphalt pavement wearing surface and glue laminated deck and lifting them off of the bent caps by crane. The bent caps and timber piles would also be removed so that no remains of the existing piles would be present above the mudline. All of the debris from the bridge removal would be disposed of off-site. The new concrete bridge would have a pre-cast concrete box beam and one bent in the spring. The bridge deck would be cast-in-place.

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The FHWA and NPS have determined that there would be no adverse effects to cultural resources as a result of the proposed action. The FHWA respectfully requests your review of the proposed project and concurrence with our determination within 30 days of receipt of this letter. Enclosed you will find a topographic map, photographs of the project area, and preliminary project plans. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,



Kevin S. Rose
Environmental Compliance Specialist

Enclosures

cc:

Mr. Larry Johnson, Acting Superintendent, Ozark National Scenic Riverways, NPS (hardcopy only)

Mr. Bob Kammel, FLTP Coordinator, Midwest, NPS

Mr. Eric Daniels, Ozark National Scenic Riverways, NPS

Mr. Joe Strenfel, Ozark National Scenic Riverways, NPS



U.S. Department
of Transportation

**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

JAN 30 2015 In Reply Refer to: HFPP-15

CERTIFIED MAIL

Dr. Brice Obenneyer
Director, Delaware Tribe Historic Preservation Office
Delaware Tribe of Indians
Roosevelt Hall, Room 212
1200 Commercial Street
Emporia, KS 66801

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways
Section 106 Consultation

Dear Dr. Obenneyer:

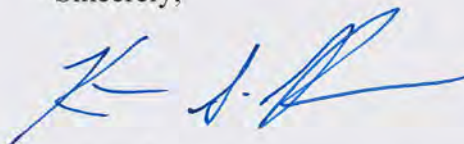
The Eastern Federal Lands Highway Division, of the Federal Highway Administration (FHWA), in cooperation with the National Park Service (NPS), is continuing to prepare an Environmental Assessment (EA) for the rehabilitation or replacement of Big Spring Bridge located in the Ozark National Scenic Riverways in Carter County, Missouri. A preferred alternative has now been identified. The preferred alternative would remove the existing timber glue laminated (glulam) bridge and replace it with a concrete bridge on the same alignment. The existing bridge would be removed by saw cutting the asphalt pavement wearing surface and glue laminated deck and lifting them off of the bent caps by crane. The bent caps and timber piles would also be removed so that no remains of the existing piles would be present above the mudline. All of the debris from the bridge removal would be disposed of off-site. The new concrete bridge would have a pre-cast concrete box beam and one bent in the spring. The bridge deck would be cast-in-place.

The undertaking's area of potential effect has been defined as the existing Big Spring Bridge and the area within which all construction and ground disturbing activity would be confined. The existing bridge and roadway approaches would be closed to traffic and used for staging during construction. Enclosed you will find a topographic map with the project's coordinates and an aerial photograph showing the area of potential effect.

The new bridge would be constructed on the same alignment as the existing bridge, keeping all ground disturbing activities within the area previously disturbed by the construction of the bridge in the 1970's. Therefore, the FHWA and NPS have determined that there would be no adverse effects to cultural resources as a result of the proposed action.

The FHWA respectfully requests your review of the proposed project and concurrence with our determination within 30 days of receipt of this letter. Enclosed you will find a topographic map, photographs of the project area, and preliminary project plans. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,



Kevin S. Rose
Environmental Compliance Specialist

Enclosures

cc:

Mr. Larry Johnson, Acting Superintendent, Ozark National Scenic Riverways, NPS (hardcopy only)

Mr. Bob Kammel, FLTP Coordinator, Midwest, NPS

Mr. Eric Daniels, Ozark National Scenic Riverways, NPS

Mr. Joe Strenfel, Ozark National Scenic Riverways, NPS



U.S. Department
of Transportation

**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

JAN 30 2015

In Reply Refer to: HFPP-15

CERTIFIED MAIL

Dr. Richard Allen
Cherokee Nation
P.O. Box 948
Tahlequah, OK 74465

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways
Section 106 Consultation

Dear Dr. Allen:

The Eastern Federal Lands Highway Division, of the Federal Highway Administration (FHWA), in cooperation with the National Park Service (NPS), is continuing to prepare an Environmental Assessment (EA) for the rehabilitation or replacement of Big Spring Bridge located in the Ozark National Scenic Riverways in Carter County, Missouri. A preferred alternative has now been identified. The preferred alternative would remove the existing timber glue laminated (glulam) bridge and replace it with a concrete bridge on the same alignment. The existing bridge would be removed by saw cutting the asphalt pavement wearing surface and glue laminated deck and lifting them off of the bent caps by crane. The bent caps and timber piles would also be removed so that no remains of the existing piles would be present above the mudline. All of the debris from the bridge removal would be disposed of off-site. The new concrete bridge would have a pre-cast concrete box beam and one bent in the spring. The bridge deck would be cast-in-place.

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The new bridge would be constructed on the same alignment as the existing bridge, keeping all ground disturbing activities within the area previously disturbed by the construction of the bridge in the 1970's. Therefore, the FHWA and NPS have determined that there would be no adverse effects to cultural resources as a result of the proposed action.

The FHWA respectfully requests your review of the proposed project and concurrence with our determination within 30 days of receipt of this letter. Enclosed you will find a topographic map, photographs of the project area, and preliminary project plans. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,



Kevin S. Rose
Environmental Compliance Specialist

Enclosures

cc:

Mr. Larry Johnson, Acting Superintendent, Ozark National Scenic Riverways, NPS (hardcopy only)

Mr. Bob Kammel, FLTP Coordinator, Midwest, NPS

Mr. Eric Daniels, Ozark National Scenic Riverways, NPS

Mr. Joe Strenfel, Ozark National Scenic Riverways, NPS



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

JAN 30 2015 In Reply Refer to: HFPP-15

CERTIFIED MAIL

Ms. Tamara Francis Fourkiller
Cultural Preservation Director
Delaware Nation
P.O. Box 825
Anadarko, OK 73005

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways
Section 106 Consultation

Dear Ms. Fourkiller:

The Eastern Federal Lands Highway Division, of the Federal Highway Administration (FHWA), in cooperation with the National Park Service (NPS), is continuing to prepare an Environmental Assessment for the rehabilitation or replacement of Big Spring Bridge located in the Ozark National Scenic Riverways in Carter County, Missouri. Thank you for your letter dated May 9, 2014, in which you provided us with your comments regarding the proposed project.

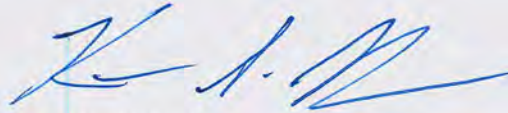
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The undertaking's area of potential effect has been defined as the existing Big Spring Bridge and the area within which all construction and ground disturbing activity would be confined. The existing bridge and roadway approaches would be closed to traffic and used for staging during construction. Enclosed you will find a topographic map with the project's coordinates and an aerial photograph showing the area of potential effect.

The new bridge would be constructed on the same alignment as the existing bridge, keeping all ground disturbing activities within the area previously disturbed by the construction of the bridge in the 1970's. Therefore, the FHWA and NPS have determined that there would be no adverse effects to cultural resources as a result of the proposed action.

The FHWA respectfully requests your review of the proposed project and concurrence with our determination within 30 days of receipt of this letter. Enclosed you will find a topographic map, photographs of the project area, and preliminary project plans. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,



Kevin S. Rose
Environmental Compliance Specialist

Enclosures

cc:

Mr. Larry Johnson, Acting Superintendent, Ozark National Scenic Riverways, NPS (hardcopy only)

Mr. Bob Kammel, FLTP Coordinator, Midwest, NPS

Mr. Eric Daniels, Ozark National Scenic Riverways, NPS

Mr. Joe Strenfel, Ozark National Scenic Riverways, NPS



JAN 30 2015 In Reply Refer to: HFPP-15

CERTIFIED MAIL

Mr. Joseph Blanchard
Absentee Shawnee Tribe of Indians of Oklahoma
2025 South Gordon Cooper Drive
Shawnee, OK 74801

Subject: PRA-OZAR 10(2) - Big Spring Bridge Project
Ozark National Scenic Riverways
Section 106 Consultation

Dear Mr. Blanchard:

The Eastern Federal Lands Highway Division, of the Federal Highway Administration (FHWA), in cooperation with the National Park Service (NPS), is continuing to prepare an Environmental Assessment (EA) for the rehabilitation or replacement of Big Spring Bridge located in the Ozark National Scenic Riverways in Carter County, Missouri. A preferred alternative has now been identified. The preferred alternative would remove the existing timber glue laminated (glulam) bridge and replace it with a concrete bridge on the same alignment. The existing bridge would be removed by saw cutting the asphalt pavement wearing surface and glue laminated deck and lifting them off of the bent caps by crane. The bent caps and timber piles would also be removed so that no remains of the existing piles would be present above the mudline. All of the debris from the bridge removal would be disposed of off-site. The new concrete bridge would have a pre-cast concrete box beam and one bent in the spring. The bridge deck would be cast-in-place.

The undertaking's area of potential effect has been defined as the existing Big Spring Bridge and the area within which all construction and ground disturbing activity would be confined. The existing bridge and roadway approaches would be closed to traffic and used for staging during construction. Enclosed you will find a topographic map with the project's coordinates and an aerial photograph showing the area of potential effect.

The new bridge would be constructed on the same alignment as the existing bridge, keeping all ground disturbing activities within the area previously disturbed by the construction of the bridge in the 1970's. Therefore, the FHWA and NPS have determined that there would be no adverse effects to cultural resources as a result of the proposed action.

The FHWA respectfully requests your review of the proposed project and concurrence with our determination within 30 days of receipt of this letter. Enclosed you will find a topographic map, photographs of the project area, and preliminary project plans. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,



Kevin S. Rose
Environmental Compliance Specialist

Enclosures

cc:

Mr. Larry Johnson, Acting Superintendent, Ozark National Scenic Riverways, NPS (hardcopy only)

Mr. Bob Kammel, FLTP Coordinator, Midwest, NPS

Mr. Eric Daniels, Ozark National Scenic Riverways, NPS

Mr. Joe Strenfel, Ozark National Scenic Riverways, NPS

From: [Lisa LaRue-Baker - UKB THPO](#)
To: [Landers, Lisa \(FHWA\)](#)
Cc: [Holly Noe](#)
Subject: PRA-OZAR 10(2), Big Spring Bridge Project, Ozark National Scenic Riverways
Date: Wednesday, February 11, 2015 4:32:14 PM

Thank you for the follow-up letter with a preferred alternative. The UKB agrees with this alternative, and feels that there are no known historic or cultural resources which will be affected.

Thank you,

Lisa C. Baker
Acting THPO
United Keetoowah Band of Cherokee Indians in Oklahoma
PO Box 746
Tahlequah, OK 74465

c 918.822.1952
ukbthpo-larue@yahoo.com

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[Please FOLLOW our historic preservation page and LIKE us on FACEBOOK](#)



From: [Ileana Houston](#)
To: [Landers, Lisa \(FHWA\)](#)
Subject: PRA-OZAR 10(2) Big Spring Bridge
Date: Monday, March 09, 2015 3:32:21 PM
Attachments: [PASS Letter - PASS Letter.docx](#)

Ms. Landers

The Delaware Nation Cultural Preservation Department received correspondence regarding PRA-OZAR 10(2) The Big Spring Bridge Project. However, should this project inadvertently uncover an archaeological site or object (s), we request that you halt all construction and ground disturbance activities and immediately contact the appropriate state agencies, as well as our office (within 24 hours).

Thank you,

Ileana Houston

Office Coordinator
Delaware Nation Cultural Preservaion Department
P.O. Box 825
Anadarko, OK 73005
Phone: (405) 247-2447 EXT. 1408
Fax: (405) 247-8905



Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

February 9, 2015

Kevin S. Rose
Environmental Compliance Specialist
Eastern Federal Lands Highway Division
21400 Ridgetop Circle
Sterling, Virginia 20166-6511

Re: PRA-OSAR 10(2) – Big Spring Bridge Project, Ozark National Scenic Riverways (FHWA) Carter County, Missouri

Dear Mr. Rose:

Thank you for submitting information about the above referenced project for our review pursuant to Section 106 of the National Historic Preservation Act (P.L. 89-665) and the Advisory Council on Historic Preservation's regulation 36 CFR Part 800, which require identification and evaluation of cultural resources.

We have reviewed the information provided concerning the above referenced project. We concur with your determination that the current Big Spring Bridge in non-contributing to the Big Spring Historic District, a property listed in the National Register of Historic Places. We also concur with your determination that the proposed new bridge will have **no adverse effect**.

Please be advised that, should project plans change, information documenting the revisions should be submitted to this office for further review and comment on possible effects to historic properties. In the event that cultural materials are encountered during project activities, all construction should be halted, and this office notified as soon as possible in order to determine the appropriate course of action.

If you have any questions, please write Judith Deel at State Historic Preservation Office, P.O. Box 176, Jefferson City, Missouri 65102 or call 573/751-7862. Please be sure to include the SHPO Log Number (**002-CT-15**) on all future correspondence or inquiries relating to this project.

Sincerely,

STATE HISTORIC PRESERVATION OFFICE

A handwritten signature in cursive script that reads 'Mark A. Miles'.

Mark A. Miles
Director and Deputy State
Historic Preservation Officer

MAM:jd

c Eric Daniels, ONSR

Promoting, Protecting and Enjoying our Natural Resources. Learn more at dnr.mo.gov





U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

DEC -7 2015 In Reply Refer to: HFPP-15

FEDERAL EXPRESS

Ms. Amy Salveter
Field Supervisor
U.S. Fish and Wildlife Service
Columbia Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, MO 65203-0057

Subject: PRA-OZAR 10(2), Big Spring Bridge and Alley Spring Bridge Project
Ozark National Scenic Riverways
Request for Concurrence

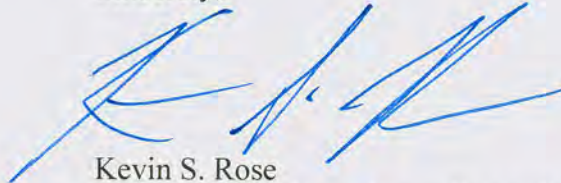
Dear Ms. Salveter:

The Eastern Federal Lands Highway Division, of the Federal Highway Administration (FHWA), in cooperation with the National Park Service, is proposing to rehabilitate or replace the Big Spring Bridge and rehabilitate the Alley Spring Bridge. Both bridges are located in the Ozark National Scenic Riverways in Carter County and Shannon County, Missouri, respectively. The preferred alternative in the Environmental Assessment being prepared for the Big Spring Bridge would remove the existing timber glulam bridge and replace it with a concrete bridge on the same alignment. The proposed rehabilitation of the Alley Spring Bridge includes cleaning and painting of the steel, replacing deteriorated timber and minor concrete repair on the pier.

A Biological Assessment (BA) has been prepared for the project and is enclosed for your review. The BA analyzes impacts to the following federally-listed threatened and endangered species that could be located in the project area: Ozark hellbender (*Cryptobranchus alleganiensis bishopi*), gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), and northern long-eared bat (*Myotis septentrionalis*). A follow-up winter bat survey will be completed this November/December; however, we do not anticipate the results of the study to change the determinations made in the Biological Assessment.

The FHWA has determined that the project may affect, but is not likely to adversely affect any federally-listed species or their critical habitats based on the analysis completed in the BA. The FHWA respectfully requests your review of the proposed project and concurrence with our determination within 30 days of receipt of this letter. If you have any questions concerning this matter, please contact Ms. Lisa Landers, Environmental Protection Specialist, at Lisa.Landers@dot.gov or (571) 434-1592.

Sincerely,



Kevin S. Rose
Environmental Compliance Specialist

Enclosures

cc:

Mr. Larry Johnson, Superintendent, Ozark National Scenic Riverways, NPS (hardcopy only)
Mr. Bob Kammel, Acting FLTP Coordinator, Midwest Region, NPS
Mr. Eric Daniels, Ozark National Scenic Riverways, NPS

From: [Crabill, Trisha](#)
To: [Landers, Lisa \(FHWA\)](#)
Cc: [Amy Salveter](#); [Lawrence Johnson](#); [Eric Daniels](#); [victoria_grant](#)
Subject: PRA-OZAR 10(2) Big Spring Bridge and Alley Spring Bridge Projects
Date: Wednesday, December 23, 2015 4:42:10 PM

Ms. Landers,

I've reviewed the information provided in your December 7, 2015 Biological Assessment (BA) regarding the Big Spring and Alley Spring bridge projects in Carter County and Shannon County, Missouri, respectively. Both projects occur within the Ozark National Scenic Riverways (ONSR) and will be implemented in cooperation with the National Park Service. The Big Spring project will involve removal and replacement of the existing bridge; while the Alley Spring project will involve cleaning and painting of the steel, replacement of deteriorated timber, and minor concrete repair on the pier.

Federally listed species evaluated in the BA include: the Ozark Hellbender (*Cryptobranchus alleganiensis bishopi*), gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), and northern long-eared bat (*Myotis septentrionalis*). No other federally threatened, endangered, proposed, or candidate species or proposed or designated critical habitat are likely to be present within the project areas.

Ozark Hellbender

As stated above, the Big Spring project will involve removal of the existing bridge and construction of a new bridge. Project activities will require placement of a temporary causeway to provide access during construction. Although suitable habitat for the Ozark Hellbender is present in Big Spring, no hellbenders were found during surveys conducted on May 21, 2015, and no records exist of hellbenders in Big Spring itself. However, suitable Ozark Hellbender habitat occurs immediately below Big Spring's confluence with the Current River, and Ozark Hellbenders are known to occur within five miles of the project area. Suitable Ozark Hellbender habitat also occurs near the Alley Spring project area, but no Ozark Hellbenders have been found within Alley Spring and the species has not been documented in the Jacks Fork since 1992.

Based on your description of project activities, conservation measures which will be implemented (e.g., containment systems, turbidity curtains, etc.), and the distance of the project areas to known Ozark Hellbender sites, we do not anticipate impacts to the species. While some sediment may be temporarily deposited over suitable, but unoccupied hellbender habitat, we do not anticipate long-term degradation of this habitat. Thus, the potential for Ozark Hellbenders to occupy this habitat in the future should not be impacted. Therefore, we concur with your determination that project activities for both the Big Spring and Alley Spring bridge projects may affect, but are not likely to adversely affect the Ozark Hellbender.

Gray bat

Gray bats are known to occur throughout ONSR, and the species is known to occupy Branson Cave, located less than two miles from Alley Spring. Therefore, it's likely that gray bats are present within both project areas. It's stated in your BA that both bridges were inspected for cracks or crevices that could potentially be used by bats. The underside each bridge was also inspected for urine staining at entry/exit points, presence of guano, insect parts, and live or dead bats within or near the structures, with special attention paid to areas potentially meeting thermoregulatory needs for roosting and less exposed to disturbance by human activity. No

evidence of bats was found at either the Big Spring or Alley Spring bridges. Based on these results, the minimal amount of tree clearing which will occur, and the distance to the nearest known gray bat cave, we do not anticipate negative impacts to the gray bat. We concur with your determination that project activities may affect, but are not likely to adversely affect the gray bat.

Indiana bat and northern long-eared bat

According to information provided in your BA, both Big Spring and Alley Spring project areas contain trees with suitable roosting habitat for Indiana and northern long-eared bats. Evening emergence surveys were conducted at both sites in July 2015 and no bats were observed within the project areas. Although no bats were observed during emergence surveys, both species are known to use a number of different roost trees and could occupy trees at a later time.

To avoid adverse effects to Indiana and northern long-eared bats, you stated in the BA that trees will be cleared between September 30 and April when bats are inactive. In Missouri, however, the Service recommends clearing trees between November 1 and April 1 because these species may be active in the state throughout October. During a telephone call on December 23, 2015 you stated that the tree clearing dates would be changed to November 1 to April 1 to follow this recommendation. With implementation of this measure, and because only a minimal amount of tree clearing will occur, we concur with your determination that project activities may affect, but are not likely to adversely affect the Indiana bat and northern long-eared bat.

We appreciate the efforts of the FHWA and NPS to conserve threatened and endangered species. If you have any questions, please feel free to contact me at the number below.

Sincerely,

Trisha Crabill
U.S. Fish and Wildlife Service
Ecological Services
101 Park DeVille Drive, Suite A
Columbia, MO 65203
Office: 573-234-2132 x 121
Fax: 573-234-2181

APPENDIX B

DRAFT WETLANDS AND FLOODPLAINS STATEMENT OF FINDINGS

Draft Statement of Findings: Wetlands and Floodplains

**Big Spring Bridge Project
Ozark National Scenic Riverways
Carter County, Missouri
Project Number PRA-OZAR 10(2)**

Recommended:

Superintendent, Ozark National Scenic Riverways

Date

Certified for Technical Adequacy and Servicewide Consistency:

Chief, Water Resources Division, Washington Office

Date

Approved:

Director, Midwest Region

Date

Introduction

Executive Order (EO) 11990, *Protection of Wetlands*, EO 11988, *Floodplain Management*, and EO 13690 *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, require the National Park Service (NPS) and other Federal agencies to evaluate the likely impacts of action in wetlands and floodplains, respectively. NPS Director's Order #77-1: *Wetland Protection and Procedural Manual #77-1* provide NPS policies and procedures for complying with EO 11990. NPS Director's Order 77-2: *Floodplain Management and the Procedural Manual 77-2: Floodplain Management* provide NPS policies and procedures for complying with EO 11988 and EO 13690.

This Statement of Findings (SOF) has been prepared to comply with EO 11990, 11988 and 13690. The FHWA and Ozark National Scenic Riverways (ONSR) has also prepared and made available an Environmental Assessment (EA) for the proposed rehabilitation or replacement of the Big Spring Bridge. In the EA, the NPS identified the replacement of the existing bridge with a concrete bridge as the preferred alternative.

The purpose of this SOF is to present the rationale for the proposed improvements to the Big Spring Bridge in the floodplain area and to document the anticipated effects on these resources. The proposed project is a Class 1 Action, per Director's Order #77-2. Class 1 Actions include manmade features which by their nature require individuals to occupy the site and are prone to flood damage. Avoidance of impacts to the floodplain is not possible because the existing road and bridge are located in the 100-year floodplain; therefore, any improvements made to the existing bridge would be located in the floodplain. The SOF also discloses the temporary and permanent impacts of the project on wetlands and explains how such impacts have been avoided and minimized to the extent practicable in accordance with Procedural Manual #77-1.

Proposed Action

Under the preferred alternative, Replacement with Concrete Bridge, the existing bridge would be demolished. The asphalt pavement wearing surface and glue laminated deck would be saw cut and lifted off of the bent caps by a crane. The bent caps would be removed, and the timber piles would be snapped off or saw cut at the mudline and removed. All of the debris from the bridge removal would be disposed of off-site.

The new concrete bridge would be constructed along the same alignment, and would have two 11-foot lanes, two 3-foot shoulders and a 6.8-foot sidewalk on the upstream side of the bridge. The concrete bridge would be approximately 3.5 feet wider than the existing bridge. The bridge would have a pre-cast concrete box beam. The bridge would have two spans with each being 70 feet in length, for a total length of 140 feet. This design would result in the placement of one pier in the channel. The pier would have a concrete micropile footing supporting a stone faced concrete column with a concrete cap. The concrete retaining wall abutments would be supported on piles with flared wingwalls.

Site Description

The Big Spring Bridge is located along Peavine Road in Carter County, Missouri. Big Spring Bridge provides access to the Big Spring area, the largest spring in Missouri and one of the largest in the world. Big Spring has an average daily discharge of 288 million gallons of cool spring water (National Park Service, 2014). In the summer, the spring branch becomes the primary tributary to the Current River and contains a variety of rare aquatic organisms. The Big Spring area also includes a large campground, historic cabins and dining lodge, shelter house and picnic area, canoe and boat access, and trails.

Although Big Spring was established as a state park in 1924, substantial development of the area began in 1933. A pine log foot bridge across Big Spring branch was built, and around 1940, a new single lane vehicular bridge was built. Around 1941 or 1942, a concession stand with adjacent boat docks located on the south bank of the spring branch and on the east side of the bridge was constructed. The entrance to the bridge that is currently in place is almost directly over where the concession building once stood. In 1964 the Ozark National Scenic Riverways was established, and by the mid-1970s, the NPS had upgraded the bridge crossing. The approach on the south side had a sharp turn and steep grade which made large vehicle travel challenging. The route was realigned to pass through the site of the concession stand (National Park Service, 2014). A Phase I Archeological Investigation and geotechnical investigation confirmed that the project area has been severely disturbed by previous road and bridge construction activities and that a substantial amount of fill material has been added on all four quadrants of the bridge.

Wetlands in the Study Area

Extensive disturbance of the site resulting from multiple bridge replacement and development efforts has resulted in the bridge approaches being raised by several feet above the surrounding landscape on fill material. The Big Spring branch was delineated as described in Cowardin et al. in accordance with Procedural Manual #77-1. The spring branch has a defined bed and bank with a streambed of gravel and cobble. The ordinary high water elevation is located at approximately 431 feet. Under the Cowardin system, this stream is classified as riverine, upper perennial, unconsolidated bottom, and permanently flooded (R3UBH). Due to the presence of fill material at the bridge approaches, the spring branch is incised only at this location and the banks are fairly steep. A fringe of herbaceous and woody vegetation is present along the banks of the spring branch. This vegetation is primarily American sycamore (*Platanus occidentalis*) giant cane (*Arundinaria gigantea*) Virginia creeper (*Parthenocissus quinquefolia*) and cutleaf coneflower (*Rudbeckia laciniata*). The riverine system includes all wetland and deepwater habitat contained within the channel; and at the spring branch, is bounded on the landward side by the channel bank. The landward limits of the riverine wetland are described as at the limits of the emergent or woody vegetation (L.M. Cowardin, 1979). A palustrine emergent fringe is present along the banks of the spring branch.

For sites where vegetation and soils were present (the areas surrounding the bridge approaches), vegetation, soils and hydrology were analyzed to determine if any areas met the definition of a wetland as stated in the 1987 Corps of Engineers Wetland Delineation Manual in accordance with Procedural Manual #77-1. A site visit was conducted in March of 2013 with the project

team. Subsequent geotechnical borings taken in August 2014 and soil testing for an archeological investigation in May of 2015 confirmed that the project area, including the banks of the spring branch, consisted of fill material and that no wetland hydrology or hydric soils were present. The soils present in the study area are not hydric; they have not formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

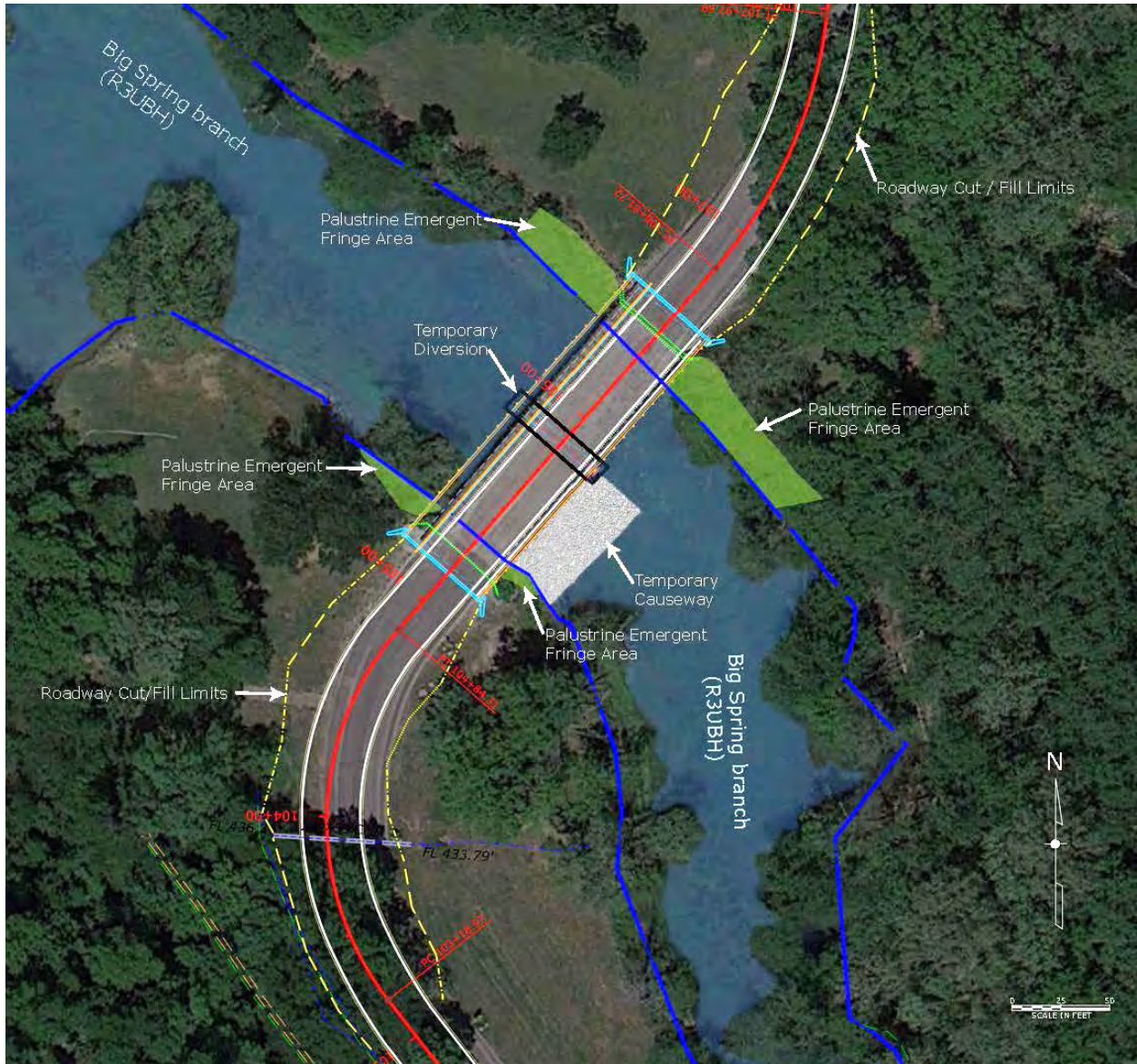


Figure 1. Wetlands in the Study Area

Wetland Functions and Values

Biotic Functions

The wetlands in the study area provide habitat for characteristic Ozark fish, including the knobfin sculpin (*Cottus immaculatus*) and the bleeding shiner (*Luxilus zonatus*). Star duckweed (*Lemna trisulca*), a plant species restricted to springs, occurs in the spring branch along with a variety of other plant species characteristic of springs, including water starwort (*Callitriche spp.*) and broad waterweed (*Elodea canadensis*). The R3UBH wetland provides suitable habitat for one Federally-listed species, the Ozark hellbender (*Cryptobranchus alleganiensis bishopi*). In May of 2015, the NPS and the Missouri Department of Conservation completed a survey of the spring branch in order to assess habitat and identify any individuals present in the project area. Suitable habitat was found in the project area; however, no individuals were observed. Although the gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*) and northern-long-eared bat (*Myotis septentrionalis*) have the potential to occur in the project area, no evidence of gray bats was found at Big Spring Bridge. Missouri Department of Conservation Natural Heritage records indicate that State-ranked species have the potential to occur in the project area. These species are the Ouachita kidneyshell (*Ptychobranchus occidentalis*), star duckweed, liverworts (*Riccardia multifida*), (*Nowellia curvifolia*) and (*Metzgeria furcata*), and broad waterweed. The palustrine emergent fringe areas include predominantly giant cane and mature and sapling American sycamores. At the top of the bank these areas are bounded by mowed turf grass, and so they provide limited wildlife habitat.

In addition to Federal- and State-listed species in the project area, Missouri has designated natural areas, which represent some of the best and last examples of original landscape. These areas feature rare plants, animals, and geologic features (Missouri Department of Conservation). Big Spring Natural Area, designated on February 14, 1983, is a 17 acre area extending from the spring down to the upstream side of the bridge.

Similar habitat is available in the approximately 2,000 foot length of the spring branch both upstream and downstream of the project area. Other spring-fed streams can also be found elsewhere in the park. The park contains more than 134 miles of spring-fed streams (United States Geological Survey, 1997).

Hydrologic Functions

Riverine wetlands occur in floodplain and riparian corridors in association with stream channels. The R3UBH wetland within the project area provides the functions of base flow, flood storage, sediment transport and local water quality control. The project area is in a large spring (Big Spring) that flows into the Current River, an Outstanding National Resource Water. Although the existing bridge abutments are exposed and experiencing material loss, during normal water levels the water surface elevation does not reach the abutments. The width of the spring is not confined by the bridge abutments. The channel is somewhat incised at and downstream of the bridge to a depth of 10 to 12 feet. At the bridge, the stream banks are comprised primarily of fill material that is likely associated with the construction of the existing bridge to a depth of 9 to 10 feet. The fill consisted primarily of loose to dense brown silty sand with various amounts and sizes of gravel. Underneath the fill material, loose to medium dense light brown sandy gravel, with some silt and clay was encountered from approximately 9 to 30 feet. The existing channel is stable and there has been relatively little change in the stream bed elevation since the measurements have been taken as part of the bridge inspections for this bridge in 1983 (Federal Highway Administration, 2014). The palustrine emergent fringe areas

along the banks of the spring branch provide erosion control and help to maintain a stable stream channel.

Cultural Values

The culture value of the wetlands within the study area is intrinsically high due to their association with the Big Spring Historic District. As stated in the Cultural Landscape Inventory, “The Big Spring Historic District is a sight that uniquely conveys concurrent developments in national recreation trends, CCC public works projects, and the associated architecture and landscape design (National Park Service, 2009).” Prior to the CCC’s development of the area, there is evidence that the area was used by European Settlers and the Native Americans before them. However, no historic or archeological sites were identified during the Phase I Archeological Investigation.

Research/Scientific Values

As a unique feature, the Big Spring has critical research and scientific value; however, the project area would not be appropriate for research given its past disturbance and development.

Economic Values

The spring branch frequently floods due to its proximity to the Current River. The Big Spring is a destination for visitors to the park, and visitors access the parking area and trail by traveling from the south or north across the bridge.

Floodplains in the Study Area

Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps show that the project areas are within the 100-year floodplain, Zone A. Zone A flood zones are areas subject to a one percent annual chance of a flood event (FEMA). Big Spring is located in FEMA mapped floodplain Zone A where the base flood elevations have not been determined.

The project area frequently floods, primarily due to its low elevation and proximity to the Current River. During high flow at Big Spring and the Current River, the discharge of Big Spring increases well before the flow increases in the Current River. During this period, no backwater occurs in the spring branch and the spring branch slowly rises in response to the increased flow in from the spring. Hours later, the flow in the Current River at the mouth of the spring branch begins to rapidly increase, causing the spring branch to rise quickly and eventually causing backwater conditions in the spring branch (Imes, 2007). The most recent major floods took place in 2011, 2012 and 2015; where the combination of flood water and backwater covered the bridge.

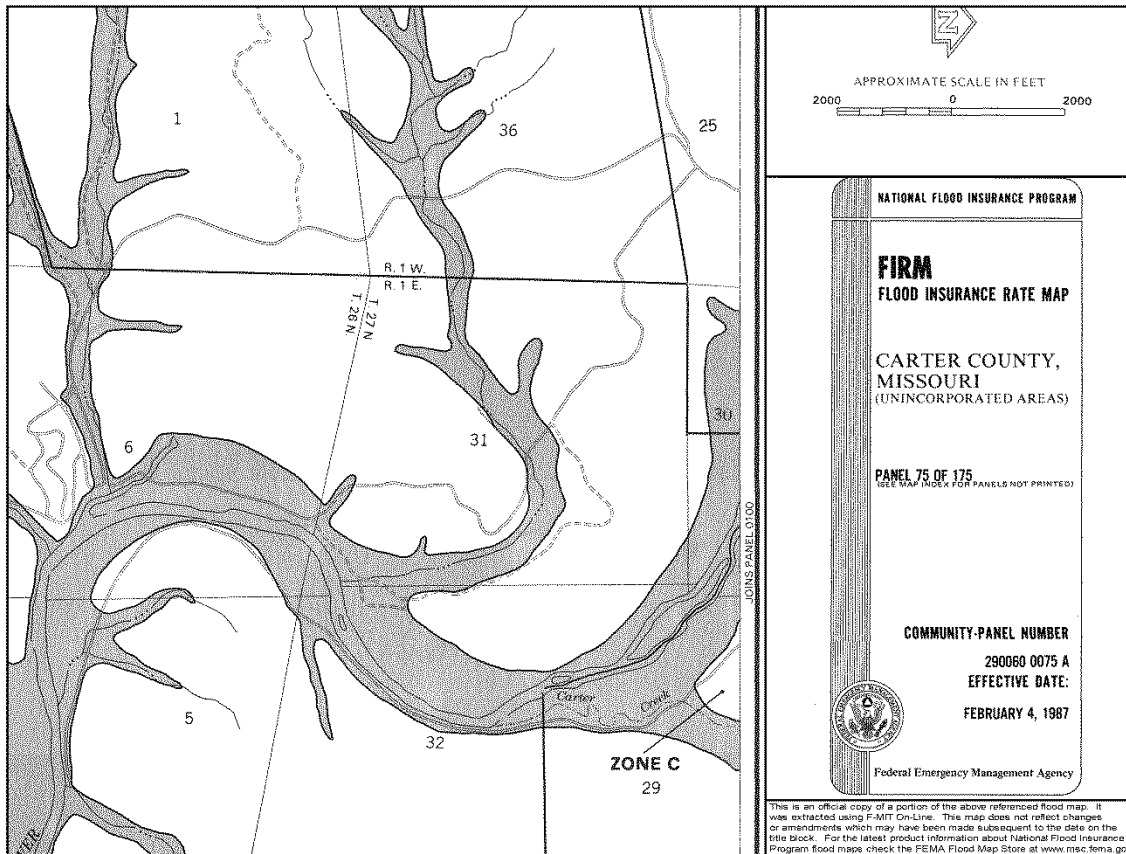


Figure 2. Floodplain Map of the Study Area

Impacts to Wetlands and Floodplains

Wetland Impacts

The construction of the center pier associated with the two-span concrete bridge would permanently impact 125 square feet of the R3UBH wetland. During construction, additional temporary impacts would be realized. The new bridge abutments would be set ten feet behind the existing abutments, and so there would be no permanent impacts to the palustrine emergent fringe. The existing piles in the R3UBH wetlands would be removed, restoring 13.5 square feet of the R3UBH wetland. A riprap causeway would be constructed across half of the spring in order to provide access for a crane. Also, a sheet pile diversion would be installed around the center pier while it is under construction. The temporary causeway and diversion would impact approximately 2,600 square feet of the R3UBH wetland. Construction equipment would need to cross through the palustrine emergent fringe to access the riprap causeway, temporarily impacting approximately 110 square feet. The total temporary (2710 square feet) and permanent (125 square feet) impact on the R3UBH wetland from the proposed action is 2835 square feet, or 0.07 acres.

Impacts to Biotic Wetland Functions:

The in-water work associated with the proposed project could potentially affect the aquatic species. The activities most likely to affect aquatic species are the construction of the temporary causeway and increased sedimentation associated with construction activities. The construction of the temporary causeway would displace individuals, disturb and potentially alter suitable habitat, and limit access across the Big Spring branch. Efforts to minimize these potential impacts would include the placement of a geotextile prior to the laying of riprap to limit disturbance to the stream bed. The removal of the existing timber bridge piles (by snapping them off or saw cutting them at the mudline) could also increase sedimentation of the spring branch. Turbidity curtains would be placed in the stream to reduce the flow of sediment outside of the project area. Erosion and sediment controls would be implemented so that impacts associated with increased sedimentation of the stream could be minimized. The proposed action would also have impacts related to the construction of the center pier. The driving of steel sheet piling for the temporary diversion may create a small amount of sediment redistribution. The in-water work is not anticipated to create large sediment plumes that could impact the State-listed/ranked hellbender, kidneyshell, liverworts, duckweed or waterweed.

Project activities may affect, but are not likely to adversely affect, the Federally-listed gray bat, Indiana bat, northern long-eared bat, and Ozark hellbender. Mitigation and minimization measures have been proposed and would be implemented in order to reduce the impact of the project. Tree clearing around the existing bridge abutments and approaches has the potential to adversely affect the Federally-listed Indiana bat and northern-long eared bat; however, no evidence of either of these species was found during the species surveys. In order to minimize the potential for impacts, tree clearing would be completed between November 1 and April 1. The new concrete bridge would be 3.5 feet wider than the existing bridge and would extend 1.75 feet into the Big Spring Natural Area.

Impacts to Hydrologic Wetland Functions:

The hydrologic functions of the spring branch would not change as a result of the proposed action. The new bridge would be 20 feet longer than the existing bridge, and so the abutments would be set approximately 10 feet back from the bank on each side. Since the spring branch is not currently constrained by the existing abutments, it is not anticipated that major changes to the bank morphology would occur.

Research/Scientific values and economic values would not be impacted by the proposed action.

Impacts to Cultural Wetland Functions:

The new concrete bridge would be constructed on the existing alignment and at a similar profile, which would result in no change to the relation of the bridge to the surrounding landscape. The configuration of two travel lanes and a sidewalk on the upstream side of the bridge would also be present in the new bridge, and so circulation patterns would not change. The new bridge would be noticeably newer than the surrounding features, and the more modern design may distract from the rustic qualities of the area. The bridge would have one solid pier wall, rather than five timber pile bents. The superstructure would be of a similar depth; however, it would be constructed of concrete instead of timber. Since the bridge is located within the Big Spring Historic District, aesthetic treatments, such as facing the bridge with natural stone would help to blend the new bridge into the surrounding Historic District. Also, timber rail elements would be incorporated into the design of the new bridge. Although the new bridge rail would not be noticeably higher, the new rail would include a steel-backed

timber vehicle rail in combination with a timber and cable pedestrian rail. Views experienced by those in vehicles on the bridge would be noticeably different. At the sight line of the driver, visitors would look through cables and the timber handrail to see Big Spring. Several large sycamore trees that are next to the bridge would have to be removed in order to replace the bridge. The clearing of vegetation and presence of a different looking bridge would change the views of the bridge experienced by visitors looking downstream from Big Spring.

Floodplain Impacts:

Approximately 675 cubic yards of riprap would be temporarily placed in the floodplain; however, after construction is completed, the material would be removed. The low chord elevation of the proposed bridge would be 0.2 feet higher than the existing bridge. The low chord elevation of the existing bridge is submerged during the two-year return period, and the bridge is entirely underwater during the 10-year return period. Raising the profile of the bridge and roadway approaches in order to provide freeboard for the 50-year event is not feasible. Therefore, the bridge is designed in order to withstand being overtopped during flood events. Since the entire area is underwater during the 100-year event, the proposed bridge would have no change to the water surface elevation of the 100-year event.

Justification for Use of the Wetlands and Floodplains

Wetlands

The existing Big Spring Bridge is deteriorated and requires rehabilitation or replacement. Under the preferred alternative, the bridge would be replaced along the existing alignment. Since the existing bridge is being replaced along an existing road in order to cross the spring branch, no non-wetland sites are practicable.

Floodplains

The study area lies within the 100-year floodplain. Replacement of the bridge is needed to maintain safe access to the Big Spring area. The project has been proposed to rehabilitate or replace the existing bridge across Big Spring and in order to do so; all of the alternatives would require crossing the spring branch. Therefore, there is no practicable alternative site within which to conduct the proposed action. No occupancy of floodplain areas will be encouraged by the implementation of this project. The new bridge would be located along the same alignment, minimizing the impact on previously undisturbed areas.

Investigation of Alternative Sites

In addition to the preferred alternative, three other action alternatives and a no action alternative were considered. The purpose of this project is to maintain the Ozark National Scenic Riverways' ability to safely serve visitors by providing safe vehicular access to the Big Spring area while minimizing impacts to natural, cultural, and aesthetic resources.

Alternative A - No Action Alternative

Under Alternative A, the No Action Alternative, no substantial improvements would be performed other than in accordance with routine maintenance operations. Analysis of the No

Action Alternative is required as part of the National Environmental Policy Act process in order to provide a basis for the comparison of other feasible alternatives.

Alternative A would have no impacts to wetlands or floodplains.

Alternative B – Rehabilitate the Existing Bridge

The existing bridge would be rehabilitated in order to address the deterioration noted in the Bridge Inspection Report (Federal Highway Administration, 2014). The timber piles would be encapsulated with a jacket, the abutments would be retrofitted, the deck would be replaced, and the railing would be updated to a crashworthy railing. Fiberglass jackets or an equivalent jacketing system would be installed on the most deteriorated timber piles. The jacket would be filled with epoxy grout to encapsulate the timber and protect it from further deterioration. The wrapping would extend from the mudline to approximately two feet above the normal high water level. Sections of severely deteriorated timber piles may be replaced, if needed. It is estimated that 200 linear feet of piles would have new fiberglass jackets installed.

The glulam timber deck would also need to be replaced. The asphalt wearing surface is in fair condition, but allows runoff to drain between the asphalt and glue laminated deck, which is causing decay. The asphalt wearing surface would be removed during the deck replacement. The wearing surface would be replaced with timber running planks, which allow for better drainage and are easier and less costly to maintain. Dewatering may also be necessary if any sections of deteriorated timber piles need to be replaced.

Alternative B would have no to negligible impacts to wetlands or floodplains depending on whether minor dewatering is needed to replace sections of the timber piles.

Alternative C – Replace with Timber Bridge

The existing bridge would be demolished. The asphalt pavement wearing surface and glulam deck would be saw cut and lifted off of the bent caps by a crane. The bent caps would be removed, and the timber piles would be snapped off or saw cut at the mudline and removed. All of the debris from the bridge removal would be disposed of off-site.

The existing bridge would be replaced in-kind with a six-span timber bridge (Figure 5). The bridge would have timber piles, glulam beams and a glulam deck. The spans would be 23.3 feet in length for a total length of 140-feet, resulting in the placement of five bents in the channel. Each bent would be supported by eight 12-inch-diameter timber piles. The timber bent caps would be constructed over the piles, upon which timber glulam beams would be placed, followed by a glulam deck (Federal Highway Administration, 2012).

The new bridge would have two 14-foot travel lanes, a 10-foot sidewalk, and would be approximately 40 feet wide, including the railing width. A steel-backed timber guardrail would be installed along the bridge. The low chord elevation (LSEL), the point on a bridge which is the lowest part of the super structure, would be 438.56 feet. The bridge would be closed during construction.

The total temporary (2600 square feet) and permanent (net increase of 4 square feet) impact on R3UBH wetlands from the proposed action is 2604 square feet, or 0.06 acres. The total temporary impact to the palustrine fringe is 110 square feet. The total impact to wetlands would be 2714 square feet or 0.06 acres. The wetland functions of fish and wildlife habitat would be

minimally impacted by the implementation of Alternative C. The installation of the riprap causeway would increase velocity, and may impact aquatic species movement, as flow would be constrained to half of the channel width. The causeway would also reduce available habitat for foraging. The bridge would be similar in appearance to the existing bridge, and so cultural values would not be impacted.

Alternative E – Replace with Steel Bridge

The existing bridge would be removed as described in Alternative C. The new steel bridge would be constructed along the same alignment as the existing bridge. The bridge would have a 140-foot long prefabricated steel truss span and two buried supports. A steel backed timber guard rail would be installed along the bridge and a pedestrian rail would be installed. The design of this bridge would eliminate the need for bents in the water.

The steel truss and floor beams would be constructed off-site and set in place with a crane positioned on a temporary causeway. A form would be added to the frame of the bridge and a cast-in-place concrete deck would be poured. The new bridge would have two 14-foot travel lanes, a 10-foot sidewalk, and would be approximately 42 feet wide (including the railing and truss width). The low chord elevation would be 437.52 feet, approximately one foot lower than the existing bridge.

The total temporary impact on R3UBH wetlands is 2600 square feet and the total temporary impact to the palustrine fringe is 110 square feet, for a total temporary impact of 2710 square feet of 0.07 acres. The steel bridge would span the R3UBH wetlands, resulting in no permanent impacts. The wetland functions of fish and wildlife habitat would be minimally impacted by the implementation of Alternative E during construction. The installation of the riprap causeway would increase velocity, and may impact aquatic species movement, as flow would be constrained to half of the channel width. The causeway would also reduce available habitat for foraging. The cultural functional values would be impacted. The change in material could prevent the new bridge from being integrated into the cultural landscape, and may cause confusion if visitors associate the bridge with other steel truss bridges in Ozark National Scenic Riverways. The design may also distract from the rustic qualities of the area. The new structure would also be considerable deeper (16 feet at midspan to six feet at the ends), becoming a focal point when viewing Big Spring from the bridge rather than blending into the surrounding landscape. Views of Big Spring from the bridge would also be impacted, since visitors would have to look through the railing and truss.

Utility Relocation

Currently at the Big Spring Bridge, the Park's utility lines are suspended from the underside of the existing bridge. These utilities consist of a six inch ductile iron pipe (DIP) waterline, four inch DIP sewer line, one 4.5 inch galvanized rigid conduit (GRC), one 3.5 inch GRC, and one 1.75 inch GRC. One of the larger GRC's is thought to contain three phase 7,200 VAC (volts of alternating current) electrical conductors, the other is assumed to contain electrical conductors for the existing pump stations on the west side of the bridge. The 1.75 inch GRC is assumed to contain telecom lines.

Three options are under consideration for utility relocation. The first option would reinstall the utility lines on the rehabilitated bridge. This could be done by hanging them from the underside of the bridge or routing the utilities through the support structure. Each of the utilities would be installed inside a casing pipe to protect the pipe from flood damage. While the bridge deck is

being replaced, temporary bypass lines would be installed to maintain service. The second option, which is the preferred option, would permanently remove the utility lines from the bridge and install them underground adjacent to the bridge. A casing pipe would also be installed under this option. The entire pipe would be below the frost line and the stream bed. In order to run them underground two directional borings would be drilled to separate the water and sewer lines. Tying into the existing utilities would require open cut trenching to lay the pipe or conduit back to the current location of the utilities to make connections. A third option for installing the power, water and sanitary underground is the jack and bore a casing pipe under the spring to allow a passage way for the utilities.

The boreholes and trenching to relocate the utilities would be located outside of the R3UBH wetland and palustrine emergent fringe. There would be no impacts to wetlands as a result of the utility relocation.

Identification of Preferred Alternative

Although Alternative D has more wetland impacts than Alternatives A, B, C and E; it was determined to be the preferred alternative. Alternative A, the No Action Alternative would not meet the purpose and need of the project. Alternative B would only extend the life of the bridge by approximately 10 years, at which point the bridge would need to be replaced. Alternative C would likely require replacement again in approximately 35 years, unlike Alternative D which has an estimated service life of 75 years. Alternative C would also continue to require debris removal from the numerous timber piles in the spring branch. Alternative E would result in an increase of maintenance due to the large superstructure. Alternative E would also have more of an adverse effect on the cultural landscape since the steel truss would be out of character with the surrounding historic district.

Other Permits

In order to construct the project, additional permits and approvals would be necessary.

Clean Water Act Section 404 Permit/ Section 10 of the Rivers and Harbors Act

The Rivers and Harbors Appropriation Act of 1899 prohibits the creation of any obstruction to the navigable capacity of any of the waters of the United States. The Federal Water Pollution Control Act, more commonly known as the "Clean Water Act," under Section 404, directs the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill material into waters of the United States at specified disposal sites. This project would discharge dredged or fill material into the waters of the United States, including a nearby Outstanding National Resource Water. The proposed project would most likely qualify for coverage under Nationwide Permit 3, Maintenance, or Nationwide Permit 14, Linear Transportation Projects. There is no associated fee, and the review period is typically 45 calendar days for Nationwide Permits.

NPDES (National Pollutant Discharge Elimination System) Permit

This project would likely disturb greater than one acre of bare soil, and therefore would need a Land Disturbance General Permit (MOAA00000). This general permit regulates stormwater discharges at land disturbance construction sites, and must be obtained prior to conducting any land disturbance activity. The removal of vegetation leaves bare soil which is more vulnerable to

erosion. As stormwater flows over a construction site, it can pick up pollutants like sediment, debris and chemicals and transport these to a water body. Polluted stormwater runoff can harm or kill fish and other wildlife (Missouri Department of Natural Resources).

401 Water Quality Certification

The 401 Water Quality Certification is a “certification,” needed for any Federal permit involving impacts to water quality. Most 401 Certifications are triggered by Section 404 Permits issued by the U.S. Army Corps of Engineers. Typical types of projects involve filling in surface waters or wetlands. Section 401 of the Clean Water Act delegates authority to the States to issue a 401 Water Quality Certification for all projects that require a Federal permit (such as a Section 404 Permit). The "401" is essentially verification by the State that a given project will not remove or degrade existing, designated uses of “Waters of the State,” or otherwise violate water quality standards. Mitigation of unavoidable impacts and inclusion of stormwater management features are two of the most important aspects of water quality review. This certification is issued by the Missouri Department of Natural Resources – Water Pollution Control Program. Missouri DNR normally reviews 401 Certification within five days of receipt of a complete application

Mitigative Actions

Wetlands

Avoidance and Minimization

Construction would take place during a full road closure so that the bridge can be replaced on the same alignment. In order to minimize impacts to wetlands, the bridge was lengthened by 20 feet so that the abutments could be moved further back into the banks of the spring branch. Best Management Practices (BMPs) and mitigation measures would be implemented in order avoid and minimize impacts to wetland functions. These mitigation measures include:

- No work would occur in the channel from March 15 to June 15 to avoid impacts to fish spawning.
- Tree clearing would be done from November 1 through April 1 to avoid impacts to Indiana bats and northern long-eared bats.
- Temporary BMPs would be utilized to minimize erosion and sedimentation from ground disturbing activities that expose bare soil. The BMPs may include the use of silt-fence, sediment logs, or erosion matting. These BMPs would be used only during construction and would be removed once the disturbed area has been permanently stabilized.
- Disturbed areas would be graded and seeded as soon as possible to minimize erosion. A revegetation plan would be developed to ensure that the disturbed stream banks are restored. Crown vetch and *Sericea lespedeza* would be avoided.
- Debris shields would be installed to capture any debris released due to repairs completed above the surface of the water.
- Any dewatering activities would include the filtering of the water prior to reintroducing it to the spring. Pumping water directly into the spring would be prohibited.
- BMPs, such as turbidity barriers, would also be used to minimize sedimentation during the temporary diversion of water and installation of riprap to create a temporary

causeway. Geotextile would be placed on the streambed prior to installing the causeway so that all of the riprap can be removed more easily after construction is completed. Disturbance to stream banks and riparian areas would be minimized. Channel modification, flow interruption or bank modification would only occur in compliance with conditions established in permits required under the Clean Water Act.

- For construction access, the temporary access pad would avoid water impoundment and allow for fish passage.
- Staging areas for equipment and materials would be established away from the spring branch.
- Stationary fuel and oil storage would remain within the staging area to avoid accidental spills into the spring branch.
- Excess concrete and wash water from trucks and other concrete mixing equipment would be disposed of in designated areas where this material cannot enter the spring branch.
- No equipment would be allowed to enter the spring branch. Equipment would be washed and rinsed thoroughly with hard spray or hot water (greater than 104 degrees Fahrenheit) and allowed to dry in the hot sun before use at the site.
- Mud, soil, trash, plants and animals would be removed from equipment before starting any work area near the water.

Justification for Proposed Waiver to Wetland Compensation Requirements:

The implementation of the proposed action, including all of the BMPs and mitigation measures, would result in minor permanent impacts (125 square feet or .003 acres) to wetlands. Approximately 2600 square feet or 0.06 acres of the R3UBH wetland and approximately 110 square feet of the palustrine emergent fringe would be temporarily impacted during construction, for a maximum duration of six months. After construction of the new bridge is completed all of the material installed for temporary construction access would be removed and the banks of the spring branch would be restored per a revegetation plan. The new bridge would direct storm runoff to the roadway approaches and shoulders rather than draining through scuppers directly into the spring branch as the existing bridge does. The existing bridge also is experiencing a loss of fill material from behind the bridge abutments. This material is currently entering the spring branch and impacting wetlands. Replacement of the existing bridge would correct this issue. The proposed action meets the intent of the NPS policy with respect to no-net loss of wetlands because the construction of a new bridge would reduce long-term sedimentation of the spring branch and downstream wetlands, mitigating for the minor long-term wetland impact of 125 square feet.

Floodplains

In order to construct the bridge, a riprap causeway would be constructed across half of the spring in order to provide access for a crane. Approximately 675 cubic yards of riprap would be placed in the floodplain; however, after construction is completed, the material would be removed. Scour protection at the abutments and pier was determined to not be necessary and so no riprap would be permanently placed in the floodplain. The construction of the solid pier would require the installation of a sheet pile diversion, temporarily impacting the floodplain.

The bridge would be replaced at approximately the same elevation. The top of the bridge deck would be constructed at approximately the same elevation as the existing bridge. The low chord elevation would be 438.95 feet, which is 0.2 feet higher than the low chord elevation of the

existing bridge (438.75 feet). Although the concrete bridge would be a wider structure than the existing bridge, the concrete bridge would have one pier instead of five bents providing larger hydraulic openings to pass debris.

The new bridge would be located within the floodplain and under the 100-year flood elevation. The bridge is designed to withstand being overtopped during flood events rather than placing additional fill material in the floodplain in order to raise the profile of the bridge and its approaches. There would be no change to the water surface elevation as a result of the new bridge during the 100-year event. Design considerations were sensitive to the location within the Big Spring Historic District cultural landscape. Altering the bridge drastically from the existing location and profile would cause an adverse effect to the cultural landscape. The new bridge is designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR Part 60).

The proposed action will not have an adverse impact on the floodplain and its associated value. Minimization and mitigation include the protection of human health and safety, protection of investment, and protection of floodplain resources and processes. The construction of a new bridge would replace an existing investment. Risk to the investment exists and would continue to exist after the bridge is replaced. The NPS would repair or reconstruct the facility if and when damage occurs. Protection of floodplain resources and processes was achieved to the extent possible.

Conclusion

The NPS and FHWA conclude that there is no practical alternative to improve safe access for pedestrians, cyclists and vehicles to access along Peavine Road across the Big Spring branch in the Ozark National Scenic Riverways. Mitigation and compliance with regulations and policies to prevent impacts to wetlands and water quality would be strictly adhered to during and after construction. Permits with other Federal and State agencies would be obtained prior to construction activities. The total temporary (2710 square feet) and permanent (125 square feet) impact on R3UBH wetlands from the proposed action is 2835 square feet, or 0.07 acres; however, the implementation of the mitigation measures would allow the proposed action to meet the intent of the no-net-loss policy of the NPS. Therefore, the NPS finds the Preferred Alternative to be acceptable under Executive Order 11988 for floodplain management and Executive Order 11990 for the protection of wetlands.

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Appendix A: Analysis of Characteristics of Big Spring Branch Banks

Methodology:

For sites where vegetation and soils were present (the areas surrounding the bridge approaches), vegetation, soils and hydrology were analyzed to determine if any areas met the definition of a wetland as stated in the 1987 Corps of Engineers Wetland Delineation Manual in accordance with Procedural Manual #77-1.



Figure 1. Study Area

Soils:

Three soils are mapped by the Natural Resources Conservation Service Web Soil Survey as being present in the study area:

1. Alred-Rueter complex, 15-35 percent slope. This soil is mapped as covering the entire study area south of the branch. Hydrologic soil group rating of C.
2. Gladden silt loam, 0-3 percent slope, occasionally flooded. This soil covers almost all of the study area north of the branch. Hydrologic soil group of A
3. Wideman fine sandy loam, 0-3 percent slope, occasionally flooded. This soil is mapped only in a small area north of the branch. Hydrologic soil group of B

Although these soils are mapped as present in the study area, extensive fill was brought in during the development and multiple replacements of the bridge. A site visit was conducted in March of 2013. Subsequent geotechnical borings taken in August 2014 and soil testing for an archeological investigation in May of 2015 confirmed that the project area, including the banks of the spring branch, consisted of fill material and that no wetland hydrology or hydric soils were present. Fill material extends to a depth of approximately 10 feet, followed by a layer of slope alluvium over residuum derived from dolomite. The fill material is described as being brown silty sand with some gravel. Munsell soils charts indicate the first layer of the fill material, which extends approximately 10 centimeters, as 10YR 3/2 silt loam and the second layer of fill material as 10YR 4/2 silt loam. Soil profiles indicate that the original A horizon has been removed or severely truncated, a layer of gravel had been deposited, and fill was brought in to reestablish grass. Soils along the steep banks of the spring branch adjacent to the bridge are consistently eroding with each flood event. The soils present in the study area are not hydric; they have not formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part.



Figure 2. View of Big Spring Bridge Showing Bridge Approach In Relation to Surrounding Landscape



Figure 3. View of Opposite Bridge Approach



Figure 4. Soil Test Pit NW of the Bridge



Figure 5. Soil Test Pit NE of the Bridge

Vegetation:

The vegetation in the study area is comprised primarily of mowed turf grass. A fringe of herbaceous and woody vegetation is present along the bank of the spring branch immediately adjacent to the bridge and includes American sycamore (*Platanus occidentalis*) (FACW), white oak (*Quercus alba*) (FACU) and green ash (*Fraxinus pennsylvanica*) (FACW) are found along with giant cane (*Arundinaria gigantea*) (FACW), Virginia creeper (*Parthenocissus quinquefolia*) (FACU), cutleaf coneflower (*Rudbeckia laciniata*) (FACW), wild grape (*Vitis spp.*) can be found. American sycamore and giant cane are the predominate species. A palustrine emergent fringe is present along the banks of the spring branch.

Hydrology:

Big Spring emerges from an exposed hydraulic conduit at the base of a buff and flows approximately 2,000 feet to the main channel of the Current River. The project area frequently floods, primarily due to its low elevation and proximity to the Current River. During high flow at Big Spring and the Current River, the discharge of Big Spring increases well before the flow increases in the Current River. During this period, no backwater occurs in the spring branch and the spring branch slowly rises in response to the increased flow in from the spring. Hours later, the flow in the Current River at the mouth of the spring branch begins to rapidly increase, causing the spring branch to rise quickly and eventually causing backwater conditions in the spring branch (Imes, 2007). The mean annual discharge of Big Spring is 445 cubic feet per second. The normal/ordinary water surface elevation is at approximately 431 feet.

Findings:

A site visit was conducted in March of 2013. Subsequent geotechnical borings taken in August 2014 and soil testing for an archeological investigation in May of 2015 confirmed that the project area, including the banks of the spring branch, consisted of fill material and that no wetland hydrology or hydric soils were present. The soils present in the study area are not hydric; they have not formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part.



Figure 6. NE Corner of the Bridge



Figure 7. SW Corner of the Bridge



Figure 8. NE Corner of the Bridge



Figure 9. SE Corner of the Bridge