National Park Service
U.S. Department of the Interior

Chickasaw National Recreation Area
Oklahoma

Construct a Bridge, Trails, and Parking Improvements

Environmental Assessment

September 12, 2014

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Environmental Assessment

Summary

Chickasaw National Recreation Area (Chickasaw NRA) and the Chickasaw Nation are proposing to collaborate on the construction of a pedestrian/bike bridge, three visitor trails, and improved parking in the Cat's Eye Road area. The proposed bridge and trails would provide visitors more direct access to and from the Chickasaw National Recreation Area and the Chickasaw Cultural Center. The purpose for taking action is to enhance the physical and cultural connection between the Chickasaw Cultural Center and Chickasaw NRA and to provide additional visitor opportunities in this area. Currently, there is no safe or convenient access between Chickasaw Cultural Center and Chickasaw NRA, and visitor opportunities in this area of the park are few. This project would promote increased access to between these two entities, as well as develop new visitor trails and improve parking in this area.

This Environmental Assessment (EA) evaluates two alternatives: a no action alternative and one action alternative. Alternative A is the no action alternative which describes the current condition if no bridge, trails, or parking improvements were constructed. Alternative B includes the construction of a new bridge, three visitor trails, and parking improvements in the Cat's Eye Road area.

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

This EA analyzes the following resource topics in detail because the resultant impacts would be noticeably measurable: Geology and Soils, Cultural Landscapes, Vegetation, Floodplains, and Visitor Use and Experience. All other resource topics were dismissed because the project would result in little to no effect to those resources. No major effects are anticipated as a result of this project. Public scoping was conducted to assist with the development of this document and comments were received, mostly in support of the proposed project.

Public Comment

If you wish to comment on the EA, you may post comments online at http://parkplanning.nps.gov/chic or mail or hand deliver comments to: Superintendent; Chickasaw National Recreation Area, 1008 West Second Street, Sulphur, Oklahoma, 73086. This EA will be on public review for 30 days. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. Although you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so. Comments will not be accepted by fax, email, or in any other way than those specified above. Bulk comments in any format (hard copy or electronic) submitted on behalf of others will not be accepted.

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PURPOSE AND NEED

Introduction

Chickasaw National Recreation Area (Chickasaw NRA) and the Chickasaw Nation are proposing to collaborate on the construction of a pedestrian/bike bridge and three visitor trails that would allow visitors access to and from the Chickasaw National Recreation Area and the Chickasaw Cultural Center.

Managed by the National Park Service (NPS), Chickasaw NRA was originally established by an act of Congress in 1902. The nearly 10,000 acres of the NRA were set aside as part of the National Park System to provide for more efficient administration of the area's scenic, scientific, natural, and historic values which contribute to the public enjoyment. Figure 1 is a map of the area including Chickasaw NRA and the Chickasaw Cultural Center.

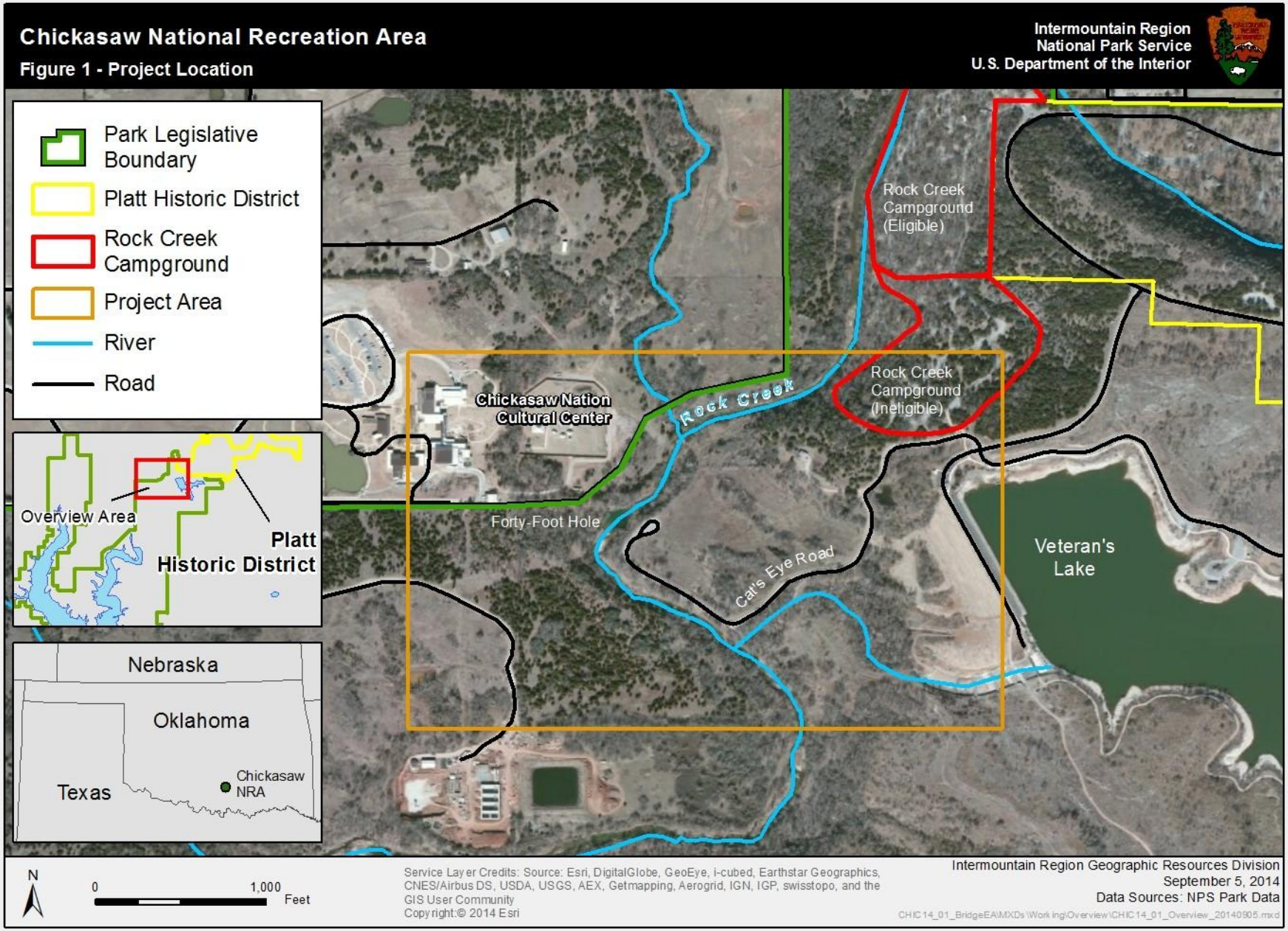
The purpose of this Environmental Assessment (EA) is to examine the environmental impacts associated with the proposal to construct a new bridge, three new trails, and parking improvements within Chickasaw NRA. This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, regulations of the Council on Environmental Quality (CEQ) (40 CFR §1508.9), and NPS Director's Order (DO)-12 (*Conservation Planning, Environmental Impact Analysis, and Decision-Making*).

Purpose and Need

The purpose of the proposal is to enhance the physical connection between the Chickasaw Cultural Center and Chickasaw NRA and to provide additional visitor opportunities in this area. Following is a description of the need for the project, as well as a summary of project objectives.

Currently, there is no physical connection (access) between the Chickasaw Cultural Center and Chickasaw NRA. The Chickasaw Nation approached NPS in 2013 suggesting that a connection be made between these two entities to foster enhanced connection and collaboration. In turn, this would help promote visitor use of and between these two areas, and ultimately the surrounding community. Access to the main entrance of the Chickasaw Cultural Center is currently by vehicle only; however, an alternative method would be by foot or bicycle. By constructing the pedestrian bridge and trails, visitors would have more than one way to access these properties. Therefore, one objective of the project is to provide safe and convenient access between the Chickasaw Cultural Center and Chickasaw NRA.

The proposed location for the construction of the bridge and the trails is in an area of Chickasaw NRA that contains fewer visitor opportunities as compared to other areas of the park. Some visitor opportunities in this area include the Veterans Lake, the Platt Historic District, Cat's Eye Road scenic drive, Rock Creek Campground, Rock Creek Multi Use Trail, and Rock Creek including a popular swimming on the creek known as "Forty-Foot Hole". Problems in this area include 1) no access from within the park to the Chickasaw Cultural Center; 2) lack of some trail connections; 3) an eroded social trail leading to the Forty-Foot Hole swimming area; and 4) undesignated parking along Cat's Eye Road. Minor improvements in this area could facilitate improved access, connections, and use in and amongst these amenities. Therefore, another objective of this project is to enhance and improve visitor opportunities in the project area.


Chickasaw National Recreation Area
Figure 1 - Project Location
Intermountain Region
National Park Service
U.S. Department of the Interior
Park Legislative Boundary
Platt Historic District
Rock Creek Campground
Project Area
River
Road
Overview Area
Platt Historic District
Nebraska
Oklahoma
Texas
Chickasaw NRA
Chickasaw Nation Cultural Center
Rock Creek
Rock Creek Campground (Eligible)
Rock Creek Campground (Ineligible)
Forty-Foot Hole
Cat's Eye Road
Veteran's Lake
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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Copyright:© 2014 Esri
Intermountain Region Geographic Resources Division
September 5, 2014
Data Sources: NPS Park Data
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Currently, there is no designated parking along Cat's Eye Road. There are visitor attractions in this area; however, the public has to park along the two-way road or on grassy shoulders along the road. Visitors currently park in undesignated areas which poses safety problems and resource damage when visitors pull off the road. Another safety problem in the Cat's Eye Road area is the lack of a designated trail to the Forty-Foot Hole swimming area. Therefore, another objective of this project is to improve parking and visitor safety in the Cat's Eye Road area;

NPS highly regards green building practices including sustainability for the design, construction, and maintenance of new structures. This includes, but is not limited to minimizing resource damage, employing integrated design principals, optimizing energy performance, generating a lower total cost of facility ownership, and reducing the environmental impact of materials. These and other environmentally friendly principles would be considered during the construction of the bridge, trails, and parking spaces. Making these new features sustainable should be consistent with NPS and Chickasaw Nation policies. Therefore, another objective of the project is to identify a design and access location that minimizes impacts to park resources in accordance with NPS regulations and policies and is consistent with Chickasaw Nation regulations and policies.

Summary of Project Objectives

- Provide safe and convenient access between the Chickasaw Cultural Center and Chickasaw NRA;
- Enhance and improve visitor opportunities in the project area;
- Improve parking and visitor safety in the Cat's Eye Road area; and
- Identify sustainable designs that minimize impacts to park resources in accordance with NPS regulations and policies and is consistent with Chickasaw Nation regulations and policies.

Impact Topics Retained For Further Analysis

The following impact topics are carried forward for further analysis in this EA:

- Geology and Soils
- Vegetation
- Floodplains
- Cultural Landscapes
- Visitor Use and Experience

Impact Topics Dismissed From Further Analysis

Table 1 indicates which impact topics were dismissed from further analysis with a brief explanation why. The table also includes the law, regulation, and/or policy that governs the compliance for that particular impact topic and a brief description of the affected environment, or baseline conditions, in the project area.

Table 1 – Impact Topics Dismissed From Further Analysis

Topic	Law, Regulation, Policy	Affected Environment / Reason Dismissed
Wildlife	NPS Director's Order 77: Natural Resource Protection	Several bird species, reptiles, amphibians, fish, and mammals such as coyotes, armadillo, rabbits, and deer inhabit or are transient to the project area. Construction related activities and noise may noticeably, temporarily disturb wildlife to a minimal degree. In the long-term, wildlife habitat would be slightly reduced from the construction of a permanent bridge and trails.
Special Status Species	Endangered Species Act; NPS Director's Order 77-8: Endangered Species	Surveys conducted June 4 – 9, 2014 and August 23, 2014 confirmed that that the American Burying Beetle, a federally endangered species, is not in the project area (Fresh Tracts 2014a, b). There are no state listed species in the project area (ODWC 2014).
Wetlands	Executive Order 11990 Protection of Wetlands; Director's Order 77-1: Wetland Protection	There are no wetlands in the project area.
Water Resources	Clean Water Act; NPS Director's Order 77: Natural Resource Protection	Rock Creek is a year-round stream that flows southwestward through the project area, and is replenished by springs, flowing wells, and storm runoff. Construction related activities would not affect the water quantity of Rock Creek. Construction related activities may noticeably and temporarily increase turbidity and water quality in the stream as a result of disturbing nearby soils; however, there is no construction occurring in the stream itself. There would be no long term impacts to water quality.
Air Quality	Clean Air Act; NPS Director's Order 77: Natural Resource Protection	Chickasaw NRA is designated as a Class II air quality area under the Clean Air Act. Construction related activities could result in localized, noticeable, temporary increases of vehicle exhaust, emissions, and fugitive dust. There would be no long term impacts to air quality.
Soundscapes	NPS Director's Order 47: Soundscape Preservation and Noise Management	Sounds in the project area are a mix of natural and man-made including those generated from wildlife, humans, vehicular traffic, moving water in Rock Creek, climate controls on buildings, and wind. Human-caused sounds would temporarily and noticeably increase during construction as a result of equipment, vehicular traffic, and construction crews. Long term changes to the soundscape would be minor, resulting from humans using the new bridge and trails.
Lightscapes	NPS Management Policies	Existing lighting in the project area includes shielded external lighting on the Chickasaw Cultural Center.

Topic	Law, Regulation, Policy	Affected Environment / Reason Dismissed
		The new bridge and trails do not include lighting, so there would be no change to the current conditions.
Wilderness	Wilderness Act, NPS Director's Order 41: Wilderness Stewardship	There is no wilderness in the project area.
Wild and Scenic Rivers	Wild and Scenic Rivers Act, NPS Director's Order 46: Wild and Scenic Rivers	There are no Wild and Scenic Rivers in the project area.
Paleontological Resources	NPS Director's Order 77: Natural Resource Protection	There are no known paleontological resources in the project area.
Historic Structures	National Historic Preservation Act; NPS Director's Order 28: Cultural Resources Management	There are two National Register eligible historic properties in the project area: Rock Creek Campground and the Platt Historic District, a National Historic Landmark. Effects to both of these historic properties are addressed under the topic "Cultural Landscapes" which is carried forward for further analysis.
Archeological Resources	National Historic Preservation Act; NPS Director's Order 28: Cultural Resources Management	Two cultural resource inventories conducted in Spring 2014 confirmed that no National Register eligible archeological resources exist in the project area (NPS 2014a, NPS 2014b).
Ethnographic Resources	National Historic Preservation Act; NPS Director's Order 28: Cultural Resources Management; NPS Director's Order 71B: Indian Sacred Sites	There are no ethnographic resources in the project area, as confirmed during Native American consultation efforts for this project.
Museum Collections	NPS Director's Order 24 Museum Collections Management; NPS Director's Order 28: Cultural Resources Management	The proposed project would not affect museum collections nor does the project have the potential to add objects to the collection.
Socioeconomics	NPS Management Policies	Without a connection between Chickasaw NRA and the Chickasaw Cultural Center, visitors must drive between these two areas. Construction related activities may temporarily, minimally boost the local economy by bringing workers to the area. In the long-term, by connecting Chickasaw NRA and the Chickasaw Cultural Center, the project may beneficially affect social and economic opportunities. With another means of access, visitors may more readily visit and use both areas.

Topic	Law, Regulation, Policy	Affected Environment / Reason Dismissed
Prime and Unique Farmlands	Farmland Protection Policy Act	There are no prime or unique farmlands in the project area.
Environmental Justice	Executive Order 12898 General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	Because the new bridge and trails would be available for use by all people regardless of race or income, and the construction workforces would not be hired based on race or income, the proposed action would not have disproportionate health or environmental effects on minorities or low-income populations.
Park Operations	NPS Management Policies	Currently, with no new bridge or trails in this area, maintenance activities are directed elsewhere. With the construction of these new amenities, park operations would minimally increase to include maintenance of the new trails. The bridge would be maintained by the Chickasaw Nation for the lifetime of the bridge.
Climate Change	NPS Management Policies	Although the planet is experiencing a warming trend, it would be speculative to predict localized changes in temperature, precipitation, or other weather changes, in part because there are many variables that are not fully understood and there may be variables not currently defined; therefore, the effects of future climate changes are not discussed further.

ALTERNATIVES

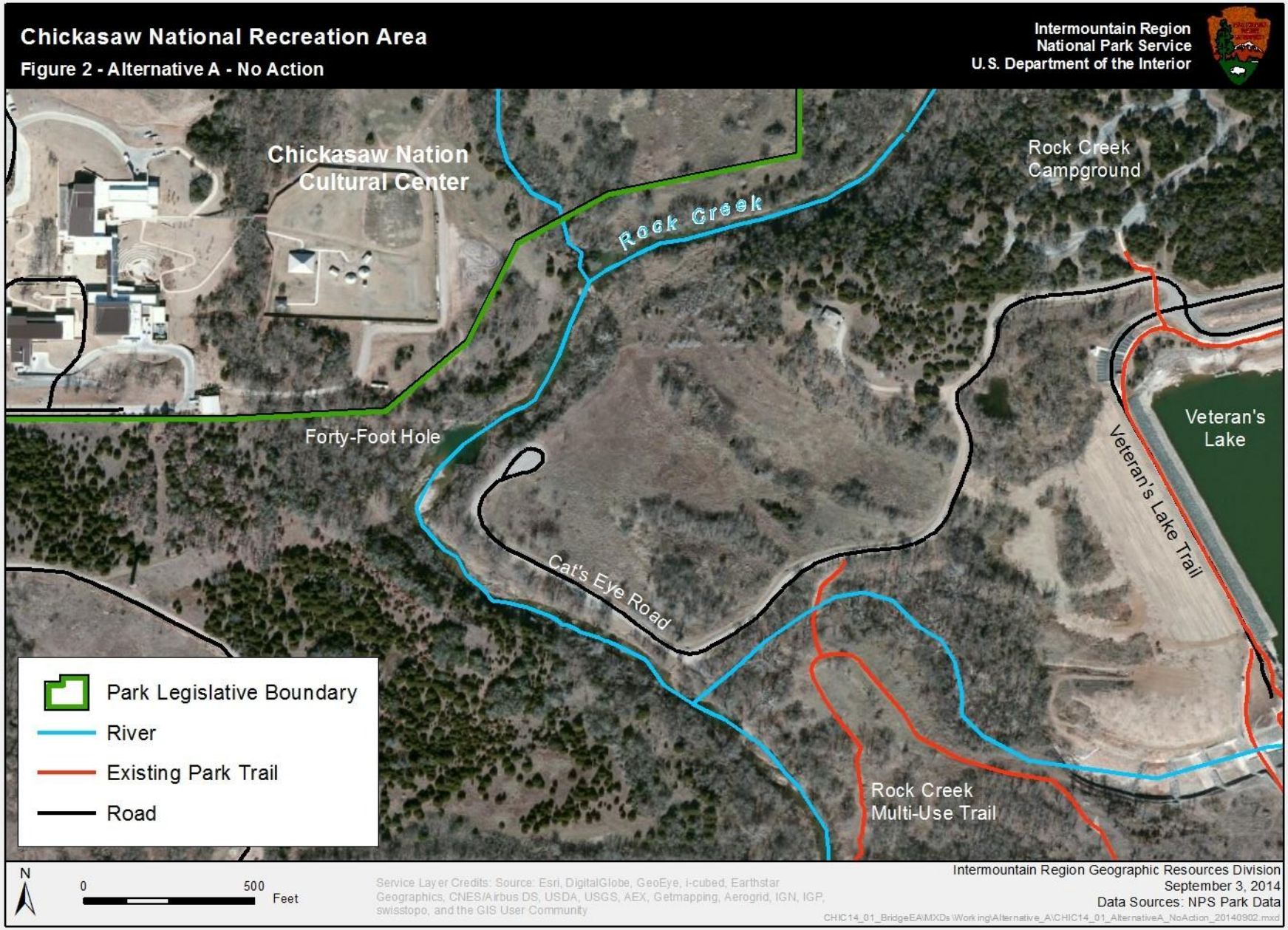
Alternatives Carried Forward

Alternative A – No Action (No New Bridge, Trails, or Parking)

The no action alternative describes the conditions that would continue to exist in the project area if nothing was implemented. This alternative provides a baseline for evaluating the changes and related environmental impacts that would occur under the action alternative (Figure 2).

Under the no action alternative, a physical connection between Chickasaw NRA and the Chickasaw Cultural Center would not be established or constructed. This means that no new bridge would be constructed that connects these two entities. Visitors would continue to enter Chickasaw NRA from 12th Street, Flower Park, Highway 177, the Perimeter Road entrance or hike park trails. Similarly, access to the Chickasaw Cultural Center would remain the same, from Cooper Memorial Road.

Trails in the project area would remain the same. The three proposed trails would not be constructed and the narrow section of Cat's Eye Road would not be widened. In addition, parking in the Cat's Eye Road area would not be improved (no new parking spaces added).


Chickasaw National Recreation Area
Figure 2 - Alternative A - No Action
Intermountain Region
National Park Service
U.S. Department of the Interior
Chickasaw Nation
Cultural Center
Rock Creek
Rock Creek
Campground
Forty-Foot Hole
Veteran's
Lake
Veteran's Lake Trail
Cat's Eye Road
Rock Creek
Multi-Use Trail
Park Legislative Boundary
River
Existing Park Trail
Road
N
0
500
Feet
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Intermountain Region Geographic Resources Division
September 3, 2014
Data Sources: NPS Park Data
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Alternative B – New Bridge, Three New Trails, Improved Parking

Alternative B consists of constructing a new bridge between Chickasaw NRA and the Chickasaw Cultural Center, three new trails, and improved parking in the Cat's Eye Road area (Figure 3).

New Bridge Location

The new bridge would cross over Rock Creek, just slightly north of the Cat's Eye Road cul-de-sac, at the southeast corner of the Chickasaw Cultural Center property. The bridge would be situated entirely on NPS property. The southeast end of the bridge would be located approximately 70 feet northeast of the end of Cat's Eye Road cul-de-sac while the northwest end would extend toward the Chickasaw Cultural Center.

New Bridge Design

Two types of bridge design are being considered, a truss bridge and a suspension bridge. Either bridge design would span approximately 235 feet across Rock Creek. Both designs take into account the fact that the east bank of Rock Creek is 2-3 feet lower than the west bank, and bridge would be level from end to end. An accessible walkway approach at each end of the bridge would need to be provided. Assuming the deck of the bridge is at the 100-year flood elevation near the abutments, then the difference in elevation between the existing Cat's Eye Road cul-de-sac parking area and bridge deck is anticipated to be less than 1 1/2 feet. The total area of disturbance for the new bridge (direct construction zone for the new bridge) is approximately 1.0 acre or less.

The low chord elevation of the bridge superstructure would be set at or above the highwater elevation, currently estimated to be at elevation 918. The bridge deck elevation would vary from 922 near the abutments to elevation 923.66 at midspan. Final profile would be established upon completion of the hydraulic analysis.

A steel truss bridge would be a traditional box style bridge or may include a slight arch along the top chord of the bridge. The concrete bridge deck would be 12 feet wide with a bridge width of approximately 14 feet. The entry points of the bridge would have ornamental portals up to a height 20 feet. The steel truss would run along the length of the bridge with a maximum height of 14 feet above the walking surface. The truss bridge would be fabricated off site in three 75-foot sections, which would be delivered to the proposed location, assembled on site and set in place by using two cranes, one on each side of the creek. Foundations would be poured on both sides of Rock Creek to the depth of bedrock approximately 15 to 18 feet below existing ground line. The bridge would be primarily constructed of steel and any decorative materials would consist of materials similar in texture and color to those found within the local area.

A suspension bridge would be constructed of a steel truss that is approximately 5 foot in depth or less and supported by vertical suspension cables that are approximately 23 feet on center. Larger diameter, curved suspension cables would be supported by a structural tower mast on each end. The top of the ornamental combined pedestrian and bicycle rail would be 54 inches above the deck and run the length of the bridge on both sides. Closely spaced horizontal metal angles would act as guardrails along both sides of the bridge. The height of the bridge walk to the top of the suspension cable support towers would be no greater than 30 feet. The concrete bridge deck would be 8 feet wide with a total bridge width of 12 feet. Fabrication of the proposed bridge would be similar to the truss bridge with fabrication off site in three 65 to 70 foot sections. Concrete abutments supported on drilled shafts approximately 54 inches in diameter would be constructed on each bank to support the truss and towers. Temporary towers may be placed near the stream bed for a short duration, at approximately 65 feet from each abutment, to facilitate final truss erection until the suspension cables are attached.

Quantities of materials and types of equipment described below are based on initial design concepts and may be slightly modified during final design to accommodate site specific requirements. However, these modifications would be minimal and would not change overall project impacts.

New Bridge Components

Abutments **–** Cast-in place concrete abutments would be constructed on site. The exact configuration would be determined by the span layout requirements, the weight of the bridge and anticipated live load of the bridge. These abutments would be set beyond the existing creek banks.

Drilled Shafts **–** The new bridge would be supported on deep foundations, which is anticipated to be concrete drilled shafts. The reinforced concrete drilled shafts would be approximately 54 inches in diameter socked into bedrock approximately 9 feet. The drilled shafts would be drilled and placed into creek banks. Efforts to contain sediment during installation of the drilled shafts would be incorporated during the construction phase. These deep foundations would support the concrete abutments at each end of the bridge and the anchor for the suspension cable.

Concrete Piers – Concrete piers would not be constructed in Rock Creek for either bridge design.

Deck – The bridge deck could be constructed of 7 inch cast in place concrete slab supported by the bridge truss system and metal deck forms or 7 inch precast prestressed deck panels supported by steel framing. Precast deck panels are anticipated for the suspension bridge alternative.

Rails - The bridge would have metal safety railings with a metal hand rail at 54 inches above the bridge deck for bicycle safety.

Security Gates - Each end of the bridge would have an integrated gate that can be closed and locked to discourage use during certain times.

Construction of Abutments – The abutments would be constructed beyond the location of the existing stream bank and would not be expected to require any temporary dewatering. Equipment would not be allowed in the stream. If any pumping of water is required it would be discharged to an upland site. Riprap would be placed at the new abutments to reduce the potential for stream flow erosion at the abutments. The riprap would likely be in the class 5 size category with stone diameters of 20 to 28 inches. Final riprap requirements would be based on hydraulic analysis of the stream at the bridge site. The riprap would be placed over a geotextile mat and a thinner layer of smaller sized riprap to securely set the larger stones. Tan colored limestone and smaller sized riprap would visually tie it into the historic character and aesthetics of the surrounding landscape and stone used on upstream face of Veterans Lake Dam.

Work in Rock Creek – Turbidity would occur during removal and installation of piles. Turbidity monitoring and limits would be conducted to meet any requirements stated in the Oklahoma Department of Environmental Quality (OKDEQ) 401 permit. The 401 permit has been acquired by the Park. In order to isolate turbidity, silt curtains or other means of separating the work zone from the creek would be utilized. Cranes would set up away from the creek bank and not be used in the creek channel.

Utilities – Light would not be used on this bridge to reduce night sky pollution. It is not desirable to attract people to this site at night.

Historic Considerations - The bridge is within the view shed of the Platt National Park National Historic District but would only be viewed from Bromide Hill as a background element. The bridge may be within the view shed of the upper section of Rock Creek Campground, but is not within the view shed of the portion of Rock Creek Campground that is eligible for the National Register of Historic Places.

Aesthetic Considerations – The new bridge, abutments and walkway approaches would be designed to reflect materials, colors and forms used both in the Platt Historic District and Veterans Lake areas of the park as well as the nearby Chickasaw Cultural Center, and thus would be compatible with both landscapes. The height of the bridge would be less than the nearby mature shade trees. The adjacent trees and grasses would be preserved to further blend the bridge, abutments and approach walkways into the natural landscape. Colors, textures and materials would be used as much as possible to soften and blend the bridge and build elements with the natural environment and setting.

New Bridge Uses

The bridge would be designed primarily for pedestrian and bicycle traffic. The bridge would be accessible for people with disabilities and follow the Architectural Barriers Act Accessible Standards intended for federal agencies. Horses would not be permitted on the bridge. Vehicular traffic would not be permitted; however, authorized limited security/maintenance vehicles would be able to use the bridge. The bridge security gates on both ends may be closed during Chickasaw Cultural Center off hours of operation, during maintenance, in emergency situations, etc. NPS would work with the Chickasaw Nation to determine an appropriate closure plan.

Design and construction of the bridge would be funded by the Chickasaw Nation. NPS and the Chickasaw Nation would prepare and enter into an Operations and Maintenance Agreement for the bridge, stating that NPS would own the bridge and the Chickasaw Nation would assume maintenance of the bridge. With proper maintenance, the bridge should last 75 to 100 years.

End-of-Bridge Kiosks

At either end of the bridge, a small interpretive kiosk would be constructed. When entering the Chickasaw Cultural Center by crossing the bridge from Chickasaw NRA, visitors would arrive at a welcome kiosk that would provide information and directions to the Cultural Center and be located on Cultural Center property. Likewise, when entering Chickasaw NRA by crossing the bridge from the Chickasaw Cultural Center, a welcome kiosk would provide information and directions about Chickasaw NRA features. There would be no kiosks on the bridge itself; however, some small-scale interpretative signage may be included. Signs would be placed in appropriate locations to indicate when one is entering either the Chickasaw Cultural Center or Chickasaw National Recreation Area.

Three New Trails

Alternative B includes the construction of three new trails within Chickasaw NRA. The intended use of these trails includes pedestrians and bicyclists. No motor vehicles would be permitted on these trails except for maintenance activities. No horses would be permitted on these new trails. All proposed trails would be accessible for people with disabilities and follow the Architectural Barriers Act Accessible Standards intended for federal agencies. Some minimal directional and interpretive signage or exhibits may be added along these trails. These trails provide linkages to create a more continuous trail network within Chickasaw NRA and greater access to the bridge that crosses over to the Chickasaw Cultural Center. The total length of these three trails is approximately 2,647 feet. The direct disturbance including cut and fill would

be about 42,000 square feet and the indirect disturbance would be approximately 10,000 square feet.

All three trails would have a compacted and stabilized aggregate surface (no pavement) and would be approximately 6 feet wide except for the Forty-Foot Hole trail which would be 3-6 feet and Trail 1 which would be 6-8 feet wide to allow access for maintenance and emergency vehicles. Some contouring of the landscape would be necessary but would be minimized to the extent possible. Three bridges with small concrete and stone abutment would be needed to cross small drainages. Retaining walls would be needed in certain locations to minimize cut and fill.

New trails shall be developed and constructed in accordance with appropriate NPS sustainable trail design principles and guidelines. This environmental assessment has considered and evaluated the cost of construction and life cycle maintenance costs of the path, prescribed a sustainable design for the construction of the path (as indicated in the following text), considered safety strategies to prevent or minimize user conflicts, evaluated methods of protecting natural and cultural resources, and integrated these trails with other transportation systems. NPS is not required to promulgate Special Regulations (NPS Bike Rule, 36 CFR 4.30) to authorize use of these trails by bicyclists because these trails are within a developed area of the park designated “Recreation” (NPS 2008).

Trail 1 would to be constructed as part of the bridge project. Trail 2 would likely be constructed as part of the bridge project or at a later time. Trail 3 would likely be constructed as part of a separately funded project.

Trail 1 - From Bridge West to Cat’s Eye Road Cul-de-sac and Northwest to the Chickasaw Cultural Center – From the southeastern end of the new bridge, a new trail would be constructed that connects to the cul-de-sac at the end of Cat’s Eye Road. The length of this trail would be approximately 180 feet. Total disturbed area would be approximately 3,600 square feet.

A sustainable trail in this location would be constructed of concrete and be 8 feet wide to match the bridge deck width. It will accommodate bicycle and pedestrian travel, stand up to erosive flood water velocities, and allow light weight vehicular access for bridge maintenance. The trail would be accessible and be no greater than 5% in grade. The adjacent slopes would be a combination rip-rapped and anchor mat along with native grasses to prevent erosion and undercutting of the concrete trail.

Trail 2 - Forty-Foot Hole – Currently, there is an eroded social trail that leads down to a popular swimming area. This trail would be formalized and rerouted as necessary, for safety and maintenance considerations. The length of this trail would be approximately 180 feet. The total disturbed area would be approximately 3200 square feet.

A sustainable trail in this location would involve a full bench cut into the stream bank and a trail tread constructed of concrete. A concrete trail surrounded by deep anchored native woody vegetation, would stand up to occasional high velocity flooding and be easy to clean after each flood. A switch back trail that is 3 to 5 feet wide and be no greater than 5% in grade would provide accessibility from the parking area to a stream side rest area.

Trail 3 - South From Bridge to Veteran’s Lake Trail and Parking Area – From the southeastern end of the new bridge, a new trail would be constructed that connects to the Multi-Use Trail and the accessible Veterans Lake Trail at the dam parking area. The length of this trail would be 2287 feet. Minor road improvements would be made where the trail crosses Cat’s Eye Road to increase safety and sightlines. Total disturbed area would be approximately 41,600 square feet.

A sustainable trail in this location would consist of a 6 feet wide compacted and stabilized aggregate tread and permit small equipment to gain access to occasionally add more aggregate or smooth the trail surface. One-half the trail would be constructed on relatively flat land and would involve adding 4 to 6 inches of fill and grading minor swales to direct water to existing drainages. The other one-half of the trail would be constructed on existing slopes that range from 4 to 20 percent. On these slopes a combination of full cut bench or half cut and half fill would be used. Drainage swales and culverts will be used to direct water to existing drainages. In some places, where upland areas are small, water will be conveyed over the surface of the trail. Native grasses would be re-established on any surrounding disturbed lands. The trail would allow the adjacent native plant and animal communities to thrive. The trail would go around larger trees and avoid woody thickets of trees where possible. Most of the trail slopes would be than 5%, but portions of the accessible trail may range from 8% to10% for short lengths. Where the trail is routed over an existing small pond dam, a small steel truss bridge, approximately 30 feet in length, would cross the dam's spillway. This bridge would be constructed of nickel-steel alloy (Corten) which is designed to rust to form a protective surface and never need painting. This prefabricated bridge would match four other prefabricated Corten bridges along nearby Veteran Lake Trail that only require occasional re-decking with treated wood.

Cat's Eye Road Parking Improvements

Approximately 5-8 new paved parking spaces would be added to the Cat's Eye Road cul-de-sac including one delineated handicap parking space. These new parking spaces would be provided for single-family vehicles, not for recreational vehicles or trailers. Minimal signage would be added to this area to help direct visitors to the amenities in the area and offer interpretation. Since Trail 1 would provide an accessible route from the bridge to the cul-de-sac parking area, Trails 2 and 3 would connect to the cul-de-sac as well. The total disturbed area for this parking lot would be approximately 2,500 square feet.

Staging, Stockpiling, and Disposal Areas

Staging and stockpiling areas would be needed for equipment and materials. Staging and stockpiling areas would be situated at the end of the Cat's Eye Road cul-de-sac, in the area to be improved for the new parking spaces and in the open native prairie field at the south end of the bridge. Another staging area would be at the northwestern end of the bridge on Chickasaw Cultural Center property. These two temporary construction areas for staging and stockpiling would be no greater 0.8 acre in size.

Materials from the construction not deemed beneficial to Chickasaw NRA would be removed and disposed of properly outside of the park boundaries. Any beneficial excess materials generated would be stored within existing designated storage (maintenance) areas within Chickasaw NRA park for later use.

Material Source

Approximately 10,825 cubic feet of material would be required to build up the east bank of Rock Creek around the abutment and along the extended accessible walkway approach. Approximately 4,300 cubic feet of material would be required to build up the west bank of Rock Creek around the abutment and extended accessible walkway approach. This approved fill material would come from a park approved weed free source outside of Chickasaw NRA. The fill material would likely be hauled in on Highway 177, then use Perimeter Road and Veterans to get to the Cat's Eye Road. All loads would be covered and no engine brakes would be used in or near developed areas and campgrounds.

Contractor Requirements

No housing at the job site would be allowed, though an office trailer is possible near the construction site. Contractor employees may lease park campsites at the public rates. All contractor employees would be required to attend and abide by Chickasaw NRA's orientation sessions and park regulations. These sessions focus on minimizing resource damage and human health and safety. The contractor would invite park staff and the park safety officer to weekly safety meetings.

Water Source and Water Disposal

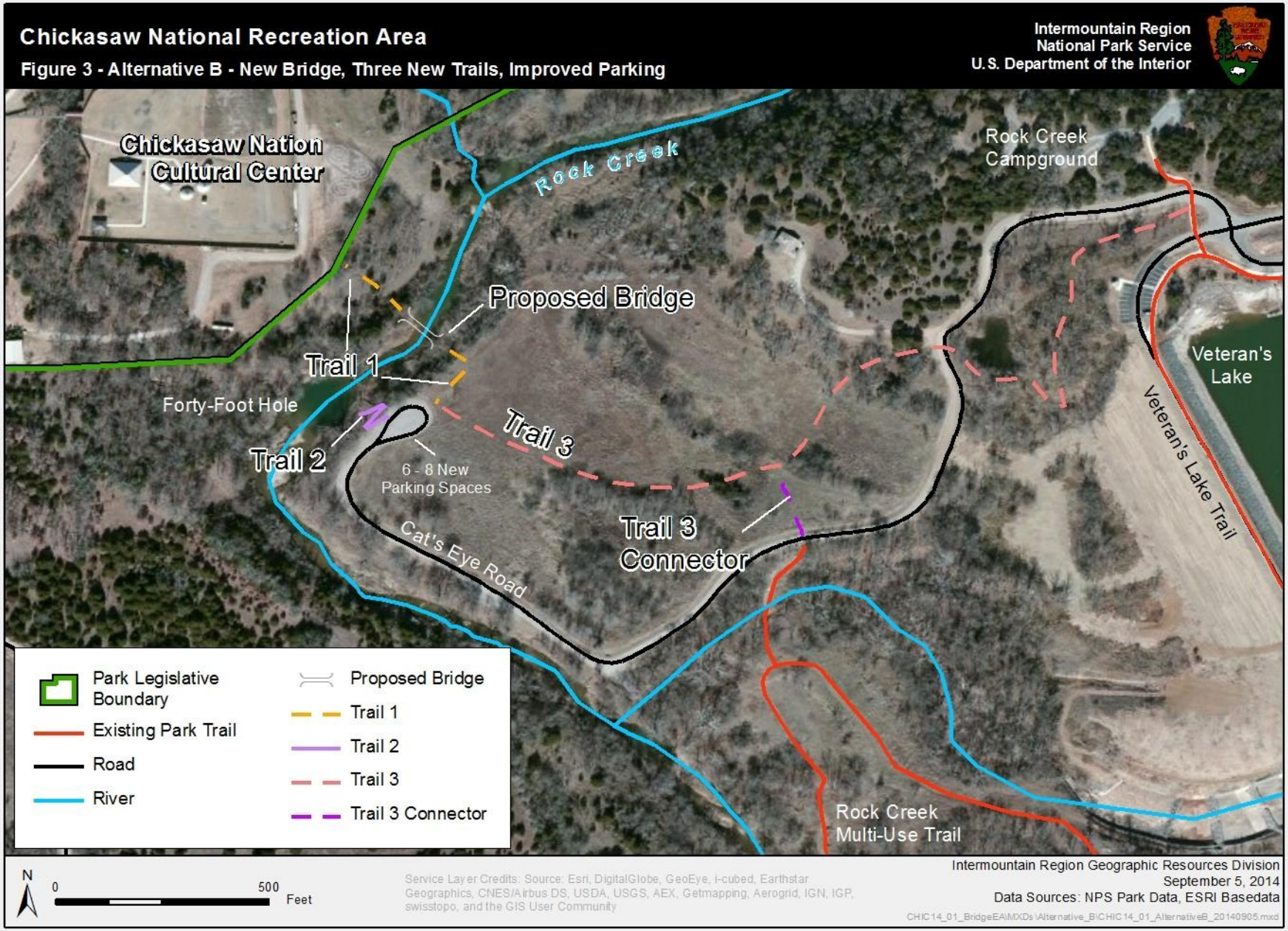
Water that would be used for dust control, compaction of base material, and incidental needs related to the construction would be drawn from nearby Veterans Lake itself. Approximately 25,000 gallons would be needed over the duration of the project. Daily water requirements are not expected to exceed about 500 gallons per day (enough to drop the 60 acre Veterans Lake level about 0.015 of an inch). Any water transport equipment used would be decontaminated prior to use. Water disposal from dewatering operations would be disposed of at the nearby prairie area south of the bridge. The existing stream bank would be maintained with no alterations or changes to existing hydrology of the lake.

Erosion Control

This project would utilize filter barriers and best management practices to protect existing water sources and maintain turbidity and sedimentation at the lowest practical level during construction activities. A stormwater pollution prevention plan and a water quality monitoring plan would be required before implementation of the project. Turbidity curtains would be set up within the staging areas and around any in-water work areas such as pier or abutment placement.

Schedule

The detailed design is scheduled to begin in summer of 2014 and would take approximately three to six to months to complete. The construction of the bridge and accessible walkway approaches would take approximately six to twelve months to complete. Night time work would not be allowed, but extended hours may be allowed on occasion. Any closures of nearby roads or trails would be advertised in advance. All required permits would be obtained prior to construction.


Chickasaw National Recreation Area
Figure 3 - Alternative B - New Bridge, Three New Trails, Improved Parking
Intermountain Region
National Park Service
U.S. Department of the Interior
Chickasaw Nation Cultural Center
Rock Creek
Rock Creek Campground
Proposed Bridge
Trail 1
Forty-Foot Hole
Trail 2
Trail 3
6 - 8 New Parking Spaces
Cat's Eye Road
Trail 3 Connector
Veteran's Lake
Veteran's Lake Trail
Rock Creek Multi-Use Trail
Park Legislative Boundary
Existing Park Trail
Road
River
Proposed Bridge
Trail 1
Trail 2
Trail 3
Trail 3 Connector
N
0
500
Feet
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Intermountain Region Geographic Resources Division
September 5, 2014
Data Sources: NPS Park Data, ESRI Basedata
CHIC14_01_BridgeEA\MXDs\Alternative_B\CHIC14_01_AlternativeB_20140905.mxd

Best Management Practices

The following best management practices would be implemented to minimize the degree and/or severity of adverse effects:

Floodplains and Water Resources

- Best management practices would be implemented to ensure no pollutants enter Rock Creek as a result of the project.
- Only biodegradable, vegetable-based hydraulic fluid would be used in excavators that may reach into Rock Creek.
- All fueling would occur more than 100 feet from any surface water in a location where a fuel spill would not be able to enter the water.
- To minimize possible petrochemical leaks from construction equipment, the contractor would regularly monitor and check construction equipment to identify and repair any leaks.
- A fuel/lubricant spill absorption kit would be in place to address potential land and water spills and leaks.
- Stormwater runoff control measures, including silt capture techniques such as silt fences would be employed to improve quality of runoff and prevent degradation of the stream.
- Design and construction measures would include development of surface water control features to minimize post-construction run-off.
- Equipment would not be allowed to operate within the stream. If any pumping of water is required, it would be discharged to an upland site.
- Fuel and oil services for construction machinery would be provided in a designated area away from Rock Creek when feasible. This would include secondary containment for all fuel storage tanks and on-site availability of a spill kit.
- Sediment curtains would be used when needed to contain sediment to the immediate work zone.
- Design would be completed in such a way as to leave the creek bank and channel in its present configuration with no change. The bridge span would be sufficiently long to reduce floodplain impacts.
- In-water work would be completed during low flow periods and equipment would not be operated (driven) below the water surface elevation, but would need to reach into the water.
- Staging and stockpiling areas would be situated outside of the floodplain.
- Based on NPS guidelines, no mitigation is required for extreme or dam-break flood events. However, preparation for such disasters should be considered due to the risk of human life. To reduce the severity of impact from severe flood events, Chickasaw NRA and the Chickasaw Cultural Center would communicate immediately.

Wildlife

- Construction personnel would be orientated on appropriate behavior in the presence of wildlife and on proper storage and handling of food, garbage and other attractants.
- The bridge site and staging areas would be monitored throughout the duration of the project.

- Construction vehicles with heavy loads within the park boundary at night would be limited to speeds 10 mph below the posted speed limit to avoid collisions with wildlife, and/or would be escorted through the park.

American Burying Beetle

The American Burying Beetle was not found in the project area during a June 2014 survey; however, if needed, the following mitigation measures would be implemented:

- To decrease habitat loss, clearing of temporary work areas would be minimized and small equipment or hand cutting techniques would be used that leave the root zone intact. In general, using hand cutting techniques is likely to result in a smaller area of impact and reduce soil compaction relative to heavy equipment.
- Construction requiring artificial lighting would be minimized. In situations where night construction work is necessary, direct light to the work area would be shielded and light would be prevented from projecting upwards, thus minimizing the potential to attract insects, including American Burying Beetle.
- In areas where American Burying Beetles are present (determined by valid surveys) or where American Burying Beetle presence is assumed (when no American Burying Beetle surveys were completed), surface soils would be returned to approximate pre-construction conditions.
- Areas in native range would be restored using approved native seed mixes developed for the applicable ecozone.
- Prior to the topsoil replacement, the impacted area would be ripped (i.e., mechanically turn soil with a plow or ripping device). Rip and disk would occur at a time when the soil is dry enough for normal tillage operations to occur on undisturbed farmlands adjacent to the areas to be ripped. This soil de-compaction treatment should be beneficial to the American Burying Beetle by reducing the extent of soil compaction.
- All workers operating in the project area would be educated about American Burying Beetle habitat, biology, reasons for American Burying Beetle decline, and the responsibility of all workers to protect the American Burying Beetle. All workers would be required to report any American Burying Beetle sightings to the project manager or environmental inspector, remove all food wastes from the area each day, and prohibit dogs or cats on the area. Each worker would be provided with a full color Endangered Species Card with a picture of the American Burying Beetle and all information summarized on the card before they are allowed to conduct soil disturbing activities. Signs would be posted at all access points to the project area highlighting the areas as American Burying Beetle habitat and reminding workers to follow special restrictions in the area.
- Appropriate erosion controls would be installed, including such items as straw bales, biologs, silt fence, and similar materials.
- Pollution Prevention Requirements would be implemented as required in section 3.3.3 of the Oklahoma Department of Environmental Quality General Permit OKR10 for Storm Water Discharges. Additionally, all equipment would be fueled outside of American Burying Beetle habitat (that is, outside of undisturbed native vegetation) and all fuel and motor vehicle oil stored outside of American Burying Beetle habitat.

Vegetation

- Disturbance to vegetation would be avoided as much as possible and contained to as small a footprint as possible while meeting project objectives.

- Non-native invasive plant infestations near the disturbed areas would continue to be treated on a yearly basis, with emphasis on these areas for a minimum of three years following project completion.
- Construction equipment would be cleaned before entering the park to minimize the transportation of exotic seeds to the site. All equipment entering the park would be inspected and may be required to be pressure washed to remove foreign soil, vegetation, and other materials that may contain non- native seeds or vegetation.
- Revegetation and recontouring of disturbed areas would take place following construction, and would be designed to minimize the visual intrusions. Revegetation efforts would strive to reconstruct the natural spacing, abundance, and diversity of native plant species using native species. All disturbed areas would be restored as nearly as possible to pre-construction conditions shortly after construction activities are completed.
- Because disturbed soils are susceptible to erosion until revegetation takes place, standard erosion control measures such as the use of silt fences would be used to minimize any potential soil erosion.
- No more than 100 trees that are 2-6 inch diameter, 50 trees that are 6-12 inch diameter and 20 trees 12-36 inch diameter may be removed. Some of these are dead, wildlife habitat trees, that would be removed to eliminate hazards next to the trail. Other existing vegetation at the site would not be disturbed to the extent possible.

Soils

- Disturbance to soils would be avoided as much as possible and contained to as small a footprint as possible while meeting project objectives.
- Erosion control measures that provide for soil stability and prevent movement of soils into waterways would be implemented.
- Any topsoil temporarily disturbed during construction would be aerated and replanted with native vegetation and mulched with native hay to reduce compaction and prevent erosion.
- Any disturbed top soil would be salvaged, stored, and used to restore the area.
- To minimize the amount of ground disturbance, staging and stockpiling areas would be placed on as much previously disturbed land as possible. All staging and stockpiling areas would be returned to pre-construction conditions following construction.

Historic Structures and Cultural Landscapes

- A collaborative team of NPS and Chickasaw Nation Staff, and others as appropriate, would meet regularly to ensure the bridge design is compatible with the natural setting, the Platt Historic District, other historic properties in the area, the Chickasaw Cultural Center, and NPS design standards. Elements of scale, color, texture, non-reflectivity, and other design components would be sensitive to the surrounding features and landscape. Visual impacts to nearby historic properties would be minimized to the extent possible. The bridge would be less than 35-feet tall, or less than the height of the surrounding trees, to minimize visual effects.
- Should construction unearth previously undiscovered cultural resources, work would be stopped in the area of any discovery and the NRA would consult with the state historic preservation officer and the Advisory Council on Historic Preservation, 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.

- The National Park Service would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting artifacts or intentionally damaging paleontological materials, archeological sites, or historic properties. Contractors and subcontractors would also be instructed on procedures to follow in case previously unknown paleontological or archeological resources are uncovered during construction.

Visitor Use and Experience

- To minimize the potential for impacts to park visitors, variations on construction timing would be considered. One option includes conducting the majority of the work in the off-season (winter) or shoulder seasons. Another option includes implementing daily construction activity curfews such as not operating construction equipment between the hours of 6 PM to 7 AM in summer (May – September), and 6 PM to 8 AM in the winter (October – April). Extended hours may be considered and would to be approved by both NPS and the Chickasaw Nation.
- Signs would be posted and press releases done to inform visitors about construction and traffic delays.
- Speed limits through construction areas would be reduced and posted.
- Construction zones would be identified and fenced with construction tape, snow fencing, or some similar material prior to any construction activity. The fencing would define the construction zone and confine activity to the minimum area required for construction. All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the construction zone as defined by the construction zone fencing.

Air Quality and Soundscapes

- Fugitive dust generated by construction would be controlled by spraying water on the construction site and if needed on Cat's Eye Road.
- All motor vehicles and equipment would have mufflers conforming to original manufacturer specifications that are in good working order and are in constant operation to prevent excessive or unusual noise, fumes, or smoke.
- To reduce noise and emissions, construction equipment would not be permitted to idle for long periods of time.
- Equipment would not be allowed to idle longer than 15 minutes when not in use. All haul loads would be tarped if required and no engine brakes would be used in or near developed areas and campgrounds.

Night Skies

- Work lights would be shielded to direct the light downward and minimize the amount of upward light scatter.

Park Operations

- The NPS would develop emergency response protocols for implementation of the project. Construction activities would be conducted in accordance with established safety protocols.

- Employees and construction crews would be required to park their vehicles in established staging areas.
- Construction workers and supervisors would be informed about the special sensitivity of NRA's values, regulations, and appropriate housekeeping.
- According to 2006 *Management Policies*, NPS would strive to construct facilities with sustainable designs and systems to minimize potential environmental impacts. Development would not compete with or dominate the NRA's features, or interfere with natural processes, such as the seasonal migration of wildlife or hydrologic activity associated with wetlands. To the extent possible, the design and management of facilities would emphasize environmental sensitivity in construction, use of nontoxic materials, resource conservation, recycling, and integration of visitors with natural and cultural settings. NPS also reduces energy costs, eliminates waste, and conserves energy resources by using energy-efficient and cost-effective technology. Energy efficiency is incorporated into the decision-making process during the design and acquisition of buildings, facilities, and transportation systems that emphasize the use of renewable energy sources.

Alternatives Considered and Dismissed

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

Bridge Location Options

Several locations for the new bridge were considered. 1) A bridge downstream from the proposed location, adjoining the Cat's Eye Road cul-de-sac, was considered and ultimately dismissed because it would have adverse environmental effects on the Forty-Foot Hole swimming area, and it would be farther away from the Chickasaw Cultural Center; 2) Several locations upstream from the proposed location were considered and ultimately dismissed for being too far away from the Chickasaw Cultural Center, thereby not meeting the purpose and need to make a safe and convenient connection. Locations upstream would also have greater visual adverse effects on the Platt Historic District and could impact a nearby natural gas pipeline. Other locations upstream would require a longer bridge to span the creek channel.

Bridge Design Options

1) More modest/smaller bridges crossing at the creek level were considered but dismissed due to the potential for flooding; 2) Larger bridge designs were considered, but ultimately dismissed for their visual impact on the Platt Historic District and possible safety hazards; 3) Bridges that would require piers in the creek were dismissed for having too great an environmental impact on the stream, water quality, and fisheries; 4) Providing transport services to make the connection between Chickasaw NRA and Chickasaw Nation such as a ferry, a boat, or horses to carry people across Rock Creek was considered and ultimately dismissed for having too great an impact on park operations and increased safety concerns or being impractical; 5) Large stepping stones within the creek-bed similar to another historical water crossing constructed by Civilian Conservation Corps within the park was considered and dismissed for increase safety concerns and flooding.

Bridge Use Options

1) A bridge that would accommodate vehicles was considered and ultimately dismissed because it would not be desirable to introduce vehicular traffic onto this part of the Cultural Center campus. Safety was also a consideration in dismissing a bridge that would accommodate vehicles because safety concerns increase when vehicles are introduced. 2) A pedestrian only bridge was considered (no bicycles, horses, or vehicles); however, this did not

meet the purpose and need of the project to enhance and interconnect visitor use activities in this area.

Trail Options

Several locations for new trails were considered. 1) New trails within or adjacent to the Platt Historic District were considered and dismissed for having too great of an environmental impact resulting from introducing new elements into the historic district. (this was dismissed because it was felt that this would delay project too much and that this should be pursued as a separate stand along project, and to give it more in depth consideration) 2) Trails on the north side of Rock Creek were considered, but were dismissed for having too much environmental impact. 3) Additional trails in other areas of Chickasaw NRA were considered and dismissed because they were outside of the geographic scope of this project which is to enhance visitor features in the more-immediate area. 4) Equestrian use was considered on the new trails and ultimately dismissed for having too great of an environmental impact and for substantially greater maintenance, and incompatibility with the Cultural Center campus.

Cat's Eye Road Parking Options

A few options for different parking lot sizes, locations, and configurations were considered. 1) A larger parking lot, with more parking spaces, or multiple small lots, or recreational vehicles were considered and dismissed for causing too much environmental impact to the soils and vegetation; 2) A smaller lot, with fewer parking spaces, was considered and dismissed for not meeting the visitor use needs of the area; 3) Constructing a parking area adjacent to the either end of the bridge was considered and dismissed for having too great an environmental impact on soils, vegetation, and possibly water resources; 4) Expanding the width of the existing cul-de-sac and introducing parallel parking was considered, but dismissed for too great and environmental impact on soils and vegetation and for increased safety concerns related to parallel parking around a cul-de-sac.

Alternative Summaries

Table 2 summarizes the major components of Alternatives A and B, and compares the ability of these alternatives to meet the project objectives (the objectives for this project are identified in the *Purpose and Need* chapter). As shown in the following table, Alternative B meets each of the objectives identified for this project, while the No Action Alternative does not meet all of the objectives.

Table 2 – Summary of Alternatives and How Each Alternative Meets Project Objectives

Alternative Elements	Alternative A – No Action	Alternative B – New Bridge, Three New Trails, Improved Parking
New Bridge	No new bridge would be constructed.	A new bridge connecting Chickasaw NRA and the Chickasaw National Cultural Center would be constructed. The bridge would be used for pedestrians, bicyclists, and limited emergency/ maintenance vehicles. The bridge would be designed to respect the existing and historic settings.
New Trails	No new trails would be constructed.	Three new trails in the project area would be constructed; 1) accessible trails at each end of the bridge 2) from the cul-de-sac to Forty-Foot Hole 3) from the cul-de-sac to the Veteran's Lake trail and parking area
Improved Parking	No additional parking would be added Cat's Eye Road area.	A new parking area, with 5-8 parking spaces for single-family vehicles, would be added around the Cat's Eye Road cul-de-sac. This new parking would not accommodate recreational vehicles.
Project Objectives	**Meets Project Objectives?**	**Meets Project Objectives?**
Provide safe and convenient access between the Chickasaw Cultural Center and Chickasaw NRA	No. No access or connection would be made between Chickasaw NRA and the Chickasaw Cultural Center. Visitors would continue to drive to each of these entities.	Yes. A new bridge would be constructed in Chickasaw National Recreation Area, directly across the Rock Creek from the Chickasaw National Cultural Center, thereby connecting these two entities.
Enhance and improve visitor opportunities in the project area;	No. With no new trails, there would be no additional visitor opportunities developed in this area.	Yes. A bridge, three new trails, and parking improvements enhance and improve visitor opportunities.
Improve parking and visitor safety in the Cat's Eye Road area	No. The existing parking would not be modified. Visitors would continue to park along the edges of the road and not in designated spaces.	Yes. Additional designated parking spaces would improve visitor safety and convenience in this area.
Identify sustainable designs that minimize impacts to park resources in accordance with NPS regulations and policies and is consistent with Chickasaw Nation regulations and policies.	Yes. With no new bridge, trails, or parking, impacts to park resources would be reduced.	Yes. Designs for the new bridge, trails, and parking area minimize impacts to park resources to the extent possible and employ green building practices. The location, appearance, materials, construction techniques, and all other aspects of the design of these features were considered and modified to reduce impact to park resources.

Table 3 summarizes the anticipated environmental impacts for Alternatives A and B. Only those impact topics that have been carried forward for further analysis are included in this table. The *Environmental Consequences* chapter provides a more detailed explanation of these impacts. All impacts would be less than significant.

Table 3 – Environmental Impact Summary by Alternative

Impact Topic	Alternative A – No Action	Alternative B – New Bridge, Three New Trails, Improved Parking
Geology and Soils	With no new construction activities, there would be no new effect to geology and soils. There would be continued erosion from social trailing in the area of Forty-Foot Hole.	Construction activities would adversely affect soils in the project area as a result of grading, compacting, paving over soils, removing soils, and removing vegetation. This alternative would disturb a total of approximately 47,000square feet of soils.
Vegetation	With no new construction activities, there would be no new effect to vegetation. There would be continued trampling of vegetation from social trailing in the area of Forty-Foot Hole and from parking undesignated areas at the end Cat's Eye Road.	Construction activities would adversely affect vegetation in the project area as a result of trampling, permanent vegetation loss, and the increased potential for non-native weed species. This alternative would result in the permanent loss of approximately 15,880 square feet of vegetation.
Floodplains	With no new construction activities, there would be no new effect to floodplains. There would be continued erosion of soils and possible sedimentation into Rock Creek from social trailing in the area of the Forty-Foot Hole.	Construction related activities would adversely affect floodplains as a result of increased sedimentation into Rock Creek. Long-term adverse effects would result from placing permanent structures (bridge, three trails, parking lot) within the floodplain of Rock Creek.
Cultural Landscapes	With no new construction activities, the two National Register eligible historic properties in project area (Platt Historic District and Rock Creek Campground) would not be affected.	There would be no adverse physical effects to the two historic properties situated within the project area; the Platt Historic District (National Historic Landmark) and the (Rock Creek Campground. The bridge and trails would not be visible from Rock Creek Campground, so there would be no impact to this historic property. The bridge and portions of the trails would be permanent, distant features within the viewshed of the Platt Historic District, thereby having an adverse effect to this cultural landscape.
Visitor Use and Experience	No new bridge, trails, or parking improvements would be constructed which would result in the visitor use and experience in the area remaining the same. Visitors would continue to drive between Chickasaw NRA and Chickasaw Cultural Center; to use already existing trails and social trails; and to park in undesignated areas at the end of Cat's Eye Road.	Construction activities would cause temporary adverse effects on visitor use and experience from increased noise, decreased air quality (dust and fumes), and traffic disruptions. In the long term, construction of a new bridge would create a beneficial connection between the park and the Chickasaw Cultural Center. Introducing additional trails in the area, as well as improving the parking at Cat's Eye Road would also benefit visitor use and

Impact Topic	Alternative A – No Action	Alternative B – New Bridge, Three New Trails, Improved Parking
		experience. For traditional users of Forty-Foot Hole, long term adverse effects may result from placing a bridge in the viewshed and increasing visitor use of this general area.

Environmentally Preferable Alternative

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

Overall Alternative A (No Action) is the environmentally preferable alternative because there would be no activities that would disturb elements of the biological and physical environment. With no new construction of a bridge, trails, and parking, this alternative best protects, preserves, and enhances historical, cultural, and natural resources. Existing conditions would be maintained and no new adverse effects to the environment would occur. This alternative would not involve new construction or any other development that could disturb existing natural and cultural resources.

Alternative B (New Bridge, Three New Trails, Improved Parking) is not the environmentally preferable alternative because it would result in disturbances and adverse effects to natural and cultural resources. Implementation of Alternative B includes construction which results in impacts to the environment that are both temporary and permanent in nature, and mostly localized to the project area. Therefore, when compared to Alternative A, Alternative B is not the environmentally preferable alternative because of the resultant impacts to natural and cultural resources from construction activities.

Preferred Alternative

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

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment (existing setting or baseline conditions) and analyzes the potential environmental consequences (impacts or effects) that would occur as a result of implementing the proposed project. Direct, indirect, and cumulative effects are analyzed for each resource topic carried forward. Impacts are analyzed based on whether they are significant or not significant, which requires considerations of impact type, context, duration, and intensity:

- **Type** describes the classification of the impact as either beneficial or adverse, direct or indirect:
  - *Beneficial*: A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
  - *Adverse*: A change that moves the resource away from a desired condition or detracts from its appearance or condition.
  - *Direct*: An effect that is caused by an action and occurs in the same time and place.
  - *Indirect*: An effect that is caused by an action but is later in time or farther removed in distance, but is still reasonably foreseeable.
- **Context** describes the area or location in which the impact would occur. Effects may be site-specific, local, regional, or even broader.
- **Duration** describes the length of time an effect would occur, either short-term or long-term:
  - *Short-term* impacts generally last only during construction, and the resources resume their pre-construction conditions following construction.
  - *Long-term* impacts last beyond the construction period, and the resources may not resume their pre-construction conditions for a longer period of time following construction.
- **Intensity** describes the degree, level, or strength of an impact. For this analysis, intensity has been categorized into negligible, minor, moderate, and major. Because definitions of intensity vary by resource topic, intensity definitions are provided separately for each impact topic analyzed in this EA.

Cumulative Impact Scenario

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

Cumulative impacts were determined by combining the impacts of the preferred alternative with other past, present, and reasonably foreseeable future actions. Therefore, it is necessary to identify other past, ongoing or reasonably foreseeable future projects at Chickasaw NRA and, if applicable, the surrounding region. Because the scope of this project is relatively small, the geographic and temporal scope of the cumulative analysis is similarly small. The geographic scope for this analysis includes actions mostly within Chickasaw NRA's boundaries and the construction of the nearby Chickasaw Cultural Center, while the temporal scope includes

projects within a range of approximately ten years. Given this, the following projects were identified for the purpose of conducting the cumulative effects analysis, listed from past to future:

- North Shore Road realigned and repaved (2001)
- Four universally accessible comfort stations constructed along the north shore of Veterans Lake (2009)
- Construct Maintenance Building for equipment storage (2009)
- Install Radio Tower at Buckhorn Maintenance Area (2009)
- Replace Road Signs throughout Chickasaw NRA (2009)
- Pave Veterans Lake Trail along north shore of Veterans Lake (2010)
- Bureau of Reclamation dam safety project for Veterans Lake dam. Repaired and cleaned the spillway and spillway crest, removed dense vegetation covering both the upstream and downstream face of the dam, added more earth fill to the downstream dam face, added a new rip-rap layer to the upstream dam face, established sod cover on the downstream dam face and adjacent spoil areas, removed the historic stone flumes, and installed seepage-control measures. (2010)
- Construct Chickasaw Cultural Center (2010)
- Reduce fuel loads (vegetation clearing) south of Veterans Lake (2010-2011)
- Cedar removal and controlled burns in areas of the Platt Historic District (2010-2011)
- Painting and preservation work on various historic and non-historic structures (past, current, future)
- Prescribed burning and vegetation thinning (past, current, future)

Geology and Soils

Affected Environment

According to NPS's 2006 Management Policies, NPS will preserve and protect geologic resources and features from adverse effects of human activity, while allowing natural processes to continue (NPS 2006). These policies also state that NPS will strive to understand and preserve the soil resources of park units and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil, or its contamination of other resources.

Geology

The principal rock unit exposed in Chickasaw NRA is the Vanoss Formation of Late Pennsylvanian age. The Vanoss Formation consists of an upper shale facies and a lower limestone conglomerate facies. The shale facies contains shale and sandstone beds and lentils. The limestone conglomerate facies consists mainly of tightly cemented, well-rounded to subangular limestone and dolomite pebbles, cobbles, and small boulders, along with some clasts of sandstone, siltstone, shale, chert, granite, and gneiss. The contact between the two facies is gradational. Both the limestone and shale facies of the Vanoss Formation are present in the area of the proposed bridge and trails. Along Rock Creek, alluvium and colluvium of Quaternary age overly the Vanoss Formation. The alluvium and colluvium consist of sand, silt, clay, and gravel. Thickness of these unconsolidated deposits ranges from about 3 to 50 feet (Blome 2013).

Soils

Chickasaw NRA was mapped as part of the soil survey for Murray County by the Soil Conservation Service (SCS 1984). Three general soil types are present Chickasaw NRA: Garvin-Elandco soils, Kiti-rock outcrop-Rayford soils, and Chigley-Travertine- Naru soils. Garvin-Elandco soils are found along the floodplain of Rock Creek and Guy Sandy Creek. Kiti-rock outcrop-Rayford soils make up much of the Platt Historic District and the uplands adjacent to Rock Creek, including the Veterans Lake area. Chigley-Travertine-Naru soils are found surrounding Lake of the Arbuckles, which is outside of the project area.

Garvin-Elandco Soils - The proposed bridge, trails, and parking improvements are situated mostly in Garvin-Elandco soils. Elandco soils make up about 30 percent of the map unit. Typically, the surface layer is brown silt loam about 10 inches thick. The next layer is dark grayish brown silty clay loam to a depth of about 23 inches. The next layer is brown silty clay loam to a depth of about 34 inches. The underlying material is dark grayish brown silty clay loam that has thin strata of silt loam to a depth of about 75 inches. The Elandco soils are high in natural fertility and organic matter content. The surface layer is slightly acid to mildly alkaline, and the soil is mildly alkaline to moderately alkaline below. The rate of water movement through the soil is moderate, and the available water capacity is high. The root zone is deep and is favorable for root growth. These soils have low potential for most urban uses. Flooding is the main limitation that restricts their use for septic tank absorption fields, sanitary landfills, dwellings, small commercial buildings, and roads and streets. This limitation is difficult and expensive to overcome.

Kiti-Rock Outcrop-Rayford Soils – The trail from the eastern edge of the new bridge to the Veterans Lake parking area may lie in Kiti-rock outcrop-Rayford soils which are gravelly or cobbly, shallow and very shallow, very gently sloping to steep, well-drained soils that formed from colluvium and residual materials from limestone bedrock. They are found on side slopes and ridgetops. Most of the soils in Chickasaw NRA have limitations for building and recreational development. The Kiti-rock outcrop-Rayford soils have restrictions due to the depth to rock, surface stones, rock outcrops, and high shrink-swell potential.

Many of the soils in Chickasaw NRA have been disturbed and altered. The causes of these changes include changes in land management; cultivation; grazing; and the construction of roads, recreation facilities, and other structures. Natural and human-caused soil erosion also has affected the area soils. Soil erosion has occurred near Veterans Lake along unpaved social trails and temporary disturbances associated with maintenance or construction projects. Similarly, soils have been disturbed from the social trail leading to Forty-Foot Hole and from those who have parked their vehicles outside of designated parking areas along the Cat's Eye Road.

Impacts of Alternative A – No Action

No disturbance to geology or soil resources would occur because Alternative A does not include any construction related activities, excavation, or ground disturbance. Some erosion would continue to occur at the existing social trail leading down to Forty-Foot Hole. Impacts to geology and soils under Alternative A would be less than significant.

Cumulative Effects – Past ground disturbing activities such as realigning and repaving the North Shore Road; paving Veterans Lake Trail; development of the Chickasaw Cultural Center; and constructing comfort stations, a maintenance building, a radio tower, road signs, and other structures, have impacted soil resources from excavation, erosion, compacting and/or losses in soil productivity. Past, current, and future prescribed burning and thinning causes temporary increases in soil erosion, but long-term effects would be beneficial by reducing the potential for

wildfire which would possibly have even greater impacts on soil resources from the increased potential for erosion. The BOR's dam safety project resulted in temporary disturbances to the rock and soils on the dam faces. Overall, these activities have disturbed the geologic and soil resources in the area to a less than significant degree. Because Alternative A results in little to no geology or soil disturbance, it would not incrementally add to the overall adverse, less than significant cumulative effect to geology and soil resources.

Impacts of Alternative B (Preferred) – New Bridge, Three New Trails, Improved Parking

Construction activities under Alternative B would adversely affect soils in the project area as a result of grading, compacting, paving over soils, removing soils, and removing vegetation. The total area of new soil disturbance would be approximately 1.2 acres. This alternative would result mostly in the physical disturbance of soils, while effects to soil chemistry and composition are not expected. This alternative also results in soil compaction, which increases erosion potential and possible increases in sedimentation in nearby drainages. Adverse impacts to geology would result from placing pilings or bridge abutments in bedrock. Best management practices including planting vegetation in disturbed areas after construction and spraying the area with water to minimize dust during construction are expected to keep the effects to soils minimal. In addition, following the work, topsoil would be returned to the area, revegetated, and monitored for invasion by non-native species. In general, this alternative would primarily result in short- and long-term, adverse, direct, localized, less than significant, impacts to soil resources as a result of construction activities and long term use of these new features. Construction of the three designated trails and parking improvements also has a beneficial effect on soils in that it reduces other social trails that currently generate increased erosion and reduces people parking in undesignated areas and disturbing those soils.

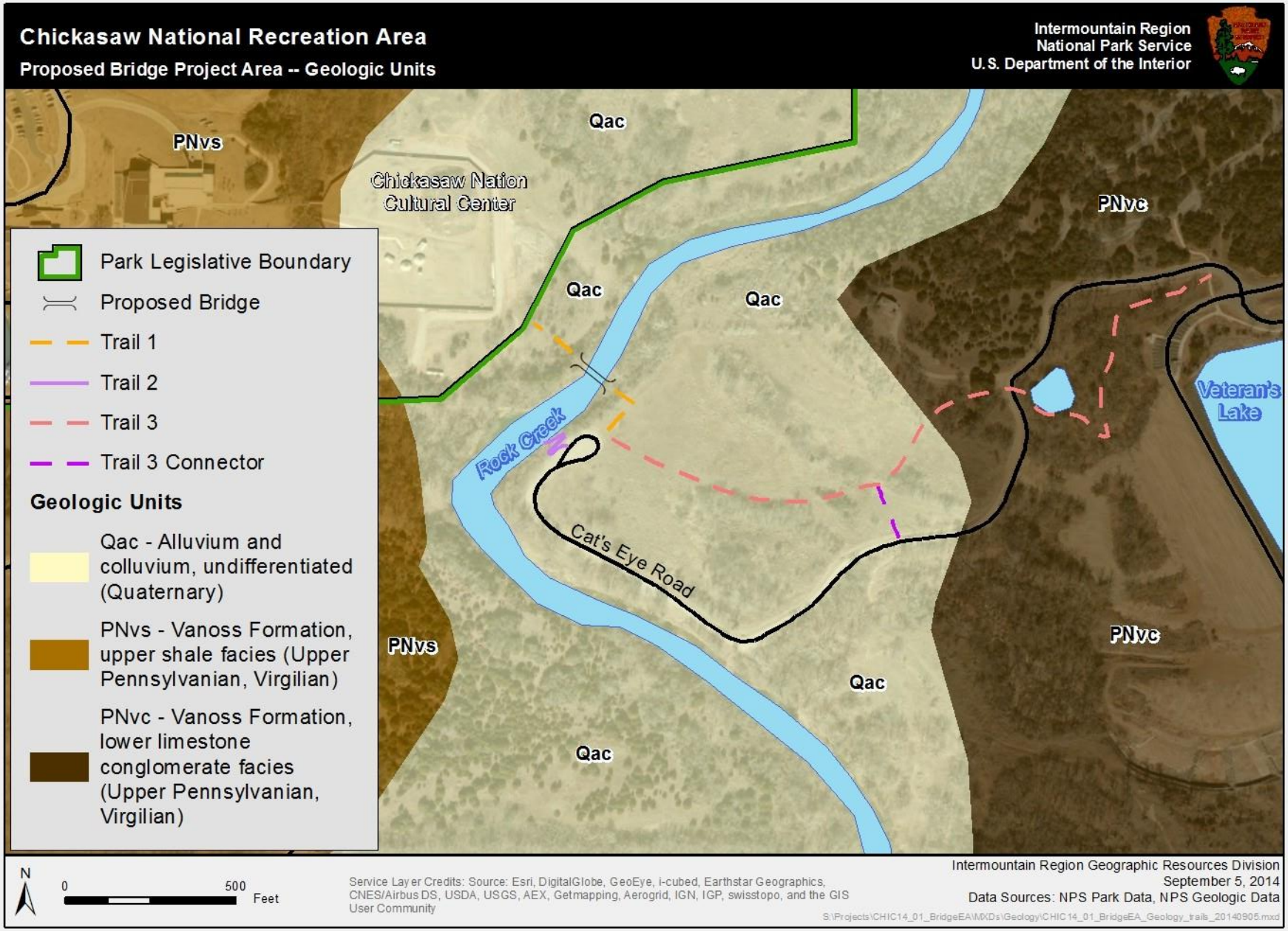
New Bridge - Under Alternative B, construction of a new bridge would result in the physical disturbance of less than 1.0 acre of soils. This disturbance includes installing new abutments for the bridge, which displaces soil in the immediate area. This soil would be retained and reused for fill needed to build the accessible entrance walkway on both ends of the bridge. Adjacent to the new bridge, the topography would be graded and sloped to create accessible walkway entrances to the bridge, which would physically disturb soils. The area leading up to the bridge would be compacted to create a walkway on both sides of the bridge. Soil material exposed during construction would be subject to erosion until stabilized or revegetated. Compacted soils increase runoff potential. In this area, a total of approximately 10 trees would be removed. The loss of the root structures and perennial shade could alter the soil microclimate and increase erosion potential. Any pilings or bridge abutments would likely extend down to the bedrock, having an adverse effect on geology.

Three New Trails – Construction of three new trails would result in the physical disturbance (cut and fill) of approximately 1.2 acres of soils to construct the 3 to 8 foot wide trails Some of these trails would be placed in already disturbed areas; however, the majority of the new trails would be placed in undisturbed areas, meaning there would be soil disturbance in previously undisturbed areas. Construction activities to build the new trails would physically displace soils in the immediate area. Soil under the trails would be compacted and would create a more impervious surface and greater water runoff during storm events. Placement of erosion control features along the trails would help reduce erosion as a result of these water runoff events. Small shrubs, bushes, grasses, and other vegetation in these areas would be removed to create the trails, which increases erosion potential of the soils resulting from loss of root structure holding the soil in place.

Parking Improvements - Construction of parking improvements at the Cat's Eye Road Loop would result in the physical disturbance of approximately .05 acre of soils, which is based on the maximum size of the parking area of approximately 25 feet by 90 feet. Grading the area to a level surface would physically disturb and displace soils, while pavement would result in a permanent loss of soil productivity in this area. Creating a new parking area would introduce an impervious paved surface over the soils, thereby increasing stormwater runoff into the surrounding area which could increase erosion potential in the area surrounding the new parking lot.

The use of staging and stockpiling areas in the project area would similarly result in the physical disturbance of soils of approximately 0.35 acre. Construction vehicles driving over the project area and workers walking over these areas would compact soils.

Cumulative Effects – The cumulative effects to geology and soils are the same as under Alternative A except that Alternative B does result in some soil and geology disturbance, thereby incrementally adding to the overall adverse cumulative effect to geology and soils. Although the contribution of effect from Alternative B does increase the overall adverse cumulative effect to geology and soils, the incremental addition of soil impact under Alternative B is nominal and does not contribute substantially to the overall effect. Therefore, considering the impacts to geology and soils from Alternative B in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effect to geology and soils is adverse and less than significant.


Chickasaw National Recreation Area
Proposed Bridge Project Area -- Geologic Units
Intermountain Region
National Park Service
U.S. Department of the Interior
PNvs
Qac
Chickasaw Nation Cultural Center
PNvc
Qac
Qac
Veteran's Lake
Rock Creek
Cat's Eye Road
PNvs
PNvc
Qac
Qac
Park Legislative Boundary
Proposed Bridge
Trail 1
Trail 2
Trail 3
Trail 3 Connector
Geologic Units
Qac - Alluvium and colluvium, undifferentiated (Quaternary)
PNvs - Vanoss Formation, upper shale facies (Upper Pennsylvanian, Virgilian)
PNvc - Vanoss Formation, lower limestone conglomerate facies (Upper Pennsylvanian, Virgilian)
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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Intermountain Region Geographic Resources Division
September 5, 2014
Data Sources: NPS Park Data, NPS Geologic Data
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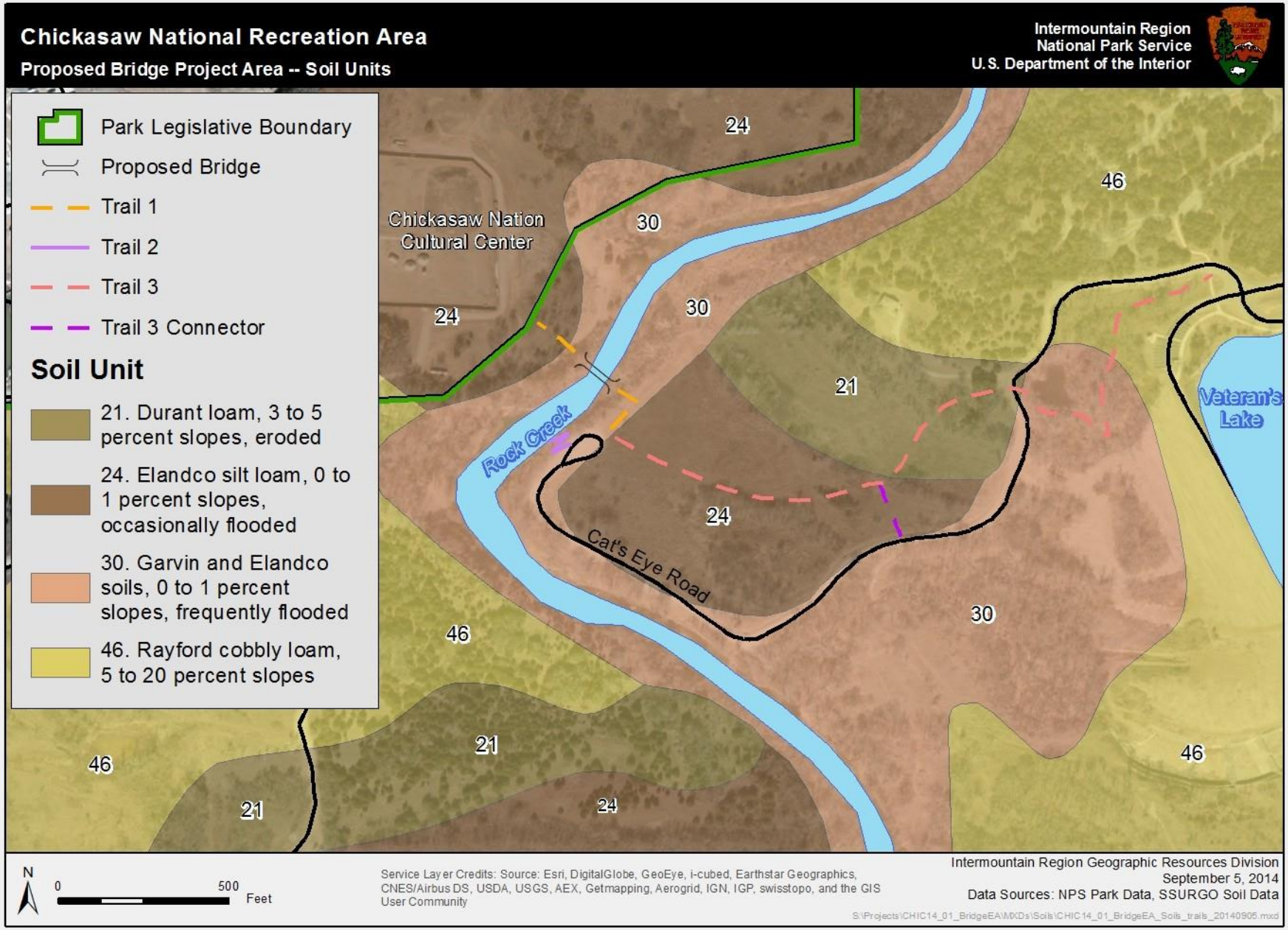
Chickasaw National Recreation Area
Proposed Bridge Project Area -- Soil Units
Intermountain Region
National Park Service
U.S. Department of the Interior
Park Legislative Boundary
Proposed Bridge
Trail 1
Trail 2
Trail 3
Trail 3 Connector
Soil Unit
21. Durant loam, 3 to 5 percent slopes, eroded
24. Elandco silt loam, 0 to 1 percent slopes, occasionally flooded
30. Garvin and Elandco soils, 0 to 1 percent slopes, frequently flooded
46. Rayford cobbly loam, 5 to 20 percent slopes
Chickasaw Nation Cultural Center
Rock Creek
Cat's Eye Road
Veteran's Lake
24
46
30
24
30
21
24
30
46
21
46
21
24
N
0
500
Feet
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Intermountain Region Geographic Resources Division
September 5, 2014
Data Sources: NPS Park Data, SSURGO Soil Data
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Vegetation

Affected Environment

According to NPS's 2006 Management Policies, NPS strives to maintain all components and processes of naturally evolving park unit ecosystems, including the natural abundance, diversity, and ecological integrity of plants (NPS 2006).

Chickasaw NRA lies in a transitional zone between the eastern deciduous forest and the mixed grass or mid-grass prairie/grassland. The area is a mosaic of forest and woodlands, with scattered grasslands and old fields. There are 21 different vegetative cover types present within Chickasaw NRA, including disturbed habitats (NPS 2008). These cover types are grouped into grasslands, woodlands, upland and bottomland forests, and old field. Post oak/blackjack oak forests and woodlands (also referred to as "cross timbers") was once the most common woody vegetation community in Chickasaw NRA. Red cedar is now a major component covering about 30 percent of Chickasaw NRA.

Vegetation in the project area includes a mixture of woodlands and prairie areas. Along the banks of Rock Creek, vegetation primarily consists of hardwoods and grasses. The area from Rock Creek to Veterans Lake Trail is dominated by native prairie grasses and forb species in the lower elevations with some introduced species such as Bermuda grass and Johnson grass. The upland areas consist of woodlands with American elm, red cedar, green ash, and various oaks.

Impacts of Alternative A – No Action

No disturbance to vegetation would occur because Alternative A does not include any construction related activities, excavation, or ground disturbance. Some trampling of vegetation may occur near where visitors access Rock Creek and Forty-Foot Hole on undesignated social trails. Similarly, there may be some trampling or driving over vegetation in the undesignated parking areas at the end of Cat's Eye Road. Impacts to vegetation under Alternative A would be less than significant.

Cumulative Effects – Past ground disturbing activities such as realigning and repaving the North Shore Road; paving Veterans Lake Trail; development of the Chickasaw Cultural Center; and constructing comfort stations, a maintenance building, a radio tower, road signs, and other structures, resulted in the loss and trampling of vegetation and the introduction of invasive exotic plants. Past, current, and future prescribed burning and thinning results in changes in vegetation composition and density that would have a beneficial effect in maintaining native vegetation communities, controlling the spread of red cedar, and reducing the risk of wildfire. The BOR dam project removed woody vegetation from the dam faces. Overall, these activities have disturbed the vegetation in the area to a less than significant degree. Because Alternative A results in little to no disturbance to vegetation, it would not incrementally add to the overall adverse, less than significant cumulative effect to vegetation resources.

Impacts of Alternative B (Preferred) – New Bridge, Three New Trails, Improved Parking

Construction activities under Alternative B would adversely affect vegetation in the project area as a result of trampling, permanent vegetation loss, and the increased potential for non-native weed species. The newly constructed bridge, trails, and parking would result in a total vegetation loss of approximately 1.2 acres. The loss of native vegetation would not affect the viability of local plant populations, and with the application of best management practices including minimizing the construction zone to the extent possible and revegetation efforts following construction, impacts to vegetation would be reduced. Despite all of the best

management practices, a potential for the spread of non-native weed species exists which adversely affects native vegetation. Construction activities would also introduce workers and equipment into the project area which could result in trampling of vegetation. In general, this alternative would result in short- and long-term, adverse, direct, localized, less than significant, impacts to vegetation as a result of construction activities. In addition, construction of the three designated trails and parking improvements also has a beneficial effect on vegetation in that it reduces vegetation trampling by eliminating social trails and driving in undesignated areas.

New Bridge - Under Alternative B, construction of a new bridge would result in the physical removal of approximately 0.08 acre of vegetation. In the areas where the footers for the new bridge would be installed, this would result in the loss of mixed grasses/prairie. This type of vegetation is expected to reestablish following construction. Adjacent to the new bridge, the topography would be graded and leveled to create the proper slope/access to the bridge, which would remove grasses and prairie forbs. In this area, a total of approximately 12 trees 4" to 36" in diameter would also be removed.

Three New Trails - Construction of three new trails would result in the physical removal of approximately 0.4 acre of vegetation, the calculation for which is based on a maximum width of 8 feet for each trail. Following is a description of the vegetation loss along each new trail alignment.

Accessible trail segments would be constructed with the bridge to connect with the Cat's Eye Road cul-de-sac at one end and the Chickasaw Cultural Center at the other end. Currently, there is an eroded social trail that leads from the cul-de-sac down to Forty-Foot Hole. This trail would be rerouted and made accessible, to improve access, safety and maintenance. The length of this trail would be approximately 180 feet. The total disturbed area would be approximately 3,600 square feet.

From the cul-de-sac, a new trail would be constructed that connects to the Multi-Use Trail and the accessible Veterans Lake Trail at the dam parking area. The length of this trail would be 2,287 feet. Total disturbed area would be approximately 36,600 square feet.

Trail 1 - From Bridge West to Cat's Eye Road Cul-de-sac and Northwest to the Chickasaw Cultural Center – A total 0.06 acre of vegetation would be lost, consisting of mixed grasses.

Trail 2 - Forty-Foot Hole – A total 0.06 acre of vegetation would be lost, consisting of elm, cottonwood, oak, pecan and roughleaf dogwood.

Trail 3 - South From Bridge to Veteran's Lake Trail and Parking Area – A total of 0.7 acre of vegetation would be lost, consisting of mixed grasses, Chickasaw plum and elm, ash and oak trees.

In addition to these adverse effects, Alternative B would have a beneficial effect to native vegetation as a result of rehabilitating the social trail in the area of Forty-Foot Hole.

Parking Improvements - Construction of parking improvements at the Cat's Eye Road cul-de-sac would result in the physical loss of approximately 0.05 acre of vegetation, which is based on the maximum size of the parking area of approximately 90 by 25 feet. This includes the removal of mixed grasses and prairie forbs. In addition to these adverse effects, parking improvements would eliminate the need for people to drive over and trample vegetation in undesignated parking areas, thereby having a beneficial effect to vegetation.

The use of staging and stockpiling areas in the project area would similarly result in trampling, vegetation loss, and the increased potential for non-native weed species. Use of these areas during construction would result in the total loss and/or trampling of approximately 0.3 acre of

vegetation. Construction vehicles driving over the project area and workers walking over these areas would also trample vegetation.

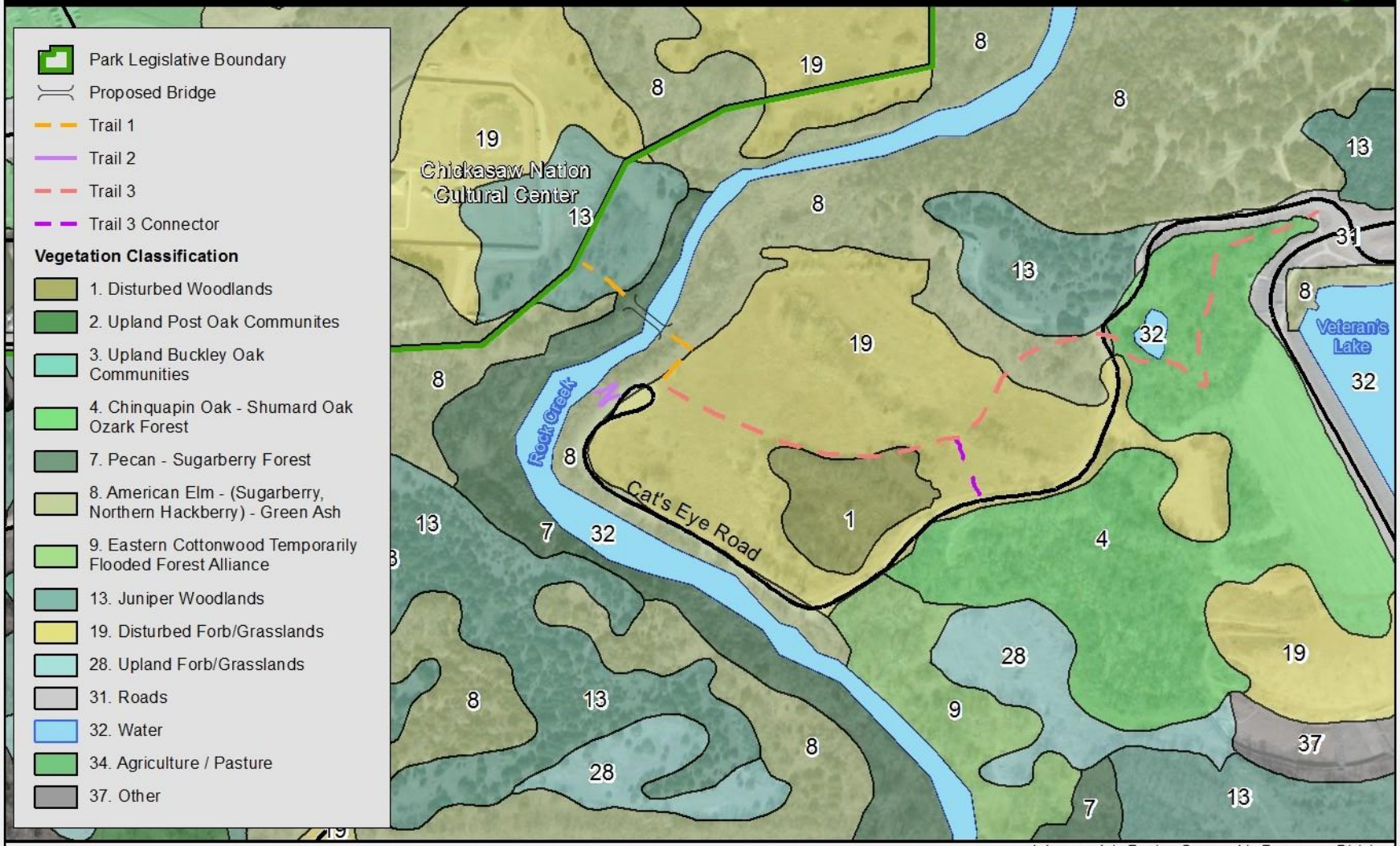
Following construction, approximately 1.0 acre of disturbed areas would be revegetated. Construction activities would be confined to the smallest area necessary to complete the work, and all areas of temporarily disturbed vegetation would be restored with native or appropriate introduced vegetation following construction. Infestation and spread of invasive noxious weeds, such as Johnson grass, is possible. Weeds frequently invade disturbed ground where they easily establish and out compete native species if left unchecked. Implementation of BMP weed-control practices would minimize the potential for weed establishment and long term impacts. Revegetation of disturbed areas is expected to occur rapidly in the warm climate with normal rainfall.

Cumulative Effects – The cumulative effects to vegetation are the same as under Alternative A except that Alternative B does result in some vegetation loss, thereby incrementally adding to the overall adverse cumulative effect to vegetation. Although the contribution of effect from Alternative B does increase the overall adverse cumulative effect to vegetation, the incremental addition of vegetation impact under Alternative B is nominal and does not contribute substantially to the overall effect. Therefore, considering the impacts to vegetation from Alternative B in the context of the other past, present, and reasonably forseeable future projects, the overall cumulative effect to vegetation is adverse and less than significant.

Chickasaw National Recreation Area

Proposed Bridge Project Area -- Vegetation

Intermountain Region
National Park Service
U.S. Department of the Interior



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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Intermountain Region Geographic Resources Division
September 5, 2014
Data Sources: NPS Park Data, NPS Vegetation Data, ESRI Basedata

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Floodplains

Affected Environment

Floodplains are defined by the *NPS Procedural Manual 77-2: Floodplain Management* as "the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, and including, at a minimum, that area subject to temporary inundation by a regulatory flood." Executive Order 11988 *Floodplain Management* requires all federal agencies to avoid construction within the 100-year floodplain unless no other practicable alternative exists. NPS *Management Policies* and Director's Order 77-2 *Floodplain Management* will strive to preserve floodplain values and minimize hazardous floodplain conditions. According to Director's Order 77-2 *Floodplain Management*, certain construction within a 100-year floodplain, including this project, requires preparation of a Statement of Findings (SOF) for floodplains. Appendix A includes the SOF for this project.

A 1981 flood insurance rate map produced by the Federal Emergency Management Agency (FEMA) for the City of Sulphur shows the 100-year and 500-year flood boundaries along Rock Creek, but the mapped boundaries terminate about 1,500 feet north of the proposed bridge site. In October, 1989, a U.S. Geological Survey (USGS) gage (station 07329852) was installed at Sulphur on Rock Creek near Rock Creek Campground and about 1,800 feet upstream from the proposed bridge site. Flood frequency of the project area was determined using data collected from the Rock Creek gage. Water-surface profiles through the project site and the 100-year and 500-year floodplain elevations were computed using the HEC-RAS model.

Hydraulic analysis predicts a 100-year flood elevation of 913.31 feet and a 500-year flood elevation of 915.38 feet at the project site. The 100-year flood extent encompasses the proposed bridge site, all of proposed Trail 2, which leads to Forty Foot Hole, and part of proposed Trail 3. Trail 1 and the proposed Cat's Eye Road cul-de-sac parking lot are outside both the 100-year and 500-year floodplains.

Rock Creek drains about 44 square miles upstream of the Rock Creek stream gage. Streamflow has been recorded at this station from October 1, 1989 to present (2014). For water years 1990-2013 (Oct. 1, 1989 to Sept. 30, 2013), the annual mean flow was 47.2 cubic feet per second (cfs), and ranged from 5.68 cfs in 2013 to 129 cfs in 1990. The lowest daily mean flow was 0.51 cfs (August 7, 2011), and the highest daily mean flow was 3,450 cfs (May 2, 1990). A maximum peak flow of 10,400 cfs was recorded on April 26, 1990; peak flows exceeding 4,000 cfs have occurred in 14 of the past 24 years (U.S. Geological Survey, 2013).

Heavy rains can present a flooding hazard within Chickasaw NRA. Flooding occurs as a result of violent thunderstorms than can produce heavy downpours over a short period of time, saturating the soil and creating significant flood hazards. The first documented flash flood occurred on January 21, 1916. This flood caused widespread damage within the park by sweeping away parts of the pavilion and other structures at the present Bromide Pavilion site. The most damaging flood recorded a Chickasaw NRA occurred on October 8, 1970, when the area received a record one-day rainfall of almost 12 inches (Wilke and others, 1998).

Just upstream of the park, Rock Creek's natural floodplain values have been altered by human activities, including urban and agricultural development that has increased the magnitude of runoff. In the 1960s and 1970s, 22 flood control detention dams were constructed in the Rock Creek watershed above Sulphur to reduce flooding downstream. Impervious surfaces such as roads, roofs, and parking lots have increased the rate at which storm runoff flows to the creek. Within the park, the floodplain still has many natural values. Rock Creek is deeply incised adjacent to the project area, and the adjacent floodplain is largely covered by a riparian forest that provides habitat for a variety of plant and wildlife species. Outside of the wooded riparian

banks of Rock Creek is a gently sloped, prairie grass covered terrace. The wooded riparian buffer bordering Rock Creek within the park remains in a natural state without development.

Development in the vicinity of the proposed bridge has occurred in the flat, gently sloping, prairie grass-covered terrace. Cat's Eye Road and the entrance to the Rock Creek Multi-Use Trail have altered some of the natural floodplain value but do not obstruct flows during major flood events. Veterans Lake Dam helps reduce streamflows conveyed downstream during minor and major flood events, but there are no gates to allow control of releases. When the spillway releases water downstream, the north entrance to the Multi-Use Trail may be impassible.

Impacts of Alternative A – No Action

Alternative A would not impact the floodplain because there would be no change to existing conditions. With no construction related activities, excavation, or ground disturbance, there would be no change to existing floodplain characteristics and values. Impacts to floodplains under Alternative A would be less than significant.

Cumulative Effects – Original construction of Veterans Lake in 1933 altered natural hydrologic processes in the Rock Creek basin. Further developments in the area including, more recently, the North Shore Road, Veterans Lake Trail improvements, and construction of the Chickasaw Cultural Center, influence water quality. While most of the project area consists of vegetated surfaces, some areas have established social trails, which increases runoff and sediment transport during precipitation events. Past, current, and future prescribed burning and thinning also may affect hydrologic and water quality processes by temporarily removing surface cover, and increasing runoff and the concentration of nutrients in runoff below Veterans Lake. The completed dam safety work improved the structural integrity of Veterans Lake dam and may have introduced minor levels of sediment into the lake or downstream during rehabilitation work. None of these activities have appreciably affected the floodplain characteristics and values of Rock Creek. Cumulative effects to floodplains are adverse and less than significant. Because Alternative A results in no change to the floodplain, it does not contribute to the overall cumulative effect to floodplains.

Impacts of Alternative B (Preferred) – New Bridge, Three New Trails, Improved Parking

Alternative B would result in short- and long-term, direct adverse impacts to the floodplains as the result of introducing a bridge and three trails, of which all or part are within the 100-year floodplain of Rock Creek. Staging areas would be situated outside the 100-year floodplain. Best management practices, including ensuring that no pollutants enter the creek during construction, minimizing sedimentation and erosion to the extent possible, and designing the structures to leave the streambank in its present configuration, help minimize these adverse effects. In summary, the impacts to floodplains are adverse and less than significant. Appendix A contains a SOF for floodplains.

New Bridge – The bridge deck elevation will be set at or above the 500-year flood elevation, of 915 feet. The bridge deck elevation will vary from 918 feet near the abutments to 919.25 feet at midspan.

Construction of a new bridge would occur within the 100-year floodplain. The placement of piers and abutments would be outside the streambank and channel of Rock Creek. The piers and abutments would be permanent new features anticipated to be slightly inside or outside the 100-year floodplain, having long-term, direct, adverse effects from the presence of a potential "obstacles" within the floodplain. Increased sedimentation as a result of construction activities (digging, grading) would cause temporary adverse effects to the floodplain and water quality. In addition to the mitigation measures previously mentioned, the new bridge would be designed for structural durability and minimal resource impacts. Further, the new bridge span would be

sufficiently long to help reduce 100-year floodplain impacts, and in-water work would be completed during low flow periods. The abutments and piers of the proposed bridge are outside the 100-year floodplain and within the 500-year floodplain.

Three New Trails – Construction of Trail 2 and Trail 3 would have long-term, adverse, direct impacts to the floodplain because they are entirely within, or partially within, the 100-year floodplain of Rock Creek. Construction activities would temporarily increase sedimentation into the creek. Long-term effects result from the placement of a permanent compacted feature within the floodplain which slightly changes the streambanks and floodplain characteristics. Visitors using these trails could increase sedimentation into the creek. The portions of trails within the 100-year floodplain would be subjected to scouring and erosion. Certain portions of trails may need to be repaired or rebuilt following a severe flood event.

Trail 1 - From Bridge Southwest to Cat's Eye Road Cul-de-sac and Northwest to the Chickasaw Cultural Center – On the southeastern end of the new bridge, Trail 1 would be constructed to connect the bridge to the Cat's Eye Road cul-de-sac, and on the northwest end of the bridge, Trail 1 would be constructed to connect to the Chickasaw Cultural Center. Trail 1 would be outside the 100-year floodplain.

Trail 2 - Forty-Foot Hole – Trail 2 would replace an existing, eroded social trail that leads from the Cat's Eye Road cul-de-sac to a popular swimming hole. The social trail would be eliminated by filling with soil, revegetating with native vegetation, and laying down branches to discourage foot traffic. The entirety of Trail 2 would be within the 100-year floodplain.

Trail 3 - South From Bridge to Veterans Lake Trail and Parking Area – From the southeastern end of the new bridge, a new trail would be constructed that connects to the Multi-Use Trail and the accessible Veterans Lake Trail at the dam parking area. Minor road improvements would be made where the trail crosses Cat's Eye Road to increase safety and sightlines. Most of Trail 3 would be outside the 100-year floodplain, but the Trail 3 connector to the existing Multi-Use Trail may be within the 100-year floodplain.

Construction work, including excavation and grading of new portions of the trail, would increase sedimentation temporarily, and decrease floodplain values during construction activities. Long-term, the presence of a trail in the floodplain would not significantly affect floodplain values or characteristics.

Parking Improvements – Approximately 5-8 new paved parking spaces would be added to the Cat's Eye Road cul-de-sac, including one delineated handicap parking space. The Cat's Eye Road cul-de-sac is outside both the 100-year and 500-year floodplains, and thus construction of parking improvements at the Cat's Eye Road cul-de-sac would not adversely impact floodplain characteristics of Rock Creek. The impervious surface of the parking lot would increase potential of stormwater runoff into Rock Creek, which could result in increased sedimentation during storm events. Similarly, construction activities would temporarily increase sedimentation into the creek temporarily during construction. The parking area would be very low profile and would not impede floodwater flood during large storm events.

Staging and stockpiling areas on both sides of the bridge would be situated outside the 100-year floodplain and would not substantially impact the floodplain characteristics or values. Construction vehicles could introduce pollutants and increase sedimentation into the stream and decreased water quality; however, best management practices would be used to reduce these adverse effects.

Cumulative Effects – The cumulative effects to floodplains are the same as under Alternative A except that Alternative B does result in adverse effects to the floodplain, thereby incrementally adding to the overall adverse cumulative effect to floodplains. Although the contribution of effect

from Alternative B does increase the overall adverse cumulative effect to floodplains, the incremental addition of floodplain impact under Alternative B is nominal and does not contribute substantially to the overall effect. Therefore, considering the adverse impacts to floodplains from Alternative B in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effect to floodplains is adverse and less than significant.

Cultural Landscapes

Affected Environment

According to NPS's Director's Order-28 Cultural Resource Management Guideline, a cultural landscape is a reflection of human adaptation and use of natural resources, and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. NPS *Management Policies* indicates that the treatment of a cultural landscape will preserve significant physical attributes, biotic systems, and uses when those uses contribute to historical significance. Treatment decisions will be based on a cultural landscape's historical significance over time, existing conditions, and use. Treatment decisions will consider both the natural and built characteristics and features of a landscape, the dynamics inherent in natural processes and continued use, and the concerns of traditionally associated peoples (NPS 2006).

Two National Register eligible cultural landscapes are situated within the area of potential effect for this project, the Platt Historic District and Rock Creek Campground:

The **Platt Historic District**, a National Historic Landmark, is characterized by a wide array of structures and natural and cultural features that reflect the legacy of designed development and patterns of human use associated primarily with the area's renowned springs and creeks. Established in 1906 as Platt National Park, the Platt Historic District is a nationally significant designed landscape with a period of significance from 1933 to 1940. This period encompasses Civilian Conservation Corps (CCC) efforts to implement the NPS rustic style of architecture. CCC laborers and craftsmen skillfully incorporated local materials - predominantly stone and wood - into park structures to enhance their rustic appearance and blend them with their natural setting. The Platt Historic District retains a high degree of integrity relating to location, design, setting, materials, workmanship, feeling, and association with these features. The Platt Historic District is within the area of potential effect for this project because the proposed new bridge is visible from the historic district.

Rock Creek Campground – Rock Creek campground consists of two areas. The eastern half was constructed between 1950-1951, includes campsites 1-59, and is eligible for inclusion in the National Register of Historic Places under Criteria A and C, as a good example of changing design in recreational facilities in the post World War II era. Significant at the state level, contributing features of the campground include the loop roads and campsites, comfort stations 1 and 2, the traffic islands, diversion terrace, culverts, and trails. While fire pits, picnic tables and trash containers have changed over time with the consumptive use of visitors and maintenance requirements, there is a high level of integrity to the original design of the campground.

The western half of Rock Creek Campground, consisting of campsites 60-102, was constructed circa 1976 and was determined by the Oklahoma State Historic Preservation Office to not be eligible for the National Register. This part of the campground is within the area of potential direct effect for this project because part of Trail 3 would be visible from the far western part of the campground.

Impacts of Alternative A – No Action

Alternative A would not impact either of the two National Register eligible historic properties situated in the area of potential effect. With no construction related activities, excavation, ground disturbance, or new features introduced into the landscape, there would be no change to the existing conditions of Platt Historic District and Rock Creek Campground. Impacts to cultural landscapes under Alternative A would be less than significant.

Cumulative Effects – Past construction within the vicinity of the Platt Historic District and Rock Creek Campground, including the development of the Chickasaw Cultural Center, improvements to the North Shore Road and Veterans Lake Trail, constructing comfort stations on the North Shore of Veterans Lake, and replacing road signs have resulted in adverse visual effects to these historic properties. Painting and preservation work on historic buildings within Chickasaw NRA and repairing historic flumes as part of the BOR dam safety project have beneficially affected historic properties. Reducing fuel loads in areas near historic structures and cultural landscapes potentially improves the risk for losing these historic properties to a fire. Cedar removal and controlled burns have restored the prairie landscape to areas of the Platt Historic District. Overall, past, present, and future activities have resulted in a mix of beneficial and adverse effects to historic properties, all of which, cumulatively, are less than significant. Because Alternative A results in no change to cultural landscapes, it does not contribute to the overall cumulative effect to cultural landscapes.

Impacts of Alternative B (Preferred) – New Bridge, Three New Trails, Improved Parking

Implementation of Alternative B would adversely affect the two cultural landscapes (historic properties) in the project area, the Platt Historic District (National Historic Landmark District) and the Rock Creek Campground (campsites 1-59 eligible for the National Register). There would be no physical disturbance of these historic properties; however, the new bridge and portions of Trails 1 and 3 are within the viewshed of the Platt Historic District, but not campsites 1-59 of Rock Creek Campground. The new parking area and Trail 2 would not be within the viewshed of either of these two historic properties. Construction related impacts are adverse and include the temporary introduction of increased noise and decreased air quality in these cultural landscapes, as well as the visual intrusion of construction vehicles and workers. Best management practices, including designing these new structures to be historically sensitive to the existing historic properties and not allowing construction vehicles to idle, would help minimize the adverse effects. Alternative B would result in short- and long-term, adverse, and less than significant impacts to the Platt Historic District.

New Bridge – Construction of a new bridge would not have direct physical impacts to the Platt Historic District or the National Register eligible part of Rock Creek Campground. The new bridge is not visible from the National Register eligible portion of Rock Creek Campground, so there is no effect to this historic property from construction of the bridge. Long-term, adverse effects would result from placing the new bridge, a permanent non-historic feature, within the viewshed of the Platt Historic District. The new bridge is far enough away from the Platt Historic District that it is visible from the historic district, but is not a prominent new feature. The bridge would be designed to minimize this adverse visual intrusion to the extent possible.

Three New Trails – Construction of the three new trails would not have direct physical impacts to the Platt Historic District or the National Register eligible part of Rock Creek Campground. None of the trails are visible from the National Register eligible part of Rock Creek Campground, so there is no effect to this historic property from the construction of these trails. Long-term, adverse effects to the Platt Historic District would result from placing Trails 1 and 3, permanent non-historic features, within the viewshed of this cultural landscape. Trail 2 is entirely out of the viewshed of Platt Historic District. Use of these trails by pedestrians,

bicyclists, and equestrians also introduces a new element in the viewshed of the Platt Historic District, that is the people who use the trails.

Trail 1 - From Bridge West to Cat's Eye Road Cul-de-sac and Northwest to the Chickasaw Cultural Center – From the southeastern end of the new bridge, a new trail would be constructed that connects to the cul-de-sac at the end of Cat's Eye Road. This trail would not be within the viewshed of Rock Creek Campground. This trail would be within the viewshed of the Platt Historic District, and would appear rather small and in the distance.

Trail 2 - Forty-Foot Hole – Currently, there is an eroded social trail that leads down to a popular swimming hole. This trail would be formalized and rerouted as necessary, for safety and maintenance considerations. This trail would not be within the viewshed of the Platt Historic District or Rock Creek Campground.

Trail 3 - South From Bridge to Veteran's Lake Parking Area – From the southeastern end of the new bridge, a new trail would be constructed that connects to the Multi-Use Trail and the accessible Veterans Lake Trail at the dam parking area. Minor road improvements would be made where the trail crosses Cat's Eye Road to increase safety and sightlines. The trail and minor road improvements would not be within the viewshed of the Platt Historic District, but not the National Register eligible part of Rock Creek Campground. The trail and the people using the trail would appear quite small and in the distance from Platt Historic District.

Parking Improvements – Construction of parking improvements at the Cat's Eye Road cul-de-sac would not impact the Platt Historic District or Rock Creek Campground (no physical or visual impacts). The parking improvements are far enough away from the two historic properties that it would not physically impact them, nor would it be visible from them.

Staging and stockpiling areas used during construction could temporarily adversely affect the Platt Historic District and the Rock Creek Campground from the introduction of increased noise and decreased air quality in the historic setting. The presence of construction vehicles and workers would also be a temporary visual intrusion in the cultural landscapes.

Cumulative Effects – The cumulative effects to historic properties are the same as under Alternative A except that Alternative B does result in adverse effects to the Platt Historic District and Rock Creek Campground, thereby incrementally adding to the overall adverse cumulative effect to historic properties. Although the contribution of effect from Alternative B does increase the overall adverse cumulative effect to historic properties, the incremental addition of historic property impact under Alternative B is nominal and does not contribute substantially to the overall effect. Therefore, considering the adverse impacts to historic properties from Alternative B in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effect to historic properties is adverse and less than significant.

Visitor Use and Experience

Affected Environment

Chickasaw NRA attracts 1.3 million visitors annually from a multi-state region, nationally and internationally. Visitors come to enjoy the many features of the Chickasaw NRA, with most visitors coming between May and August. A visitor study conducted in 2012 at CNRA indicated that 97 percent of park visitors were from Oklahoma and Texas. While many visitors are repeat visitors, new visitors comprised 31 percent of visitation during the 2012 study. Previous estimates from 1994 indicate that about 75 percent of all visits to the park were for day use and 75 percent of the use came on weekends (NPS 2008).

Chickasaw NRA offers a wide variety of experiences. Wayside exhibits and bulletin boards are scattered throughout Chickasaw NRA, but generally do not adequately introduce all of the themes in the park. Ranger-led activities occur mostly during the summer, but reach a small percentage of visitors. Park interpretive staff and rangers strive to interact with park visitors and provide educational materials, programs, and exhibits to assist visitors in learning more about the natural and cultural resources in the park. Visitors also can find information about the park at the Chickasaw Visitor Center, Travertine Nature Center, and Sulphur Chamber of Commerce. Within the project area, visitor amenities include the following:

Veterans Lake offers a park-like atmosphere, where use is restricted to a slower pace and relatively quiet activities. Primary activities here include fishing, swimming, canoeing and kayaking, no-wake boating, hiking the trail around the lake, and looking at scenery and wildlife. Picnic areas are available, and camping is available at the nearby Rock Creek campground. Veterans Lake itself is a day use area, where an 87 acre impoundment is formed by damming the waters from Wilson Creek with an earthen dam about 1/8th mile in length. A 2.9 mile trail forms a perimeter trail loop around the lake. This trail is an eight foot wide, concrete paved, accessible trail. The trail follows the shore line passing areas of upland prairie and through drainage and riparian areas where Wilson Creek flows into the impoundment. Topography is gently rolling, but with some uphill and downhill pitches. There is a day use group picnic pavilion, a boat launch ramp, a dock, two parking areas, three vault toilets, and scattered picnic tables. The loop trail is used by visitors for nature walks, walkers, joggers, bicyclists, and wheel chair use. The lake is used by fisherman, boating on the lake and fishing from the shoreline and the dock. The lake and area surrounding the trail have good nature observation opportunities as biodiversity and species richness is high in this area. Waterfowl birding is good. Many visitors use the picnic areas for picnicking and the shoreline pavilion is routinely reserved by visitor groups for picnics. Park interpretation is limited to two bulletin boards, occasional Ranger roving, and seasonal nature walks.

The **Platt Historic District** contains over 200 historic structures from the Civilian Conservation Corps era for visitors to explore on foot or by vehicle on paved roads. Historic features of interest include spring pavilions, trails, picnic areas, campgrounds, restrooms, low dams across Travertine Creek to create swimming areas, and formal and informal wooded and prairie landscapes.

Visitors use **Cat's Eye Road** as a scenic drive. Visitors park in undesignated areas at the cul-de-sac at the end of the road to access the Forty-Foot Hole swimming area, which is largely secluded. Visitor services maintained in this area are a gravel cul-de-sac parking area adjacent to the swimming area traditionally known as Forty-Foot Hole. Topography is steeply sloping from the adjacent cul-de-sac parking area to the stream side and Forty-Foot Hole. There is vehicle parking at the adjacent cul-de-sac parking area, and horse trailer rigs use the cul-de-sac to turn around. There are no interpretive waysides or information bulletin boards in this area.

Rock Creek Campground consists of the eastern half that is eligible for the National Register and the western half that is not eligible. There are 105 individual campsites and one group site. The campground also includes three comfort stations and portions of the campground are open year-round. All campsites include a fire ring, picnic table, and parking pads. This campground usually fills on summer weekends. The upper west end of the campground, which is not eligible for the National Register, includes campsites 80-106.

The north trail head entrance to the **Rock Creek Multiple Use Trail** is located along the Cat's Eye Road. The Rock Creek Multiple Use Trail is 6 miles long and is used by bicyclists, hikers and equestrian riders and connects with the Buckhorn area at Lake of the Arbuckles. Trucks with horse trailers as well as individual cars parallel park close to the north trail entrance on

grassy road shoulders. The Cat's Eye Road cul-de-sac is adjacent to the popular Forty-Foot Hole swimming area. In this area, cars park on the grassy road shoulders. The cul-de-sac is used by trucks towing horse trailers and cars. There is an information bulletin board located at the north trailhead of the Rock Creek Multi-Use Trail along the gravel road.

Rock Creek is a stream riparian area and visitor uses include wading, fishing, and swimming. Wildlife observation and nature study opportunities are good in this area. Floating the creek by canoe or john boat is difficult owing to subsurface rock obstructions, particularly in periods of low water. As a result, limited visitor use of boating occurs in this area. The Forty-Foot Hole swimming area is a relatively isolated day use area that provides for contemplative outdoor recreation activities and experiences. A social trail leading down to the swimming area is eroded into the steep bank and is unsafe to use. Park interpretation is limited to very infrequent park ranger roving, informal contacts with visitors. There are no interpretive waysides or information bulletin boards in this area.

The **Chickasaw Cultural Center** was opened in 2010 by the Chickasaw Nation, and is devoted to sharing and celebrating Chickasaw history and culture. The 109-acre facility features exhibit buildings, a theatre, research center, café, amphitheater, traditional village, and garden. Located adjacent to the eastern edge of Chickasaw NRA, there is no safe or convenient access between the two areas. Visitors must drive about 4.5 miles on State Highway 7 and other roads to get from the culture center to the Cat's Eye Road cul-de-sac.

Impacts of Alternative A – No Action

With no construction related activities, excavation, ground disturbance, or new features introduced into the landscape, there would be no change to how visitors use and experience the project area. With no new bridge between Chickasaw NRA and the Chickasaw Cultural Center, there would be no convenient or safe pedestrian access between these two entities and visitors would continue to drive between them, which poses a minor inconvenience. With no new trails constructed in the area, visitors would continue to use the existing social trail to access Forty-Foot Hole, which could pose minor safety hazards because of the informal nature of the trail (less stable footing). Also, with no parking improvements, visitors would continue to park in undesignated areas along Cat's Eye Road which could also pose minor safety hazards from visitors getting out of their cars onto the road (unintended human-vehicle interactions). While Alternative A would pose some minor inconveniences and safety concerns, impacts to visitor use and experience would be less than significant.

Cumulative Effects – Veterans Lake has become a popular recreation facility since it became part of Chickasaw NRA in 1983. The North Shore Road and the paved trail along the south shore of Veterans Lake offers universal access to portions of Veterans Lake, and improvements to these facilities enhance visitor use and experience. Similarly, construction activities including comfort stations at Veterans Lake and replacing road signs have upgraded the quality of services within Chickasaw NRA. Construction of the Chickasaw Cultural Center created additional visitor opportunities in the area. Construction activities also temporarily degrade the visitor use and experience in the immediate area of construction resulting from decreased air quality, increased noise, and traffic delays/closures. The Veterans Lake rehabilitation has improved visitor use and experience by implementing safety features, extending a trail across the dam and creating a safer dam environment. Past, present, and future prescribed burning and thinning results in smoke and temporary visibility issues that may affect visitor activities. Overall, past, present, and future activities have resulted in a mix of beneficial and adverse effects to visitor use and experience, all of which, cumulatively, are less than significant. Because Alternative A results in no change to visitor use and experience, it does not contribute to the overall cumulative effect to visitor use and experience.

Impacts of Alternative B (Preferred) – New Bridge, Three New Trails, Improved Parking

Construction of Alternative B would result in short term adverse impacts to visitor use in the project area from the increased noise and decreased air quality (dust and fumes) tied to construction vehicles and workers. Increased noise and the presence of workers in this area would likely temporarily detract wildlife from using this area, which would have a negative effect on visitors' nature observation experience. Construction activities would also cause temporary disruptions of traffic and vehicle flow in the construction zone; however, best management practices including minimizing the construction zone to the extent possible and working outside of high visitor use times are designed to minimize any inconveniences related to construction. Visitors would not be permitted to access the immediate construction zones while the bridge, trails, and parking area are under construction, which would temporarily limit visitor use activities in this area. These visitor activities would be permitted to resume following construction. Construction related impacts to visitor use and experience would be both adverse and beneficial, and less than significant.

New Bridge – Construction of a new bridge would provide convenient access for visitors between Chickasaw NRA and the Chickasaw Nation Cultural Center. The bridge and any related interpretive signs or kiosks would be considered visitor amenities, thereby improving the visitor use and experience in the area. Because of the improved access between Chickasaw NRA and the Chickasaw Nation Cultural Center, visitor use in this area would likely increase. On the other hand, the placement of a bridge, landing areas, and associated trails in this area would change the viewshed of the area from that of a more natural contemplative setting, to that of a more developed park area setting. For visitors using this area and seeking a more naturalistic setting, their outdoor recreation experience would likely be negatively impacted with the construction of a bridge and associated landings, and the subsequent increased numbers of visitors to the area passing between Chickasaw NRA and the Chickasaw Nation Cultural Center.

Three New Trails – Similarly, construction of three new trails would add to the number of visitor amenities in this area. Following is a description of the visitor use impacts related to each trail.

Trail 1 - From Bridge West to Cat's Eye Road Cul-de-sac and Northwest to the Chickasaw Cultural Center – From the southeastern end of the new bridge, a new trail would be constructed that connects to the cul-de-sac at the end of Cat's Eye Road. From the northwestern end of the bridge, a trail would be constructed to connect to the Chickasaw Cultural Center. This accessible walkway would provide gentle walking inclines for all visitors.

Trail 2 - Forty-Foot Hole – Trail 2 would replace the existing social trail leading down to Forty-Foot Hole. This new trail would be accessible and provide a level landing area and bench near the water's edge. It would be parallel to the slope, include two switch backs and be easier to walk and maintain than the social trail. The social trail will be filled, seeded to native grasses, and mulched with native hay. Woody branches and brush would be used to discourage the social trail to return.

Trail 3 - South From Bridge to Veteran's Lake Trail and Parking Area – From the southeastern end of the new bridge, a new trail would be constructed that connects to the Multi-Use Trail and the accessible Veterans Lake Trail at the dam parking area. Construction of the trail in this area provides a more direct route from the bridge area to the Multi-Use Trail and Veterans Lake compared to the circuitous route of the gravel road that encircles the meadow. The trail would provide a more direct route from the bridge to Veterans Lake, and improve the opportunities for visitor use of the bottomland meadow area for wildlife observation and nature study. Minor road improvements would be made where the trail crosses Cat's Eye Road to increase safety and

sightlines. These improvements would more safely accommodate increased traffic expected with the new bridge and trails.

Parking Improvements – Construction of parking improvements at the Cat's Eye Road cul-de-sac would improve visitor experience by providing designated parking areas which are safer and easier for visitors to use. The Cat's Eye area is a relatively isolated day use area, so these parking improvements could attract additional visitors, which would adversely affect the experience of visitors seeking isolated and contemplative outdoor recreation activities and experiences.

Cumulative Effects – The cumulative effects to visitor use and experience are the same as under Alternative A except that Alternative B does result in some short-term adverse construction impacts (noise, dust, inconvenience) and some long-term beneficial effects (additional visitor amenities), thereby incrementally adding to the overall mix of beneficial and adverse cumulative effects to visitor use and experience. Although the contribution of effect from Alternative B does increase the overall adverse and beneficial cumulative effects to visitor use and experience, the incremental addition of visitor use and experience impact under Alternative B is nominal and does not contribute substantially to the overall effect. Therefore, considering the impacts to visitor use and experience from Alternative B in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effect to visitor use and experience is both adverse and beneficial, and less than significant.

CONSULTATION AND COORDINATION

Internal Scoping

Scoping is a process to identify the resources that may be affected by a project proposal, and to explore possible alternative ways of achieving the proposal while minimizing adverse impacts. Internal scoping was conducted by an interdisciplinary team of professionals from Chickasaw National Recreation Area and the Chickasaw Nation. Interdisciplinary team members met in May 2013 and again in March 2014 to discuss the purpose and need for the project; various alternatives; potential environmental impacts; past, present, and reasonably foreseeable projects that may have cumulative effects; and best management practices. The team also gathered background information and discussed public outreach for the project. Over the course of the project, team members have conducted numerous individual site visits to view and evaluate the proposed construction site.

External Scoping

External scoping was initiated with the distribution of a scoping letter to inform the public of the proposal to construct a new bridge, trails, and parking improvements, and to generate input on the preparation of this environmental assessment. The scoping letter dated September 13, 2013 was mailed to residents in Sulphur, Oklahoma, various federal and state agencies, and other interested parties on the park's mailing list. A press release was also sent to local news organizations. In addition, the scoping letter was posted on the NPS Planning, Environment, and Public Comment (PEPC) website.

During the 30-day scoping period, NPS received two pieces of correspondence from the general public and one response from the Chickasaw Nation. All three pieces of correspondence expressed favor for the proposed project and no substantive comments were received.

Agency Consultation

Endangered Species Act

In accordance with the Endangered Species Act, NPS contacted the U.S. Fish and Wildlife Service (FWS) with regards to federally listed special status species. FWS directed NPS to a current species list, April 24, 2014, which was used in preparation of this environmental assessment (USFWS 2014). NPS conducted a survey for the American burying beetle during its active season and the results were negative (Fresh Tracts 2014).

In accordance NPS policy, the NRA also contacted the Oklahoma Department of Wildlife Conservation (ODWC) with regards to state-listed species. In a telephone conversation on May 8, 2014, ODWC confirmed that there are no state special status species of concern in this area (ODWC 2014).

Section 106 of the National Historic Preservation Act

In accordance with §106 of the National Historic Preservation Act, NPS provided the Oklahoma State Historic Preservation Officer (SHPO) an opportunity to comment on the effects of this project with regards to historic properties. NPS submitted a determination of "no adverse effect" to the SHPO and is awaiting response. Prior to submitting the determination of effect, NPS received two letters from SHPO, as follows. In a letter dated September 6, 2013, SHPO recommended that the design for all new improvements be both historically compatible with, while being differentiated from, those features that make the historic properties significant (OKSHPO 2013). In another letter dated January 8, 2014, SHPO suggested that the height of the bridge be no greater than treeline to minimize effects to the Platt Historic District, and NPS

has accommodated this request into the design of the new bridge (OKSHPO 2014). NPS sent a finding of no adverse effect was sent to SHPO in September 2014, and is awaiting concurrence.

Clean Water Act

In accordance with the Clean Water Act, a Section 404 Permit authorizes placement of fill or dredge material in waters of the U.S. NPS has obtained this permit from the U.S. Army Corps of Engineers dated December 11, 2013 (Permit #SWT-2013-695).

Oklahoma Pollutant Discharge Elimination System Storm Water General Permit for Construction Activities

The Oklahoma Department of Environmental Quality requires an Oklahoma Pollutant Discharge Elimination System (OPDES) general permit OKR10 for discharges of storm water associated with construction activities. Non-storm-water discharges authorized by this permit include uncontaminated flows from excavation dewatering activities and uncontaminated groundwater. For site disturbances greater than 1 acre and not more than 40 acres, a Notice of Intent (NOI) form must be completed for a permit request prior to grading activities, and a Storm Water Pollution Prevention Plan (SWP3) covering the construction site must be developed. The construction site is not located within the watershed of an Outstanding Resource Water or within an Aquatic Resources of Concern designated by the Oklahoma Water Resources Board. A SWP3 would be developed prior to grading and surface if the disturbed area is more than one acre.

Native American Consultation

NPS contacted the following five Native American tribes at the beginning of this project to determine if there were any ethnographic resources in the project area and if they wanted to be involved in the environmental compliance process:

- Chickasaw Nation
- Apache Tribe of Oklahoma
- Comanche Nation
- Caddo Tribal Council
- Choctaw Nation of Oklahoma

NPS received one response from the Chickasaw Nation in support of the project. The EA will be sent to the tribes during the public review period for their review and comment.

Environmental Assessment Review and List of Recipients

The EA is subject to a 30-day public comment period. To inform the public of the availability of the EA, NPS will publish and distribute a letter to various agencies, tribes, and the park's mailing list, as well as place an ad in the local newspaper. The document will be available for review on the PEPC website at http://parkplanning.nps.gov/chic and at the park's visitor center. Copies of the EA will be provided to interested individuals, upon request.

During the 30-day public review period, the public is encouraged to submit their written comments to NPS, as described in the instructions at the beginning of this document. Following the close of the comment period, all public comments will be reviewed and analyzed, prior to the release of a decision document. NPS will issue responses to substantive comments received during the public comment period, and will make appropriate changes to the EA, as needed.

List of Preparers

The following persons assisted with the preparation of the EA.

Table 4 – List of Preparers

Name/Title	Contribution
NPS – Chickasaw NRA	
Bruce Noble, Superintendent	Developed alternatives, provided technical input and conducted EA review
Noel Osborn, Chief of Resource Management	Provided technical information on geology, hydrology, and water quality sections, and conducted EA review
Ron Parker, Chief of Interpretation	Provided technical information on visitor use
Ken Ruhnke, Landscape Architect	Provided technical information on the bridge and trail alternatives, cultural resources, and conducted EA review
Daniel Winings, Resource Management Specialist	Provided technical information on soils, vegetation and endangered species
NPS – Intermountain Region	
Scott Amirault, Environmental Protection Specialist (on detail)	Conducted EA review
Laurie Domler, Environmental Protection Specialist	Developed Purpose and Need
David Hurd, Environmental Protection Specialist	Developed Purpose and Need
Josh Kleinman, Environmental Protection Specialist	Developed Purpose and Need, EA outline, scoping brochure, tribal consultation
Cheryl Eckhardt, Environmental Protection Specialist	Developed EA content
Eric Delynko, GIS Specialist	Developed EA maps
Caitlin Reusch, GIS Specialist	Developed EA maps
Melissa Trenchik, Regional Environmental Coordinator	Developed alternatives, provided technical input and conducted review of the EA

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Fresh Tracts 2014a, American Burying Beetle Presence/Absence Survey Report, J. Grant Huggins, June 4 – 9, 2014.

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NPS 2014a. Cultural Resource Inventory Trip Report March 10 – March 14, 2014, NPS Archeologist George Prothro

NPS 2014b. Cultural Resource Inventory Trip Report April 29 – May 1, 2014, NPS Archeologist George Prothro

ODWC 2014. Dan Winings from NPS Chickasaw NRA contacted Mark Howery from the Oklahoma Department of Wildlife Conservation who confirmed that there are no state special status species of concern in this area. Telephone conversation, May 8, 2014

OKSHPO 2013, Letter from the Oklahoma Historical Society State Historic Preservation Office to the National Park Service regarding the "Proposal to Construct Pedestrian Bridge and Trail Segments within Chickasaw National Recreation Area", dated September 6, 2013

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National Park Service
U.S. Department of the Interior
Chickasaw National Recreation Area
Oklahoma

Appendix A – Statement of Findings for Floodplains

Recommended by:

Bruce Noble, Superintendent, Chickasaw National Recreation Area, National Park Service

Concurred by:

Forrest E. Harvey, Chief of the Water Resources Division, National Park Service,

Approved by:

Sue E. Masica, Intermountain Regional Director, National Park Service

Introduction

Executive Order 11988 *Floodplain Management* requires the NPS and other federal agencies to evaluate the likely impacts of actions in floodplains. The objective of Executive Order 11988 is to avoid, to the extent possible, the long- and short- term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. NPS Director's Order 77-2: *Floodplain Management* and NPS Procedural Manual *77-2: Floodplain Management* provides NPS policies and procedures for complying with Executive Order 11988. This Statement of Findings for Floodplains (SOF) documents compliance with Executive Order 11988 *Floodplain Management*, NPS Director's Order 77-2: *Floodplain Management*, and NPS Procedural Manual 77-2: *Floodplain Management*

The purpose of this Floodplain SOF is to review the actions associated with the proposal to construct a new bridge, three new trails, and parking lot improvements within Chickasaw NRA in sufficient detail to:

- Provide an accurate and complete description of the flood hazard assumed by implementation of the selected alternative (without mitigation);
- Provide an analysis of the comparative flood risk among alternative sites;
- Describe the effects on floodplain values associated with the selected alternative.
- Provide a thorough description and evaluation of mitigation measures developed to achieve compliance with Executive Order 11988 *Floodplain Management*, NPS Director's Order 77-2: *Floodplain Management*, and NPS Procedural Manual 77-2: *Floodplain Management*

Proposed Action

NPS prepared an Environmental Assessment for the proposal to construct a new bridge between Chickasaw NRA and the Chickasaw Cultural Center, three new trails, and improved parking in the Cat's Eye Road area. All of these amenities would be constructed within Chickasaw NRA, as follows:

New Bridge – The new bridge would cross over Rock Creek, just slightly north of the Cat's Eye Road cul-de-sac, at the southeast corner of the Chickasaw Nation Cultural Center property. The east end of the bridge would be located approximately 70 feet north of the end of Cat's Eye Road, and the west end would extend toward the Chickasaw Nation Cultural Center. Two types of bridge design are being considered: a truss bridge and a suspension bridge. Either bridge design would span approximately 200 feet across Rock Creek. Bridge components include abutments, piers, steel superstructure, concrete deck, combined pedestrian and bicycle trails, and security gates. The abutments and piers would be supported on foundations that extend into bedrock. The bridge deck elevation will be set at or above the 500-year flood elevation of 915 feet. The bridge deck elevation will vary from 918 feet near the abutments to 919.25 feet at midspan.

Kiosks are an option at either/both ends of the new bridge. Use of the bridge would be reserved for pedestrians and bicyclists. Equestrians would not be permitted to use the bridge. Vehicles would be prohibited except for emergency and maintenance vehicles.

Three New Trails – Alternative B includes the construction of three new trails within Chickasaw NRA. The intended use of these trails includes pedestrians and bicyclists. No motor vehicles would be permitted on these trails except for maintenance activities. No horses would be permitted on these new trails. All proposed trails would be accessible for people with disabilities

and follow the Architectural Barriers Act Accessible Standards intended for federal agencies. Some minimal directional and interpretive signage or exhibits may be added along these trails. These trails provide linkages to create a more continuous trail network within Chickasaw NRA and greater access to the bridge that crosses over to the Chickasaw Cultural Center. The total length of these three trails is approximately 2,647 feet. The direct disturbance including cut and fill would be about 42,000 square feet and the indirect disturbance would be approximately 10,000 square feet.

Trail 1 would have a concrete surface and would be 8 feet wide. Trail 2 would have a concrete surface and would be 3-6 feet wide. Trail 3 would have a compacted and stabilized aggregate surface and would be approximately 6 feet wide. Some contouring of the landscape would be necessary but would be minimized to the extent possible. Three bridges with small concrete and stone abutment would be needed to cross small drainages. Retaining walls would be needed in certain locations to minimize cut and fill.

Trail 1 - From Bridge Southwest to Cat's Eye Road Cul-de-sac and Northwest to the Chickasaw Cultural Center – On the southeastern end of the new bridge, Trail 1 would be constructed to connect the bridge to the Cat's Eye Road cul-de-sac, and on the northwest end of the bridge, Trail 1 would be constructed to connect to the Chickasaw Cultural Center. The length of this trail would be approximately 180 feet. Total disturbed area would be approximately 3,600 square feet. Trail 1 would be outside the 100-year and 500-year floodplains.

Trail 2 - Forty-Foot Hole – Trail 2 would replace an existing, eroded social trail that leads from the Cat's Eye Road cul-de-sac to a popular swimming hole. The new trail would be formalized and rerouted as necessary for safety and maintenance considerations. The length of this trail would be approximately 180 feet. The total disturbed area would be approximately 3,200 square feet. The entirety of Trail 2 would be within the 100-year floodplain.

Trail 3 - South from Bridge to Veteran`s Lake Trail and Parking Area – From the southeastern end of the new bridge, a new trail would be constructed that connects to the Multi-Use Trail and the accessible Veterans Lake Trail at the dam parking area. The length of this trail would be 2,287 feet. Minor road improvements would be made where the trail crosses Cat's Eye Road to increase safety and sightlines. Total disturbed area would be approximately 41,600 square feet. Most of Trail 3 would be outside the 100-year floodplain, but the Trail 3 connector to the existing Multi-Use Trail may be within the 100-year floodplain.

Cat's Eye Road Parking Improvements - Approximately 5-8 new paved parking spaces would be added to the Cat's Eye Road cul-de-sac, including one delineated handicap parking space. These new parking spaces would be provided for single-family vehicles, not for recreational vehicles or trailers. Minimal signage would be added to this area to help direct visitors to the amenities in the area and offer interpretation. Since Trail 1 would provide an accessible route from the bridge to the cul-de-sac parking area, Trails 2 and 3 would connect to the cul-de-sac as well. The total disturbed area for this parking lot would be approximately 2,500 square feet. The parking area would be situated outside both the 100-year and 500-year floodplains.

Staging and stockpiling areas on both sides of the bridge would be situated outside the 100-year floodplain.

Site Description

Site Location

The project site is located in the Rock Creek valley at an elevation of approximately 915 feet (Figure 1A). The proposed bridge would span Rock Creek 200 feet upstream of the popular swimming area known as Forty Foot Hole. Rock Creek empties into Arbuckle Lake approximately one to two miles downstream, depending on the lake elevation.

The Rock Creek watershed has good vegetative cover and consists primarily of grasslands and woodlands over clay loam soils. No information is available on the yearly sediments loads into Rock Creek or through the project area.

Climate

Chickasaw NRA has a moist, subhumid climate. Temperatures in Murray county range from an average daytime high of 95 degrees in July and August to an average low of 31 degrees in January. Average annual precipitation is about 41 inches. May and October are the wettest months, on average, but much of the spring through fall receives sufficient rainfall. One in two winters have at least one inch of snow, with one year in seven having ten or more inches. Thunderstorms occur on about 47 days each year, predominantly in the spring and summer (Oklahoma Climatological Survey, 2014).

Hydrology

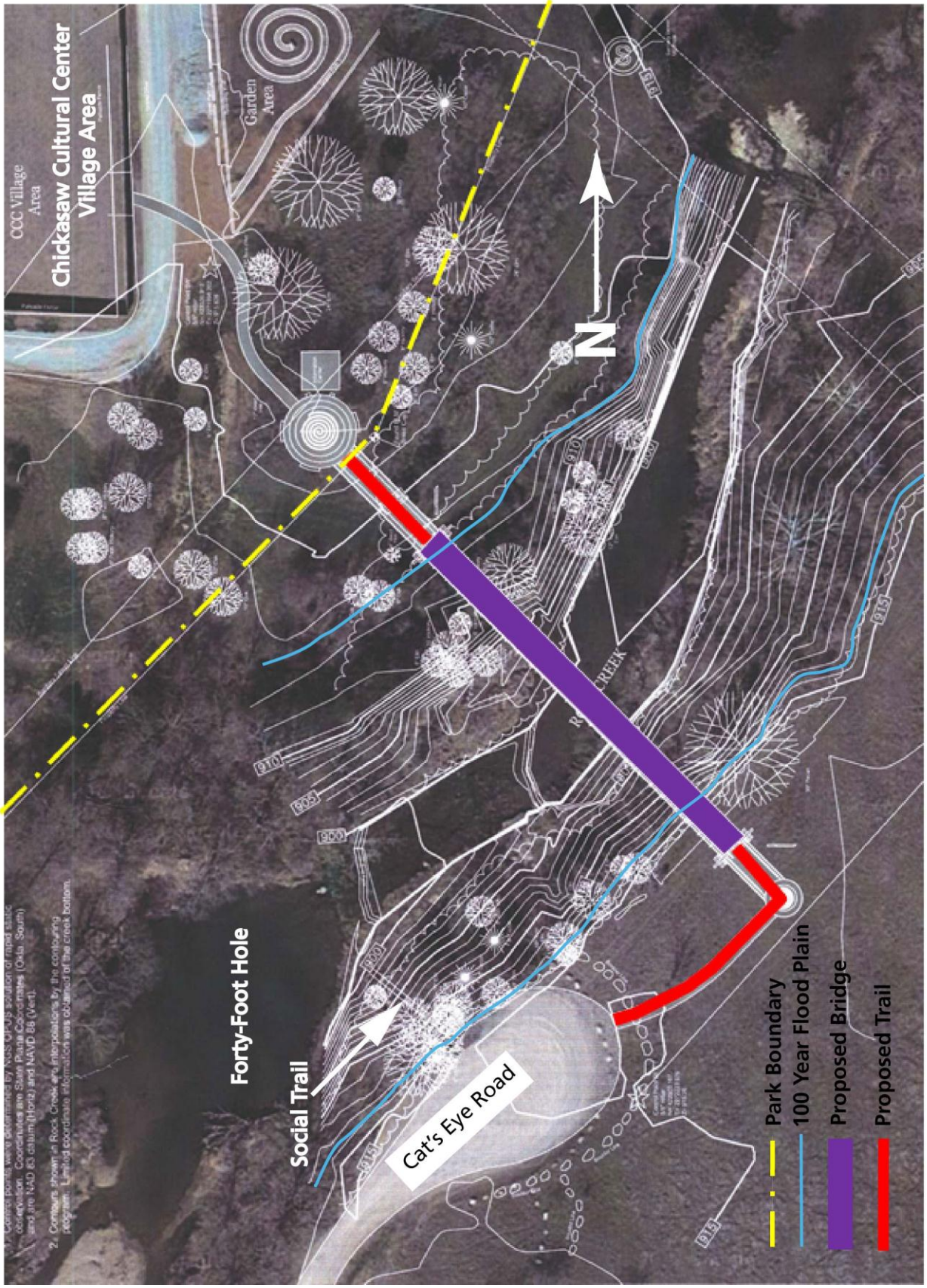
Rock Creek begins about 10 miles north of Chickasaw NRA and flows south through the park into Lake of the Arbuckles before discharging into the Washita river near Doughtery, Oklahoma. The perennial stream derives flow from springs, flowing artesian wells, and storm runoff. Streamflow is regulated by numerous flood-retarding structures upgradient from the gage.

A 1981 flood insurance rate map produced by the Federal Emergency Management Agency (FEMA) for the City of Sulphur shows the 100-year and 500-year flood boundaries along Rock Creek, but the mapped boundaries terminate about 1,500 feet north of the proposed bridge site.

The U.S. Geological Survey (USGS) maintains a streamflow gaging station at Sulphur (station 07329852) on Rock Creek near Rock Creek Campground (80 feet west of campsite 69) and about 1,800 feet upstream from the proposed bridge site. Rock Creek drains 44 square miles upstream of the gage. Streamflow has been recorded at this station from October 1, 1989 to present (2014). For water years 1990-2013 (Oct. 1, 1989 to Sept. 30, 2013), the annual mean flow was 47.2 cubic feet per second (cfs), and ranged from 5.68 cfs in 2013 to 129 cfs in 1990. The lowest daily mean flow was 0.51 cfs (August 7, 2011), and the highest daily mean flow was 3,450 cfs (May 2, 1990). A maximum peak flow of 10,400 cfs was recorded on April 26, 1990; peak flows exceeding 4,000 cfs have occurred in 14 of the past 24 years. The maximum peak stage was 19.65 feet on April 26, 1990 (U.S. Geological Survey, 2013).

Heavy rains can present a flooding hazard within Chickasaw NRA. Flooding occurs as a result of violent thunderstorms than can produce heavy downpours over a short period of time, saturating the soil and creating significant flood hazards. The first documented flash flood occurred on January 21, 1916. This flood caused widespread damage within the park by sweeping away parts of the pavilion and other structures at the present Bromide Pavilion site. The most damaging flood recorded at Chickasaw NRA occurred on October 8, 1970, when the area received a record one-day rainfall of almost 12 inches (Wilke and others, 1998).

Figure 1A


Chickasaw Cultural Center
Village Area
CCC Village Area
Garden Area
N
Forty-Foot Hole
Social Trail
Cat's Eye Road
Park Boundary
100 Year Flood Plain
Proposed Bridge
Proposed Trail

Just upstream of the park, Rock Creek's natural floodplain values have been altered by human activities, including urban and agricultural development that has increased the magnitude of runoff. In the 1960s and 1970s, 22 flood control detention dams were constructed in the Rock Creek watershed above Sulphur to reduce flooding downstream. Impervious surfaces such as roads, roofs, and parking lots have increased the rate at which storm runoff flows to the creek. Within the park, the floodplain still has many natural values. Rock Creek is deeply incised adjacent to the project area and the adjacent floodplain is largely covered by a riparian forest that provides habitat for a variety of plant and wildlife species. Outside of the wooded riparian banks of Rock Creek is a gently sloped, prairie grass covered terrace. The wooded riparian buffer bordering Rock Creek within the park remains in a natural state without development.

Development in the vicinity of the proposed bridge has occurred in the flat, gently sloping, prairie grass-covered terrace. Cat's Eye Road and the entrance to the Rock Creek Multi-Use Trail have altered some of the natural floodplain value but do not obstruct flows during major flood events. Veterans Lake Dam helps reduce streamflows conveyed downstream during minor and major flood events, but there are no gates to allow control of releases. When the spillway releases water downstream, the north entrance to the Multi-Use Trail may be impassible.

Justification for Use of the Floodplain

One objective of the project is to provide safe and convenient access between the Chickasaw Nation Cultural Center and Chickasaw NRA. The proposed bridge over Rock Creek just north of Cat's Eye Road is the closest feasible and reasonable location between Chickasaw NRA and the Chickasaw Nation Cultural Center. It is the shortest distance between these two destinations. As such, to connect these two destinations over Rock Creek requires the construction of a bridge, which must cross the 100-year floodplain.

Another objective of the project is to enhance and improve visitor opportunities in the project area. The three proposed trails are intended to support the proposed bridge and make viable trail connections in the area. The majority of the project area is situated near Rock Creek close to the site of the new bridge. Most of the three proposed trails would be situated outside the 100-year floodplain.

A third objective of the project is to improve parking and visitor safety in the Cat's Eye Road area. Hydraulic analysis indicates that the existing cul-de-sac at the end of Cat's Eye Road, which provides access to this area, is outside both the 100-year and 500-year floodplains.

Investigation of Other Alternatives

Several locations for the new bridge were considered, including upstream and downstream from the proposed location. Other bridge design options were also considered and dismissed as discussed in the Environmental Assessment. Trail options (additional trails and other locations) were considered and dismissed for having too great of an environmental impact. Other parking options for the Cat's Eye Road area were considered, including larger and smaller parking lots and construction of a new parking lot closer to the bridge; however, those were dismissed for having too great of an environmental impact and/or not meeting the project objectives. There are no alternative bridge sites that would provide convenient access and avoid crossing the Rock Creek floodplain. The trails were minimized in number and length to the extent possible that would still meet the project objectives, and the parking lot at Cat's Eye Road was minimized in size and positioned to reduce floodplain impacts.

Site Specific Flood Risk

High-magnitude floods in the project area occur as a result of rainfall events, as described in Site Description – Hydrology. Hydraulic analysis of the project area was determined using data

collected from USGS gage station 07329852, located on Rock Creek about 1,800 feet upstream from the proposed bridge site. Flood frequency was determined using methodology proposed by the USGS (Lewis, 2010), which incorporates both gage data and regression methods to predict peak discharges associated with various annual chance probabilities. The method also takes into account regulation by the NRCS floodwater structures in the watershed. Water-surface profiles through the project site and the 100-year and 500-year floodplain elevations were computed using the HEC-RAS model.

As seen in Table 1, the predicted 100-year flood elevation (defined as the 100-year flow recurrence interval) in the open channel at the project site is 913.31 feet, and the predicted 500-year flood elevation is 915.38 feet. Computed water-surface elevations just upstream of the proposed bridge site are slightly higher than at the open channel at the project site: 914.02 feet at the 100-year year recurrence interval and 918.27 feet at the 500-year recurrence interval.

The predicted peak discharge is 11,600 cfs at the 100-year recurrence interval and 15,380 cfs at the 500-year recurrence interval (Table 1). Predicted velocity of the open channel is 12.52 feet per second (fps) at the 100-year recurrence interval and 13.62 fps at the 500-year recurrence interval. The predicted velocity just upstream of the proposed bridge site is slightly lower than at the open channel at the project site: 11.59 fps at the 100-year recurrence interval and 10.45 fps at the 500-year recurrence interval.

The proposed bridge deck passes all events through the 100-year event and overtops in the 500-year event. The lowest exposed structural member of the proposed bridge would be above the water-surface elevation of 913.13 feet at the 50-year recurrence interval. The low-flow channel of Rock Creek is three to four feet deep and is full in the 2-year event. The high-flow channel has steep banks with slopes ranging from 4:1 to 7:1. The 100-year event is generally contained within these banks. The 100-year flood extent encompasses all of proposed Trail 2, which leads to Forty Foot Hole, and part of proposed Trail 3.

Table 1 - HEC-RAS Model Output for Proposed Rock Creek Bridge

Flow Recurrence Interval (year)	Peak Discharge (cubic feet per second)	Open Channel		Proposed Bridge Site	
		Water Surface Elevation (feet)	Velocity (feet per second)	Water Surface Elevation (feet)	Velocity (feet per second)
2	3,792	907.95	7.85	908.26	7.4
10	6,852	910.37	10.06	910.88	9.37
25	8,770	911.64	11.1	912.24	10.32
50	10,129	912.46	11.78	913.13	10.99
100	11,600	913.31	12.52	914.02	11.59
500	15,380	915.38	13.62	918.27	10.45

Mitigation

The following best management practices would be implemented to minimize the degree and/or severity of adverse effects to floodplains and water quality. Designing the new bridge trails, and

parking lot, and constructing these features using best management practices would minimize the adverse effect.

- Best management practices would be implemented to ensure no pollutants enter Rock Creek as a result of the project.
- Only biodegradable, vegetable-based hydraulic fluid would be used in excavators that may reach into Rock Creek.
- All fueling would occur more than 100 feet from any surface water in a location where a fuel spill would not be able to enter the water.
- To minimize possible petrochemical leaks from construction equipment, the contractor would regularly monitor and check construction equipment to identify and repair any leaks.
- A fuel/lubricant spill absorption kit would be in place to address potential land and water spills and leaks.
- Stormwater runoff control measures, including silt capture techniques such as silt fences would be employed to improve quality of runoff and prevent degradation of the stream.
- Design and construction measures would include development of surface water control features to minimize post-construction run-off.
- Equipment would not be allowed to operate within the stream. If any pumping of water is required, it would be discharged to an upland site.
- Fuel and oil services for construction machinery would be provided in a designated area away from the lake and wetlands when feasible. This would include secondary containment for all fuel storage tanks and on-site availability of a spill kit.
- Sediment curtains would be used when needed to contain sediment to the immediate work zone.
- In-water work would be completed during low flow periods and equipment would not be operated (driven) below the water surface elevation, but would need to reach into the water.
- Staging and stockpiling areas would be situated outside of the floodplain.
- Design would be completed in such a way as to leave the streambank and channel in its present configuration with no change. The bridge span would be sufficiently long to reduce floodplain impacts.
- The bridge will be designed to convey water through the structure when in 50 to 100-year flood events.
- The lowest exposed structural member of the proposed bridge would be above the 50-year flood.
- Approaches for the trails and the bridge will be on grade as much as possible, but the grade may be slightly higher where Trail 1 connects with the bridge.
- Based on NPS guidelines, no mitigation is required for extreme or dam-break flood events. However, preparation for such disasters should be considered due to the risk of human life. To reduce the severity of impact from severe flood events, Chickasaw NRA and the Chickasaw Nation Cultural Center would communicate immediately.

Conclusion

The preferred alternative was designed to achieve project objectives while considering the floodplain values of the Rock Creek area. The proposed action would place an obstacle (bridge) and other permanent features (trails) within the floodplain; however, best management practices would be implemented to minimize the adverse effects to floodplain values, water quality, and the potential loss of property or human life during and after the construction. Although placement of these features is considered optional, the purpose of the project strongly supports construction of these amenities to meet the project objectives. In addition, individual state and federal permits would be obtained prior to the commencement of construction activities. Therefore, the National Park Service finds the preferred alternative to be acceptable per Executive Order 11988 *Floodplain Management*, NPS Director's Order 77-2: *Floodplain Management*, and NPS Procedural Manual 77-2: *Floodplain Management.*

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