# NOTICE OFFERING PUBLIC HEARING
# ON HIGHWAY 123 BRIDGE REPLACEMENT

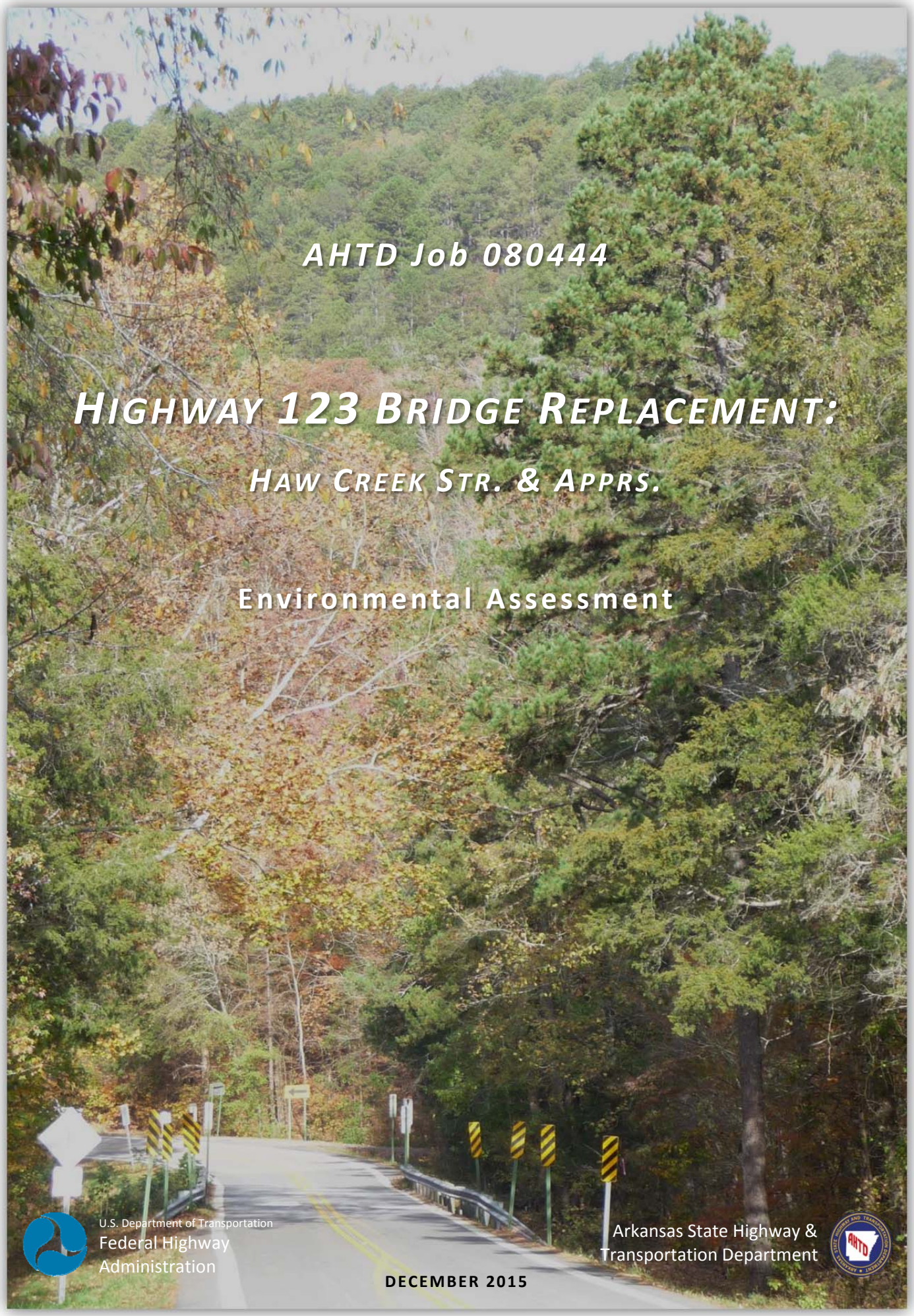
Haw Creek Str. & Apprs. (S)
Highway 123
AHTD Job 080444
Johnson County

The Arkansas State Highway and Transportation Department is planning to replace the Highway 123 bridge over Haw Creek approximately 11.8 miles south of Highway 7 in Pope County. Two build alternatives are under consideration. The project is within the Ozark-St. Francis National Forest Big Piney Ranger District.

Plans showing the project location and design features along with information related to the environmental study are available for public inspection at the Arkansas State Highway and Transportation Department's District Engineer Office, District 8 Headquarters, 372 Aspen Lane, Russellville, Arkansas. The Environmental Assessment will be available for public review at www.arkansashighways.com.

Any interested citizen in the vicinity of the route may request that a public hearing be held regarding this proposed project and the economic effect of the construction by submitting a written request to the Arkansas State Highway and Transportation Department District 8 Headquarters, P.O. Box 70, Russellville, Arkansas 72811-0070 or an e-mail to environmentalpimeetings@ahtd.ar.gov, on or before Friday, January 29, 2016.

In the event requests are received, a notice of the date, time, and place of any public hearing to be held will be published and advertised in the local media.



AHTD Job 080444

# Highway 123 Bridge Replacement:

## Haw Creek Str. & Apprs.

Environmental Assessment

U.S. Department of Transportation
Federal Highway Administration

Arkansas State Highway & Transportation Department

DECEMBER 2015

# Haw Creek Str. & Apprs. (S)

## F.A.P. Number STP-0036(17)

## Environmental Assessment

*Submitted pursuant to:*

The National Environmental Policy Act (NEPA)
42 U.S.C. §4322(2)(c) and 23 C.F.R. §771

Randal Looney
Environmental Specialist
Federal Highway Administration

12/8/2015

Date of Approval

U.S. Department of Transportation
Federal Highway Administration

*Submitted by:*

**FEDERAL HIGHWAY ADMINISTRATION**

*and*

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT**

*in cooperation with*

**U.S. FOREST SERVICE**

The following people may be contacted for additional information concerning this document: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In compliance with the National Environmental Policy Act, this Environmental Assessment (EA) describes two build alternatives to replace the Highway 123 bridge over Haw Creek and the No Action Alternative. No significant adverse environmental effects were associated with any of the alternatives.

Comments should be directed to:

Mail: Environmental - Public Involvement
AHTD
P.O. Box 2261
Little Rock, AR 72203-2261

Email: info@ahtd.ar.gov

This EA is also available for review online at:

http://www.arkansashighways.com/

Arkansas State Highway and Transportation Department

## Title VI

The Arkansas State Highway and Transportation Department (AHTD) ensures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination against any person on the basis of race, color, national origin or sex in the provision of benefits and services resulting from its federally assisted programs and activities. The AHTD public involvement process did not exclude any individuals due to income, race, color, religion, national origin, sex, age, or disability. For questions regarding the AHTD's Title VI Program, you may contact the Department's EEO/DBE Section Head (ADA/504/Title VI Coordinator) at (501) 569-2298 (Voice/TTY 711), or at the following email address: EEO_DBE_Section_Head@ahtd.ar.gov.

## Americans with Disabilities Act (ADA) Information

Materials can be provided in alternative formats: large print, Braille, or audiotape for people with disabilities by contacting AHTD's EEO/DBE Section Head (ADA/504/Title VI Coordinator) at (501) 569-2298 (Voice/TTY 711), or at the following email address: EEO_DBE_Section_Head@ahtd.ar.gov. Persons who are deaf or hard of hearing may contact the AHTD through the Arkansas Relay Service at 7-1-1.

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# Chapter 1: Purpose & Need

## What's in Chapter 1?

*Chapter 1 explains the purpose of the project, why the Highway 123 bridge needs to be replaced, and who is leading the project.*

### 1.1 What is the Highway 123 Bridge Replacement project?

The Arkansas State Highway and Transportation Department (AHTD) is proposing to replace the Highway 123 bridge over Haw Creek, Bridge No. M1863 (Figure 1), approximately 6.3 miles south of Highway 7 in Johnson County.

Bridge M1863: Highway 123 over Haw Creek

*Figure 1*

### 1.2 Why does the Highway 123 bridge over Haw Creek need to be replaced?

#### Highway 123

Highway 123 is functionally classified as a major collector and connects Interstate 40 in Clarksville to Highway 65 south of Harrison (Figure 2). It crosses the Ozark-St. Francis National Forest, connecting several U.S. Forest Service (USFS) recreational areas and campgrounds, the Buffalo National River, the Gene Rush Buffalo River Management Area, and several state highways including an arterial route, Highway 7.

**What is a major collector?**

Collector highways, such as Highway 123, generally serve travel within counties and of shorter distances than arterials, such as Highway 7. Major collectors are distinguished from minor collectors by their links to business and industrial districts, major cities, or roads of higher classification, such as Highway 7.

## Project Location

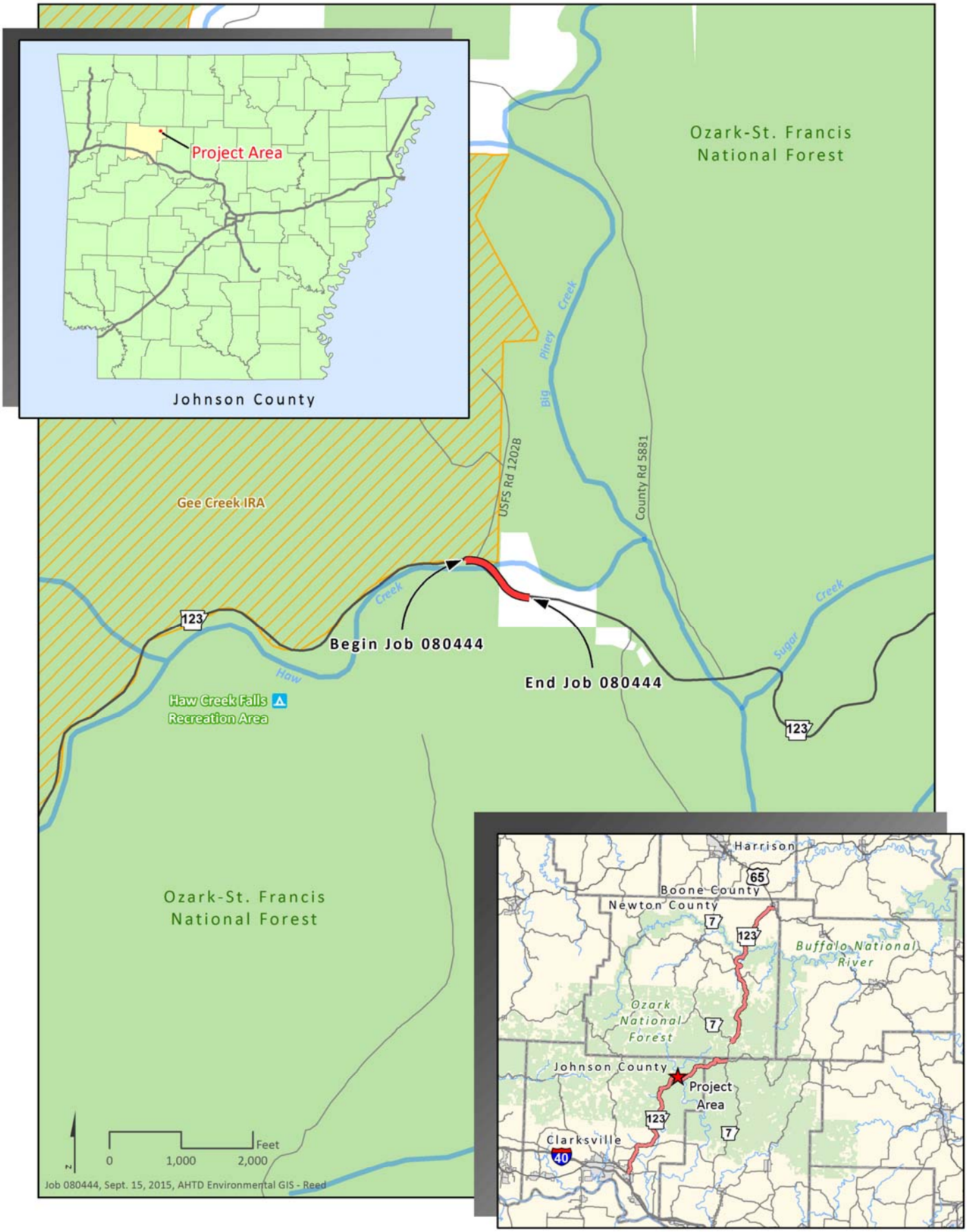


*Figure 2*

In the project area (Figure 2), Highway 123 winds through the Ozark-St. Francis National Forest, providing recreational access to Haw Creek Falls Recreation Area and Campground and serving as the local link to arterial highways, primarily for logging trucks. In the project area, the 2013 Average Daily Traffic was approximately 80 vehicles per day projected to 200 vehicles per day by 2035. Trucks account for approximately 3% of the total traffic.

In the project area, Highway 123 consists of two 10-foot wide travel lanes and 2-foot wide paved shoulders. These narrow shoulders and the skewed intersection at USFS Road 1202B do not meet current design standards and potentially pose additional safety concerns.

### Haw Creek Bridge

The subject bridge over Haw Creek was originally built in 1936 by the Civilian Conservation Corps (CCC). This bridge is a steel multi-beam bridge with rock masonry piers and abutments. The original superstructure was replaced in 1960 with an asphalt overlay on corrugated metal decking.

The Highway 123 bridge over Haw Creek at this location is classified as Structurally Deficient due to the loss of sections of the beams and metal deck panels which requires extensive and frequent patching of the pavement (Figure 3). Significant scour is also undermining one of the abutments. The bridge is load-posted, restricting the weight of vehicles allowed to use the bridge (Figure 3).

**What was the Civilian Conservation Corps (CCC)?**

The CCC was a program implemented by President Franklin Delano Roosevelt to put young Americans to work following the Great Depression. The CCC worked in Arkansas's national forests and state-owned properties from 1933 to 1942. More information on historic resources can be found in Section 3.5 of this EA.

**What does it mean when a bridge is designated as Structurally Deficient?**

Bridges are considered Structurally Deficient if significant load carrying elements are found to be in poor condition due to deterioration and/or damage. If a bridge is Structurally Deficient with a sufficiency rating of less than 50 it qualifies for replacement using federal bridge funds. The bridge over Haw Creek proposed to be replaced has a sufficiency rating of 35.2.

Haw Creek Bridge Patching & Weight Limits


*Figure 3*

## 1.3 What is the purpose of this project?

The purpose of this project is to correct the problems with the Highway 123 bridge over Haw Creek, including the removal of current weight restrictions and structural deficiencies that would otherwise result in escalating maintenance costs and possible closure of Highway 123.

## 1.4 What is the purpose of this Environmental Assessment?

This Environmental Assessment (EA) is being prepared under the National Environmental Policy Act (NEPA) to:

- Evaluate the environmental effects of replacing the Highway 123 bridge over Haw Creek.
- Inform and receive feedback from the public and decision makers about the environmental effects of the project alternatives.
- Determine whether effects are significant and require an Environmental Impact Statement or if the project effects can be sufficiently documented through an EA and Finding of No Significant Impacts (FONSI).

**What is NEPA?**

The National Environmental Policy Act of 1969 (NEPA) requires Federal agencies to consider the potential environmental consequences of their actions, document the analysis, and provide a public involvement process prior to project implementation. Federal agencies are subject to NEPA as part of their decision making process as part of their own projects, by providing funding to other organizations or agencies, through regulatory or permitting processes, or through the involvement of their resources or property.

## 1.5 Who is leading this project?

This project is led by a partnership between the Federal Highway Administration (FHWA) and the AHTD. The FHWA is involved because it is funding a portion of the project and has the primary responsibility for the content and accuracy of this NEPA document.

The project is also being funded through state funds allocated to the AHTD. The AHTD is responsible for administering and maintaining the state highway system, which includes Highway 123 and associated structures. For these reasons, the AHTD is a co-lead agency with the FHWA.

The USFS, specifically the Ozark-St. Francis National Forest, was invited to be a cooperating agency in the NEPA process. The proposed project involves Ozark-St. Francis National Forest land, including the protected Gee Creek Inventoried Roadless Area (IRA). See Section 3.4 of this EA for more information on USFS and IRA impacts and Appendix A for USFS correspondence.

**What are significant impacts?**

NEPA regulations do not provide specific thresholds to determine if project impacts are considered significant, but they do discuss the process that should be used to evaluate impacts.

Consideration is given both to context, where the significance of impacts varies with the setting of the proposed action, and intensity, the severity of the impacts.

# Chapter 2: Development of Alternatives

## What's in Chapter 2?

*Chapter 2 identifies the project limits and briefly describes how the alternatives were developed for this EA.*

### 2.1 What are the project limits and how were they chosen?

The project limits include the area required to construct the new structure and approaches and remove the existing structure and approaches. Building the new structure on new location allows for traffic to be maintained on the existing bridge during construction. If Highway 123 were closed, the shortest detour using state highways would be approximately 60 miles (Figure 4).

Detour

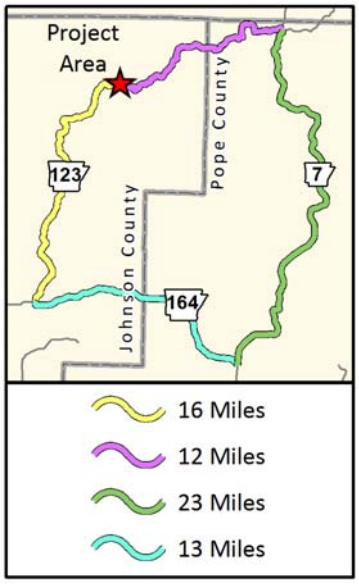


*Figure 4*

### 2.2 What alternatives were developed & evaluated in this EA?

Three alternatives were considered for this project: the No Action Alternative and two build alternatives. The proposed alignment for the two build alternatives, the Bridge and Culvert Alternatives, are shown in Figure 5.

#### No Action Alternative

The No Action Alternative would provide only routine maintenance for the Highway 123 bridge over Haw Creek at this location. By taking no action other than routine maintenance, the No Action Alternative would not address the weight restrictions on heavy trucks or the structural deficiencies associated with the bridge, requiring increasing maintenance to maintain the bridge for even lighter traffic and eventual closure of the bridge to all vehicular traffic.

**Why would you consider an alternative that does nothing?**

NEPA requires decision makers to consider a "no action" alternative in all NEPA studies. This alternative usually does not meet the project's purpose and need but is used to compare the beneficial and adverse impacts of "action" alternatives and determine their significance.

#### Bridge Alternative

The Bridge Alternative (Figure 6) would replace the existing bridge with a new bridge structure approximately 90 feet downstream of the existing structure. The proposed bridge would be a three span, 160-foot long structure with a design life expectancy of 75 years.

The bridge approaches would still have two 10-foot wide paved travel lanes but the shoulder width would increase from two feet to four feet.

Build Alternatives: Proposed Alignment


*Figure 5*

Bridge Alternative

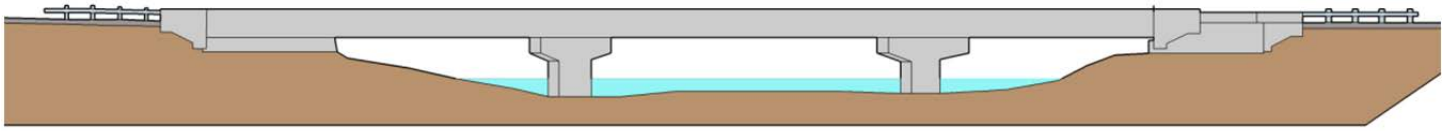

*Figure 6*

Culvert Alternative

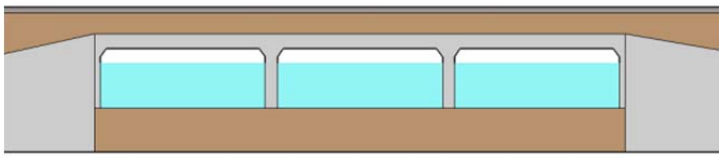

*Figure 7*

**Culvert Alternative**

The Culvert Alternative (Figure 7) would replace the existing bridge with a three-sided concrete arch culvert approximately 85 feet downstream of the existing structure. The proposed structure would be a triple-barreled, 103-foot long structure with a design life expectancy of 75 years. Highway 123 would still have two 10-foot wide paved travel lanes but the shoulder width would increase from two feet to four feet.

## 2.3 How were these alternatives developed?

Initially, a standard four-sided reinforced concrete box culvert was proposed to replace the existing bridge. This box culvert structure was designed using standard specifications with six 12-foot wide boxes. A bottomless arch culvert (Culvert Alternative) was designed to provide a natural passage for fish and widened with longer spans for recreational usage because of concerns from the U.S. Fish and Wildlife Service (USFWS) and USFS regarding the restriction of upstream fish passage and safety for boaters on Haw Creek. The Bridge Alternative was added to determine if stream impacts associated with channel excavation for the installation of the culvert could be reduced.

## 2.4 How has the public been involved?

The AHTD and the USFS provided the opportunity for early public input into the development of the proposed project through the USFS scoping process. Letters were sent to adjacent property owners and an Ozark-St. Francis National Forest citizen contact list. No comments were received.

## 2.5 How have tribal governments been involved?

Section 106 of the National Historic Preservation Act requires federal agencies to consult with tribes where projects could affect tribal areas with historical or cultural significance. The FHWA initiated tribal coordination during the scoping process with the tribes that have an active cultural interest in the area.

The Tribal Historic Preservation Officers were given the opportunity to comment on the proposed project. No objections to the proposed project were received.

## 2.6 Which of these alternatives will be considered?

All three alternatives considered in this chapter are reasonable under NEPA regulations. The No Action Alternative does not meet the project's purpose and need but will be considered in the EA as a baseline comparison of impacts against the build alternatives. Both build alternatives meet the project's purpose and need and will be discussed in the remainder of this EA.

Aquatic Passage Restriction Example

*Figure 8*

**How would a four-sided box culvert prevent passage of aquatic species?**

Because four-sided box culverts have a solid, flat, concrete bottom, water depth decreases and water velocity increases, resulting in scour immediately downstream (Figure 8). This scour lowers the stream elevation, creating a "waterfall" as water exits the box culvert. The scour and shallow depths within the box culvert prevent aquatic species such as fish and invertebrates from moving upstream.

**Which tribal governments were contacted?**

- Absentee Shawnee Tribe
- Alabama-Quassarte Tribal Town of Oklahoma
- Caddo Nation
- Cherokee Nation of Oklahoma
- Chickasaw Nation
- Choctaw Nation of Oklahoma
- Delaware Nation
- Eastern Shawnee Tribe of Oklahoma
- Jena Band of the Choctaw Indians
- Kialegee Tribal Town
- Miami Tribe of Oklahoma
- Mississippi Band of the Choctaw Indians
- Muscogee (Creek) Nation
- Osage Nation
- Peoria Tribe of Indians of Oklahoma
- Quapaw Tribe of Oklahoma
- Seminole Nation of Oklahoma
- Shawnee Tribe of Oklahoma
- Thlopthlocco Tribal Town
- Tunica-Biloxi Tribe of Louisiana
- United Keetowah Band of Cherokee Indians
- Wichita and Affiliated Tribes

# Chapter 3: Project Effects

## What's in Chapter 3?

*Chapter 3 identifies permanent and construction impacts that are expected as a result of the proposed project. Only elements that would be affected by the project are discussed. The impact areas discussed in Chapter 3 are summarized in Table 2, found in Chapter 4.*

## 3.1 How would the project affect traffic and safety?

### How would traffic patterns and volumes on Highway 123 and intersecting roads change with the project?

Normal traffic patterns would not change with the construction of either build alternative or the No Action Alternative. Traffic will be maintained on the existing structure during construction of either build alternative, although short-term lane closures may be required as the new approaches are tied into existing Highway 123.

The No Action Alternative does not involve any improvements to the Highway 123 bridge over Haw Creek, so the existing weight limits would remain in place, resulting in substantial detour routes for heavy vehicles. Eventually, as the structural deterioration worsens, the bridge would likely have to be closed to traffic resulting in the detour of all vehicles.

### How would the project affect safety?

The realignment of the intersection of Highway 123 and Forest Road 1202B west of the bridge as part of both build alternatives would correct safety concerns associated with dangerously-skewed intersections with limited sight distance.

The build alternatives would also prevent safety concerns associated with the No Action Alternative: the collapse of a failing bridge or the severance of emergency access on Highway 123 if the bridge were closed to traffic.

## 3.2 How much would the proposed project cost?

Using 2015 dollars, the Bridge Alternative is estimated to have a total project cost of $874,800. The Culvert Alternative is estimated to have a total project cost of $828,500. The No Action Alternative would not result in any construction and would only involve the cost of maintaining the road and bridge. Breakdowns of construction costs can be found below in Table 1 and later in this EA in Table 2.

*Table 1*

Cost of Alternatives

| Alternative | Total Cost | Roadway Cost | Bridge Cost | Right of Way Cost* |
|---|---|---|---|---|
| No Action | $0 | $0 | $0 | $0 |
| Bridge | $874,800 | $207,000 | $600,000 | $67,800 |
| Culvert | $828,500 | $231,000 | $530,000 | $67,500 |

**Includes right of way acquisition & personal property relocation costs.*

## 3.3 How would the project affect properties and land use in the area?

The project is located within the Boston Mountain Ecoregion. The Boston Mountains are one of the Ozark Plateaus and are characterized as mountainous and typically forested, as found in the immediate project area. Numerous rock outcrops are seen on the steep slopes southwest of the bridge and tabletop-like ledges line the western side of Haw Creek.

The build alternatives have been designed to avoid impacting the steep slopes and ledges and will primarily be impacting hardwood forest, undeveloped property mostly within the Ozark-St. Francis National Forest. A small amount of cleared private property (0.3 acre) will be impacted for either build alternative. This property appears to be used only intermittently, likely for hunting and other seasonal recreational uses. A structure on private property will be impacted, but no relocations are anticipated with either build alternative. Figure 9 shows the location of proposed right of way and temporary construction easements. The shaded area identifies the additional right of way needed for construction of the Bridge Alternative. Total right of way acreages can be found in Table 2.

Build Alternatives: Property Impacts

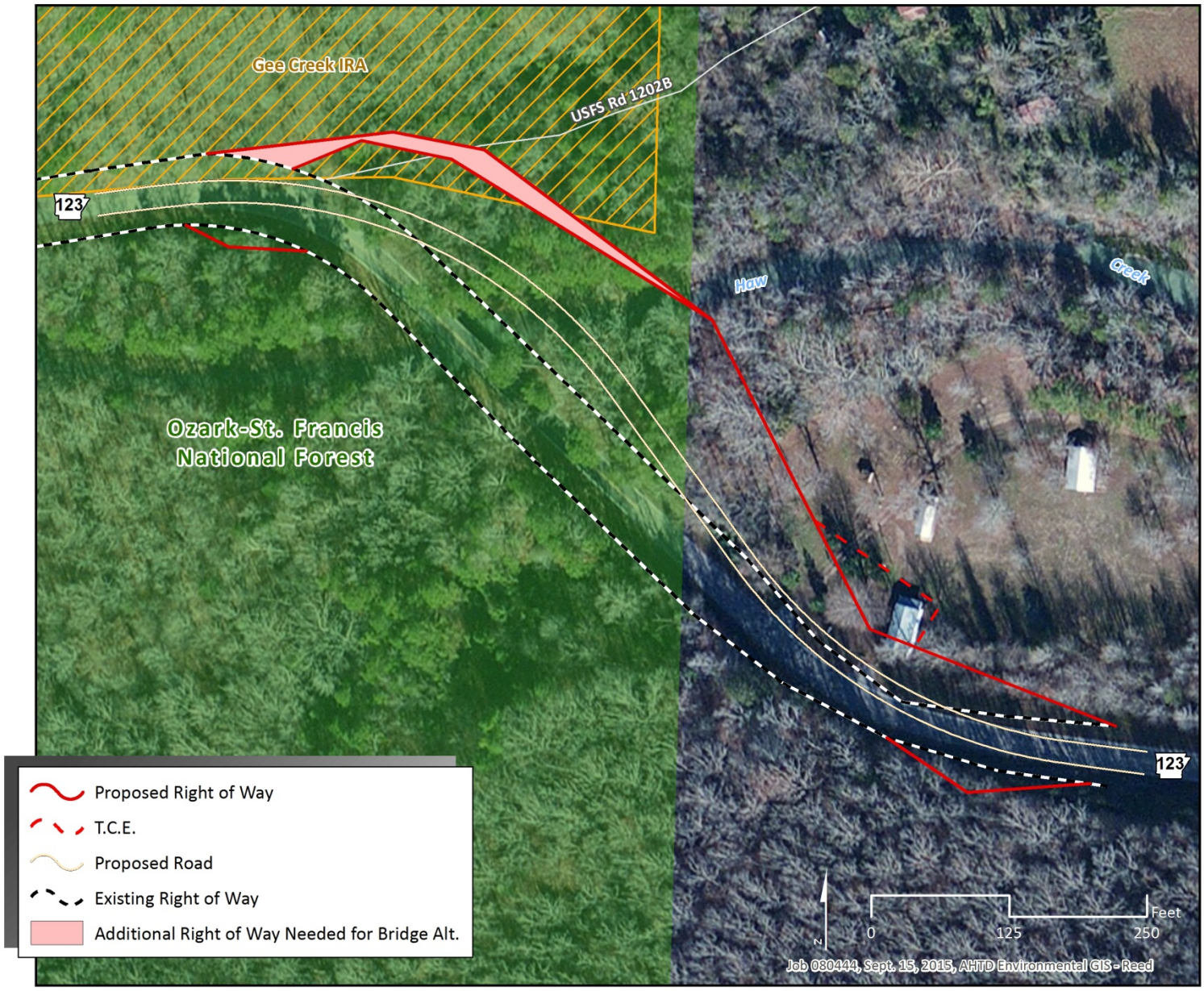


*Figure 9*

Most of the surrounding areas are undeveloped USFS property (see Figure 9 and Section 3.4). No development is anticipated to occur through the proposed project corridor and surrounding areas, regardless of the implementation of this project. No cumulative land use impacts are expected outside of the direct land use conversions outlined above.

The No Action Alternative would not result in any right of way acquisition, relocations, or land use changes, and would not encourage any additional development in or around the project area. No indirect or cumulative impacts related to land use are expected with the No Action Alternative.

## 3.4 Would the project affect any public lands?

Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 prohibits the use of publicly owned parks, national wildlife and refuge areas, and significant historic sites unless it can be shown that: 1) There is no prudent and feasible alternative that meets the project's purpose and need that would avoid use of the land; and 2) All possible planning to minimize harm to the property has been examined. Impacts to the Ozark-St. Francis National Forest and the Gee Creek IRA are discussed below. These properties are not considered Section 4(f) resources as they both function as multiple-use public land holdings as described by FHWA Section 4(f) policy. There is no Section 4(f) recreational or wildlife properties impacted by any of the alternatives under consideration.

### Ozark-St. Francis National Forest

The Ozark-St. Francis National Forest was established in 1908 as the Ozark National Forest (now managed jointly with the St. Francis National Forest) and covers 1.2 million acres in the state of Arkansas. Approximately 1.0 acre of Ozark-St. Francis National Forest land would be required for the Bridge Alternative and 0.9 acre for the Culvert Alternative, as seen in Figure 9. No USFS recreational facilities would be impacted by either alternative. The No Action Alternative would not involve Ozark-St. Francis National Forest lands, although load restrictions on the existing bridge currently affect logging traffic in the Ozark-St. Francis National Forest. If deterioration of the existing bridge leads to its closure, recreational users, especially those accessing the Haw Creek Falls Recreation Area on Highway 123 south of the proposed project, would also be affected.

### Gee Creek IRA

IRAs are areas within USFS lands that were designated as "Roadless" under the Roadless Area Conservation Rule on January 12, 2001. Approximately 0.2 acre of proposed right of way acquired from the USFS for the Bridge Alternative is within the Gee Creek IRA and 0.1 acre for the Culvert Alternative, as seen in Figure 9.

The Roadless Area Conservation Rule allows for road construction to improve road safety concerns (36 CFR 294.12(b)(5)). The proposed right of way within the Gee Creek IRA is needed to realign the skewed intersection of USFS Road 1202B and Highway 123 to increase safety.

The proposed bridge replacement also addresses safety concerns with a failing bridge or closing a highway, severing emergency access routes.

The No Action Alternative would not impact any IRAs.

## 3.5 How would the project affect cultural resources?

Section 106 of the National Historic Preservation Act requires agencies to consider the effects of Federal actions on historic properties. In compliance with Section 106 requirements, AHTD cultural resource specialists consult with the State Historic Preservation Officer (SHPO) and Native American tribes.

**What is a historic property?**

Cultural resources include elements of the built environment (buildings, structures, or objects) or evidence of past human activity (archeological sites). Those that are listed on or eligible for inclusion in the National Register of Historic Places (NRHP) are defined as historic properties.

Preliminary records reviews with the Arkansas Archeological Survey and Arkansas Historic Preservation Program, as well as early maps of the project area, were checked for indications of known archeological sites or historic structures. An archeological survey of the project area was also performed as well as a cultural resources survey to check for historic structures.

**Cultural Resources Report**

*A Cultural Resources Survey of AHTD Job Number 080444, Haw Creek Str. & Apprs., Johnson County* can be obtained through the AHTD Environmental Division.

One new historic archeological site, likely associated with the CCC and the Ozark-St. Francis National Forest's Fort Douglas District shop, was identified. The site has been determined to be eligible for inclusion in the National Register of Historic Places under Criteria A for its association with the National Forest and the CCC program (1933-1942), rendering it subject to protection under Section 4(f) of the USDOT Act of 1966. The alignments of the build alternatives were developed downstream of the existing bridge in order to avoid the CCC site. No historic Section 4(f) resources, including this site, would be impacted under any of the proposed alternatives.

The bridge to be replaced was also built by the CCC in 1936. Because a substantial amount of the structure has been altered or replaced, including the decking, it was determined to be ineligible for inclusion in the National Register of Historic Places and is not subject to Section 4(f) protection.

From these records checks, field observations, and surveys, it has been determined that none of the alternatives impact known historic properties and have a very low likelihood of impacting undiscovered cultural resources. Coordination with the SHPO, including the submission of a cultural resources report, resulted in a finding of "no adverse effect." SHPO clearance can be found in Appendix B.

## 3.6 How would the project affect views?

The proposed project is located in the Big Piney Ranger District of the Ozark-St. Francis National Forest. The landscape of the Big Piney Ranger District is naturally forested with some evidence of human development in the form of roads, pastures, small towns and communities, and occasional residential clearings. The typical topography includes broad rounded ridges, terraces, bluff tops, and rugged mountains with sharply-defined narrow valleys.

The 1.7 mile segment of Highway 123 between Haw Creek Falls Recreational Area and Big Piney Creek was considered the project corridor. Many of the landscape features that typify the Big Piney Ranger District appear in the project corridor. See Figure 10 for an example of the view on Highway 123 in the project area.

**Why are visual impacts important?**

Visual impacts caused by a highway project are seen both by people traveling on the road and by neighbors adjacent to it. People are rightly concerned with the visual character of the highways traversing their town or city: research shows that not only do these first impressions count in how a community is perceived, but they also affect the community's social civility and economic vitality. (*FHWA Guidelines for the Visual Impact Assessment of Highway Projects*).

Typical View in Project Area

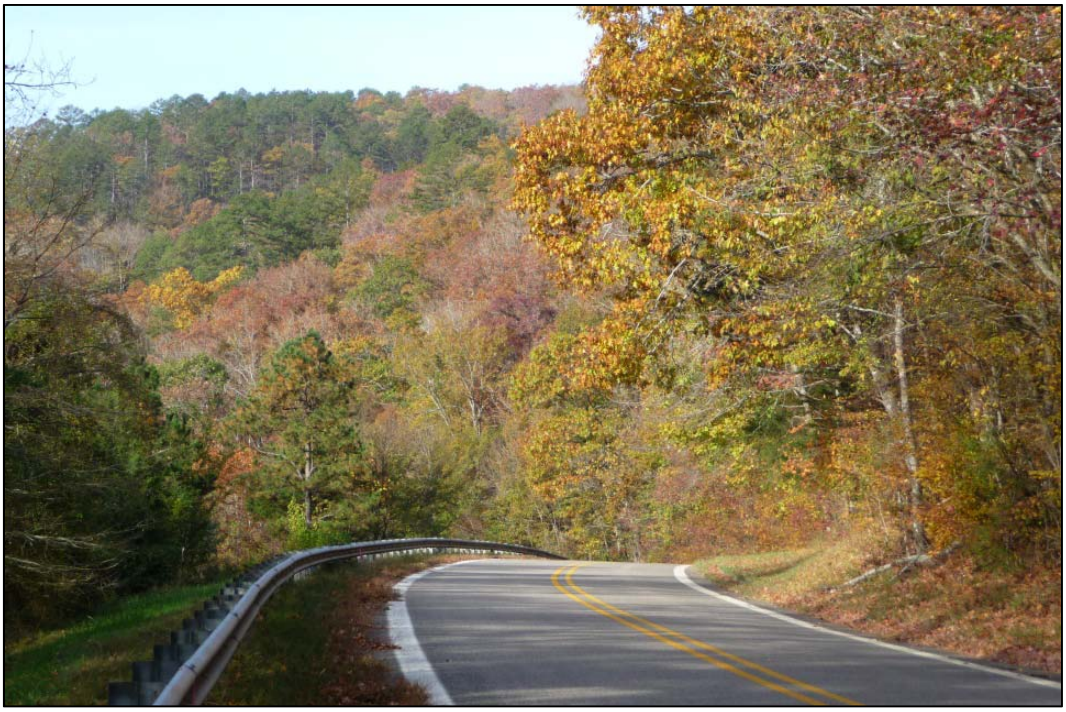

*Figure 10*

The project area is located approximately midway along the project corridor. Heading eastward from Haw Creek Falls Recreational Area, travelers enter the beginning of the project as the roadway curves sharply to the southeast and drops down to cross Haw Creek. Haw Creek is visible both up and downstream of the bridge. Riparian vegetation, rock ledges, and rock outcroppings line the banks of the

stream. The roadway gains elevation and curves eastward near the end of the project, passing between a steep ridge and a level clearing that once served as a private campground.

The Haw Creek bridge deck is in poor condition and the pavement has been patched in several places (Figure 3). The bridge guardrails are comprised of galvanized steel beams bolted to rough wood posts. The weight and speed limit signs and safety chevrons are irregularly tilted, possibly as a result of flood damage to the posts.

The majority of travelers through the project corridor are presumed to be recreationists and tourists. Multiple chambers of commerce and tourism websites and publications reference Highway 123's scenic qualities. According to the USFS scenery management system, Highway 123's scenic qualities have public value and the preservation of these qualities is important. Several scenery transitions occur in the immediate project area. All of these factors predict a high level of viewer sensitivity to changes in visual quality.

The construction of either alternative would involve clearing of new right of way (less than two acres). Clearing trees and vegetation would cause changes to the visual resources of the natural environment, adversely affecting the sensitivity of travelers and resulting in temporary visual quality impacts. These impacts will be minor and will lessen considerably over time as vegetation is reestablished.

Replacing the existing deteriorated bridge and damaged signposts with a new structure and straight signposts may increase the viewer's sense of coherence through the corridor, creating a beneficial visual quality impact. Straightening the bridge approaches could increase the visibility of Haw Creek and the duration of views, also creating a beneficial visual quality impact.

## 3.7 Would any hazardous materials be created or affected?

A visual survey and database search were performed to determine if any hazardous materials were located in the project area. No hazardous materials, landfill sites, leaking underground storage tanks, or hazardous areas were noted within the immediate project area.

**What are hazardous materials?**

A hazardous material is any item or chemical that can cause harm to people, plants, or animals when released into the environment.

If hazardous materials are identified, observed or accidentally uncovered by any AHTD personnel, contracting company(s), or state regulating agency, it would be the AHTD's responsibility to determine the type, size and extent of contamination. The AHTD would develop

a remediation plan and coordinate disposal methods to be employed for the type of contamination identified. All remediation work would be conducted in conformance with the ADEQ, Environmental Protection Agency, and Occupational Safety and Health Administration regulations.

## 3.8 How would natural water resources be affected?

### Streams

The typical design of a four-sided six-barreled box culvert will not be used since it could lead to the blockage of passage for aquatic species. Both build alternatives will provide passage up and down Haw Creek for aquatic organisms.

The Culvert Alternative would require channel excavation to allow for precast culvert sections to be placed. Additionally, a work road of approximately 1,540 square feet, consisting of 110 cubic yards of fill material, will be temporarily placed downstream of the proposed structure. The excavated portion of the channel should, over time, reestablish a natural stream channel bottom. The purple shaded area in Figure 11 shows the proposed excavation associated with the Culvert Alternative based on the preliminary design.

Culvert Alternative Excavation

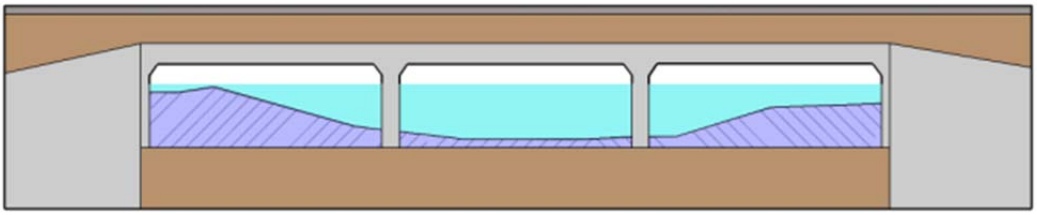

*Figure 11*

The Bridge Alternative will only require minimal excavation for the piers but will also require a work road. Information about the type and amount of fill needed for the work road is unknown until the design phase if the Bridge Alternative is chosen.

Since both alternatives would impact less than 0.5 acre and 300 linear feet of jurisdictional waters, neither alternative would require mitigation and the project should be allowed under the terms of a USACE Section 404 Nationwide Permit 14 for Linear Transportation Projects, as defined in Federal Register 77(34): 10183-10290. The

**What is mitigation?**

Impacts to natural resources, such as streams or wetlands, are often unavoidable during highway construction projects. Restoration, establishment, enhancement, or preservation of wetlands and streams may be legally required under the Clean Water Act, depending on the severity of the impacts.

AHTD will obtain all required waterway and stormwater permits before construction begins.

The No Action Alternative does involve impacts to Haw Creek as the structural deficiencies, especially the loss of the metal decking, have resulted in concrete and asphalt separating from the bridge superstructure and falling into the stream. As the bridge continues to deteriorate under the No Action Alternative, impacts to Haw Creek would likely increase, and could result in the bridge eventually being closed and ultimately collapsing into the stream.

### National Wild & Scenic Rivers

Haw Creek is a tributary to the Big Piney Creek, a designated National Wild and Scenic River and Arkansas Extraordinary Resource Water. The project is located on Haw Creek approximately 0.5 mile upstream of the confluence of the two streams. Both the culvert and bridge alternatives have the potential to temporarily increase sediments in Haw Creek, which, in turn, have the potential to reach Big Piney Creek. These temporary impacts would not threaten the long-term outstanding qualities of scenery, recreation, fish, botany, or geology designations of Big Piney Creek. Any potential sediment-related impacts to Big Piney Creek, resulting from the implementation of either build alternative, will be limited by AHTD sediment and erosion control management practices. These controls will lessen the likelihood of impacts to Big Piney Creek as a result of either build alternative.

**Where can I find AHTD sediment and erosion control best practices?**

Any potential sediment-related impacts to Big Piney Creek are mitigated by Section 110 of the *AHTD Standard Specifications, 2014 Edition*: Protection of Water Quality and Wetlands and the measures to be outlined in the Stormwater Pollution Prevention Plan required as part of the National Pollutant Discharge Elimination System Permit issued by the Arkansas Department of Environmental Quality.

## 3.9 Would the project cause flooding in surrounding areas?

The project was reviewed to identify any encroachments into special flood hazard areas, also known as the 100-year floodplain, as shown on the Flood Insurance Rate Maps issued by the Federal Emergency Management Agency. No special flood hazard areas were identified within the project area and no adverse impacts to floodplains are expected with either build alternative.

The existing structure is lower than current design standards allow as the highway is overtopped by floodwaters at approximately a 7-year flood event. The proposed improvements would raise the elevation of the highway and bridge to a 25-year flood design, meaning that in the case of a 25-year flood event, the highway and structure over Haw Creek will not be overtopped.

**What is a floodplain?**

Floodplains are land areas that become covered by water in a flood event. Special flood hazard areas, also known as 100-year floodplains, are areas that would be covered by a 100-year flood event. This is the floodplain commonly used for insurance and regulatory purposes.

**What is a flood event?**

Specific flood events, such as a 25-year or 100-year flood event, involve flood waters covering the associated floodplain. A 100-year flood event has a 1% chance of occurring in any given year, a 25-year flood event has a 4% chance of occurring in any given year, and a 7-year flood event has a 14% chance of occurring in any given year.

Although both structures would have a 25-year flood design, the bridge would be approximately three feet higher to provide clearance between the 25-year flood event and the lowest point of the bridge for greater protection of bridge elements.

## 3.10 Would any protected species be impacted by the project?

The endangered gray bat (*Myotis grisescens*), the endangered Indiana bat (*Myotis sodalis*), and the threatened northern long-eared bat (*Myotis septentrionalis*) are known to occur within the project area. Clearing trees on the proposed right of way may impact these species by removing potential roost trees, creating larger open habitat, or altering foraging areas. These impacts will be limited by restricting the clearing of trees to the winter hibernating months and placing restrictions on the time of day construction can occur during the summer. With these special provisions, is it anticipated that no species are likely to be adversely affected by either build alternative. The Biological Evaluation, prepared in cooperation with the USFS, can be found in Appendix C and includes more information on these endangered, threatened, and sensitive species. Final USFWS concurrence and clearance will be obtained once a Preferred Alternative is identified.

**What is the difference between threatened and endangered species?**

An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. Endangered species receive the highest level of protection. A threatened species is one that is likely to become endangered in the near future. Both threatened and endangered species receive federal protection under the Endangered Species Act. Sensitive species are not protected by the Endangered Species Act but have been identified by the USFS Regional Forester as having population viability concerns.

## 3.11 Does the project have any indirect impacts?

Replacing the Highway 123 bridge over Haw Creek with either build alternative is unlikely to induce any additional development of the area as it is primarily within the Ozark-St. Francis National Forest and no other improvements are proposed. The No Action Alternative involves no work other than regular maintenance and would not result in any indirect effects other than the continued deterioration and eventual failure of the subject bridge.

None of the alternatives considered are expected to result in adverse indirect impacts on any natural, cultural, social, or economic resources.

**What are indirect impacts?**

An indirect effect is a reasonably foreseeable effect that may be caused by a project but would occur in the future or outside of the project area.

## 3.12 Does the project have any cumulative impacts?

**What are cumulative impacts?**

Cumulative effects result from the total effects of a proposed project, when added to other past, present, and reasonably foreseeable future projects or actions. Cumulative effects are studied so that the public, decision-makers, and project proponents take time to consider the "big picture" effects a project could have on the community and environment.

### Ozark-St. Francis National Forest

There are no other AHTD projects near the proposed project that would require USFS property. The AHTD does have other projects that are programmed or under construction in the Ozark-St. Francis National Forest. Projects under construction within the Ozark-St. Francis

National Forest include two road reconstruction and paving projects on Highway 220 and Baxter County Road 73, a passing lane project on Highway 7, and an emergency landslide repair project on Highway 23. Programmed projects include six passing lane projects on Highway 7, two bridge replacement projects on Highway 59, and an additional road reconstruction and paving project on Baxter County Road 73. Cumulatively, these projects are not expected to result in significant impacts to the 1.2 million acres of the Ozark-St. Francis National Forest and will support USFS transportation needs.

The USFS does not have any proposed projects in the area that would require the conversion of USFS property to other uses. None of the project alternatives would result in significant cumulative impacts to the Ozark-St. Francis National Forest.

#### Gee Creek IRA

The subject project is the only AHTD project programmed or under construction impacting the Gee Creek IRA. None of the alternatives would result in significant cumulative impacts to Gee Creek IRA. Before future projects are allowed to occur within an IRA, including Gee Creek IRA, the USFS will review the project and assess its impacts to the IRA.

#### National Wild & Scenic Rivers – Big Piney Creek & Tributaries

There are no other AHTD projects directly on Big Piney Creek or its tributaries other than the proposed project, but there are the above-mentioned passing lane projects on Highway 7 within the Big Piney Creek watershed that have the potential to contribute runoff to Big Piney Creek and its tributaries. The USFS has had two recent projects within the Big Piney Creek watershed: a stream stabilization project on Big Piney Creek near Highway 123 and a 5,730-acre prescribed burn south of Haw Creek and west of Big Piney Creek.

While the USFS and AHTD projects have the potential to affect Big Piney Creek, the cumulative impacts of these projects and the proposed bridge replacement over Haw Creek will not result in significant cumulative impacts to Big Piney Creek. Any impacts are expected to be temporary and minor while these projects are constructed and will lessen over time.

### Highway 123 Visual Quality

The only other known activity affecting the visual quality of Highway 123 in the project area is the USFS prescribed burn. This 5,730-acre prescribed burn runs along Highway 123 south of Haw Creek from Forest Road 93207D to the Highway 123 bridge over Haw Creek. The negative effects of the burn, most commonly observed as black marks on trees, will be visible from Highway 123 but are expected to only last for a single growing season. Overall, prescribed burns contribute positively to scenic quality by clearing underbrush, discouraging the growth of invasive species, and encouraging greater plant species diversity, especially for native flowering plants. The cumulative scenic impacts of the Highway 123 bridge replacement over Haw Creek and the prescribed burn are anticipated to be only temporary and minor.

### Threatened and Endangered Species

Information on cumulative impacts to endangered, threatened, and sensitive species can be found in the Biological Evaluation in Appendix C. None of the project alternatives are expected to contribute to significant cumulative impacts to any listed species.

## 3.13 What other resource areas were examined but not found to be present or impacted?

### Air Quality

This project is located in an area that is designated as in attainment for all transportation pollutants. Therefore, the conformity procedures of the Clean Air Act, as amended, do not apply.

**What is air quality attainment?**

Areas are considered in attainment for air pollutants when measured levels are below the National Ambient Air Quality Standards set by the U.S. Environmental Protection Agency.

### Landforms & Geology

The landforms and geological resources referenced in Section 3.3 were avoided in the design process and will not be impacted by the No Action Alternative or either of the build alternatives.

### Noise

Noise predictions have been made for this project utilizing the FHWA's Traffic Noise Model 2.5 procedures. These procedures indicate that noise levels are below the FHWA noise criteria beyond the project's proposed right of way limits. Any increases in roadway noise levels will not be the result of the proposed project, but instead a result of traffic volume increases during the planning period (Year 2035);

**What is noise?**

Sound is anything we hear, while noise is unwanted or undesirable sound. Traffic noise is a combination of the noises produced by vehicle engines, exhaust, and tires.

therefore, any noise level increases will occur independently of this proposed project. No project-related noise impacts are anticipated.

### Important Farmland

Most of the agriculture activity in the project area is related to timber production on USFS lands. Right of way acquisition for the proposed project would not significantly reduce the amount of land in the Ozark-St. Francis National Forest, as discussed in Section 3.5. No Important Farmland would be impacted by any of the alternatives.

**What is Important Farmland?**

Important Farmland is defined by the U.S. Department of Agriculture (USDA) as land suited to food, feed, forage, fiber, and oilseed crops. Prime Farmland has the best combination of physical and chemical characteristics for the production of crops, while Farmland of Statewide Importance is land other than Prime Farmland which has a good combination of these characteristics

### Environmental Justice

Through a review of U.S. Census Data, the Health and Human Services Poverty Guidelines (Federal Register, February, 2000), and making field observations, a determination was made that the proposed project will not have any adverse or disproportionate impacts on Environmental Justice (EJ)/Title VI populations. Therefore, in accordance with the provisions of Executive Order 12898, Title VI of the Civil Rights Act of 1964 and FHWA Order 6640.23, no further analysis is necessary.

**What is EJ/Title VI?**

An EJ evaluation determines whether low-income or minority populations would suffer disproportionately high and adverse effects from an action.
Title VI of the Civil Rights Act of 1964 (Title VI) prohibits discrimination on the basis of race, color, sex, national origin, religion or disability under any program or activity receiving Federal financial assistance.

### Public Water Supplies

The Arkansas Department of Health database of public water supplies was examined to determine if any surface water intakes, wellheads, or associated protection areas of either type were present in the project area. No known public water supplies are located in or near the project area.

### Utilities

The AHTD Right of Way Division's Utility Section was contacted to determine if any public or private utilities would be impacted by the proposed project. No utilities are anticipated to be impacted by any of the project's alternatives.

### Wetlands

There were no jurisdictional wetlands identified within the proposed right of way of the build alternatives. None of the alternatives would impact jurisdictional wetlands.

**What is a wetland?**

Wetlands are areas typically inundated or saturated by surface or groundwater to the extent that they can support vegetation adapted for life in wet soil conditions.

# Chapter 4: Recommendations

## What's in Chapter 4?

*Chapter 4 contains the results and conclusions of this Environmental Assessment.*

### 4.1 What are the results of this EA?

The environmental analysis of the proposed project did not identify any significant impacts to the natural and social environment as a result of any of the alternatives. A summary of the impacts of these alternatives can be found in Table 2.

*Table 2*

Alternative Impact Comparison

| Alternative | Total Cost | Roadway Cost | Bridge Cost | Right of Way Cost* | Length (linear feet) | Proposed ROW (acres) | USFS ROW (acres) | IRA ROW (acres) | Haw Creek Impacts |
|---|---|---|---|---|---|---|---|---|---|
| No Action | 0 | 0 | 0 | 0 | N/A | 0 | 0 | 0 | Section loss in stream |
| Bridge | $874,800 | $207,000 | $600,000 | $67,800 | 794 | 1.8 | 1.0 | 0.2 | Work roads only |
| Culvert | $828,500 | $231,000 | $530,000 | $67,500 | 961 | 1.7 | 0.9 | 0.1 | Work roads & channel excavation |

**Right of way cost includes right of way acquisition and personal property relocation costs.*

### 4.2 Is the NEPA process finished?

After this EA is signed by the FHWA and approved for public dissemination, a public hearing and 30-day comment period will be offered jointly with the USFS as a NEPA cooperating agency.

After a review of comments received from citizens, public officials, and governmental agencies, the next step in the environmental process will be to identify a Preferred Alternative based on the information contained in the EA and the comments received.

After the Preferred Alternative design is finalized, a FONSI document will be prepared by the AHTD and submitted to the FHWA. Approval of the FONSI by the FHWA will identify the Selected Alternative and conclude the NEPA process.

# Reference Page: Acronyms

| | |
|---|---|
| AHTD | Arkansas State Highway and Transportation Department |
| CCC | Civilian Conservation Corps |
| EA | Environmental Assessment |
| EJ | Environmental Justice |
| FHWA | Federal Highway Administration |
| FONSI | Finding of No Significant Impacts |
| IRA | Inventoried Roadless Area |
| NEPA | National Environmental Policy Act |
| SHPO | State Historic Preservation Officer |
| USACE | U.S. Army Corps of Engineers |
| USDA | U.S. Department of Agriculture |
| USDOT | U.S. Department of Transportation |
| USFS | U.S. Forest Service |
| USFWS | U.S. Fish & Wildlife Service |

# Appendix A: U.S. Forest Service Correspondence

USDA United States Department of Agriculture Forest Service Ozark-St. Francis National Forest
605 West Main Street
Russellville, AR 72801
479-964-7200
FAX: 479-964-7255

**File Code:** 1950
**Date:** August 31, 2015

Scott E. Bennett
Director - Arkansas State Highway and Transportation Department
P.O. Box 2261
Little Rock, AR 72203-2261

Dear Director Bennett,

Thank you for the invitation to be a cooperator on the environmental analysis for AHTD Job Number 080444 that would replace the bridge over Haw Creek on State Highway 123. Because the project would affect portions of Ozark-St. Francis National Forests we will be happy to assist with effects analysis for portions of the project on the Forests.

We will be working with the office of the Chief of the Forest Service to make sure the project is in compliance with the 2012 Roadless Rule. We look forward to helping with this project that continues the process of improving safety on highways used by visitors to the Forests.

If you have further questions or information needs, please contact Terry Krasko, Planning and Public Services Staff Officer, at tkrasko@fs.fed.us or 479-964-7234.

Sincerely,

Reggie S. Blackwell

REGGIE BLACKWELL
Forest Supervisor

cc: Susan.Staffeld@ahtd.AR.gov , tkrasko@fs.fed.us , Jones, Timothy E -FS

# Appendix B: State Historic Preservation Officer Clearance

The Department of
Arkansas
Heritage

Mike Beebe
Governor

Martha Miller
Director

Arkansas Arts Council

Arkansas Natural Heritage Commission

Delta Cultural Center

Historic Arkansas Museum

Mosaic Templars Cultural Center

Old State House Museum

Arkansas Historic Preservation Program

323 Center Street, Suite 1500
Little Rock, AR 72201
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fax: (501) 324-9184
tdd: (501) 324-9811
e-mail:
info@arkansaspreservation.org
website:
www.arkansaspreservation.org

An Equal Opportunity Employer

May 14, 2013

Mr. Lynn P. Malbrough
Division Head
Environmental Division
Arkansas State Highway and Transportation Department
PO Box 2261
Little Rock, AR 72203-2261

RE: Johnson County – General
Section 106 Review – FHWA
Report Titled: "A Cultural Resources Survey of AHTD Job Number 080444 Haw Creek Str. & Apprs. Johnson County"
AHTD Job Number 080444
Black River Str. & Apprs.
AHPP Tracking Numbers: 85878

Dear Mr. Malbrough:

The staff of the Arkansas Historic Preservation Program has reviewed the above referenced cultural resources report. They find the report to be well-written and informative.

We have determined that the Civilian Conservation Corps (CCC) camp is eligible for inclusion in the National Register of Historic Places (NRHP) and that by moving the construction to the opposite side of the highway can be avoided. Furthermore, we concur that no further work is necessary on the five previously recorded sites (3JO0631, 3JO0618, 3JO0149, 3JO0150, 3JO0151) and can issue a no adverse effect finding for this undertaking.

Thank you for the opportunity to review this undertaking. Please refer to the AHPP Tracking Number listed above in all correspondence. If you have any questions, please call Theresa Russell of my staff at (501)-324-9880.

Sincerely,

Frances McSwain

Frances McSwain
Deputy State Historic Preservation Officer

cc: Mr. Robert Cast, Caddo Nation
Dr. Ann Early, Arkansas Archeological Survey
Mr. Randal Looney, Federal Highway Administration

THE DEPARTMENT OF ARKANSAS
HERITAGE

Asa Hutchinson
*Governor*

Stacy Hurst
*Director*

Arkansas Arts Council
•
Arkansas Natural Heritage Commission
•
Delta Cultural Center
•
Historic Arkansas Museum
•
Mosaic Templars Cultural Center
•
Old State House Museum

Arkansas Historic Preservation Program

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An Equal Opportunity Employer

October 29, 2015

Mr. John Fleming
Division Head
Environmental Division
Arkansas State Highway and Transportation Department
P.O. Box 2261
Little Rock, AR 72203-2261

RE: Johnson County – General
Section 106 Review – FHWA
Report Titled *Addendum to The Phase I Archeological Survey of AHTD Job 080444 Haw Creek Str. & Apprs. Johnson County*
AHPP Tracking Number 85878.1

Dear Mr. Fleming:

The staff of the Arkansas Historic Preservation Program has reviewed the above-referenced cultural resources report addendum. Based on the new information presented in this report addendum, we find there is no compelling reason to change our previous finding of no adverse effect.

Thank you for the opportunity to review this undertaking. Please refer to the AHPP Tracking Number listed above in all correspondence. If you have any questions, please call Bob Scoggin of my staff at 501-324-9270

Sincerely,

Frances McSwain

Frances McSwain
Deputy State Historic Preservation Officer

cc: Mr. Randall Looney, Federal Highway Administration
Ms. Amber Hood, The Chickasaw Nation
Dr. Ian Thompson, Choctaw Nation of Oklahoma
Dr. Andrea Hunter, Osage Nation
Mr. Everett Bandy, Quapaw Tribe of Oklahoma
Ms. Kim Jumper, Shawnee Tribe of Oklahoma
Dr. Ann Early, Arkansas Archeological Survey

# Appendix C: Biological Evaluation

# Biological Evaluation

**for**

**Threatened, Endangered, and Sensitive Species**

# Haw Creek Str. & Apprs. (S)

**November 2015**

**Big Piney Ranger District**
**Ozark – St. Francis National Forest (OSFNF)**
**Johnson County, Arkansas**

**Prepared by:**

Ben Thesing
Environmental Analyst
Arkansas State Highway &
Transportation Department
P.O. Box 2261,
Little Rock, AR 72203
P: 501-569-2520

Dwayne Rambo
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Hector, AR 72843
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**Table of Contents**

## Introduction

Forest Service Manual (FSM) Section 2672.41 requires a biological evaluation (BE) and/or biological assessment (BA) for all Forest Service planned, funded, executed, or permitted programs and activities. The objectives of this BE/BA are to: 1) ensure that Forest Service actions do not contribute to trends toward federal listing, 2) comply with the requirements of the Endangered Species Act (ESA) so that federal agencies do not jeopardize or adversely modify critical habitat (as defined in ESA) of federally listed species, 3) provide a process and standard to ensure that federally threatened, federally endangered, and Regional Forester's sensitive species receive full consideration in the decision-making process using the best available science, and 4) to ensure compliance with the Ozark-St. Francis National Forest (OSFNF) Revised Land and Resource Management Plan (RLRMP, Sept 05) and the September 22, 2005, Biological Opinion for the American Burying Beetle OSFNF Arkansas. The best available science was used in the site specific analysis for all species covered in this BE. The BE will be divided into two sections: a Federally Threatened and Endangered section and a Regional Forester's Sensitive Species section.

## Project Location/Action Area

The proposed project is located in Township 12 North, Range 21 West, Section 20 in Johnson County Arkansas (35.681486°, -93.245867°) on the Highway 123 bridge over Haw Creek. The nearest city of Hagarville, AR is approximately 12.3 miles to the south southwest. Project location map and photos of the current bridge can be found in Appendix A. The action area for this project includes the immediate footprint outlined in the alternatives below and all areas indirectly affected by noise, vibrations, or fugitive dust during construction activity. Additionally, the action area will include any portion of Haw Creek that experiences increased turbidity during construction.

## Proposed Actions/Alternatives

The Arkansas Highway and Transportation Department (AHTD), in cooperation with the Federal Highway Administration (FHWA), is proposing to replace the structurally deficient bridge and approaches at the Highway 123 crossing of Haw Creek in Johnson County. The total length of the project is 0.42 miles. A map of the project area is enclosed. The initial design of six rectangular 4-sided box culverts was discarded from further consideration in this BE due to the possibility of aquatic organism disconnection.

## Alternative 1 – Three-sided Box Culvert

Alternative 1 consists of the replacement of the current bridge with a triple three-sided (bottomless) box culvert with a total length of 75.67' and width of 107.43' approximately 85' downstream from the current structure. The three-sided precast reinforced box culverts will be placed on cast-in-place concrete

footings. Proposed right of way widths will vary; in some sections no new right of way or only temporary construction easements will be required. The overall roadway width will increase from 24' to 28' with an increase of right of way width from 60' to 85'. Some channel excavation will be required for construction of the box culvert. Total construction time for this alternative is approximated at 75 working days. Designs can be found in appendix B.

**Alternative 2 – Bridge**

Alternative 2 consists of replacing the current structure with a 160' continuous composite w-beam unit with concrete columns on spread footings. Two piers will be constructed within the ordinary high water mark of the channel. This bridge will be approximately 90' downstream of the existing structure with a total length of 162.6' and a total of 31.2' deck width out to out with a roadway width of 28'. Travel lanes will be 10' wide with 4' shoulders for a total width of 24' for travel. This option will require an approximate 2.8' higher grade than the box culverts in Alternative 1. With the higher grade a longer project length and wider approaches will be required. A slightly larger ROW acquisition would be needed with approximately 105 working days.

**Alternative 3 – No Action**

This alternative proposes no new actions for this area. Over time the integrity of the bridge will continue to degrade resulting in the compromise to safety. This alternative is required by the National Environmental Policy Act of 1969 (NEPA), and serves as a baseline for comparison of alternatives considered in detail.

## Project Specific Assumptions

Best Management Practices (BMPs) will be implemented to prevent or reduce both point source and non-point source pollution. Erosion control measures will be taken to reduce soil loss and movement and protect water quality. These will include, but are not limited to, rock ditch checks and silt fences where applicable.

**Site Survey Information**

A review of the Arkansas Natural Heritage Commission (ANHC) Database, the Ozark- St. Francis National Forest SVE (species viability evaluation) database, and historic records was performed to determine the presence or absence of TES (federally threatened, endangered, and sensitive) species in or around the project area. The databases contain specific locations for TES compiled from field surveys and research conducted by several agencies. Historic records contain general locations and dates for observed TES species.

General surveys that have been conducted in several locations across the district and taken into consideration with this BE include Winter eagle surveys, Forest bat surveys (mist netting and anabat detection), Arkansas breeding bird survey routes, Christmas bird counts, Spring migration bird counts, and other project's surveys.

Site specific walk-through surveys for sensitive and federally threatened and endangered species and rare communities within and around this project area were conducted by Arkansas Highway and Transportation Department personnel in April and May of 2015. Aquatic surveys were conducted by the USFS staff Keith Whalen and AHTD staff Ben Thesing in May of 2015.

Plant occurrences in the Ozark National Forest and on Highway 123 right of way in the project area were surveyed April 28 and May 1, 2015, by AHTD staff Kayti Ewing and Ben Thesing. A total of 161 species were identified (Appendix C). Less than 7% of those are non-native introductions located with the 100 foot area around the proposed project footprint. No plants tracked by the Arkansas Natural Heritage Commission, species listed by the US Fish and Wildlife Service as "Threatened" or "Endangered", nor species listed by the Regional Forester of the Forest Service as "Sensitive" were encountered.

**USFWS Consultation History**

The US Forest Service sent a Biological Assessment that assessed the potential effects of implementation of the 2005 Revised Land and Resource Management Plan for the Ozark-St. Francis National Forests to the US Fish and Wildlife Service (USFWS) for review on August 9, 2005. USFWS sent a concurrence letter and initiated formal consultation in accordance with Section 7 (a) 2 of the Endangered Species Act on August 17, 2005.

On September 22, 2005, a non-jeopardy Biological Opinion for the American Burying Beetle (*Nicrophorus americanus*) was issued on the effects of implementation of the 2005 Revised Land and Resource Management.

On March 20, 2015, informal consultation with the USFWS indicated that with special provisions for tree clearing and time of day construction restrictions would you reasonable measures to offer protection for listed bat species in the area.

**Species Considered and Evaluated**

Federally Threatened and Endangered (T&E) species identified by the US Fish and Wildlife Service as occurring on or adjacent to the Ozark-St. Francis National Forests were considered in this BE. All species identified as "Sensitive" on the Ozark-St. Francis National Forests by the Regional Forester were also considered in this BE.

**Federally Listed (Endangered or Threatened) Species**

Twenty-three (23) federally listed species or candidate species have been identified by the US Fish and Wildlife Service, Conway Office as occurring or having the potential to occur on the Ozark-St. Francis National Forest. These species are listed below in Table 1.

Twenty (20) federally listed species, from Table 1 below, were eliminated from consideration for projects on the Big Piney Ranger District (BPRD) of the Ozark-St. Francis National Forest because 1) they do not occur on the Forest or 2) their known distribution is well outside the counties and/or watersheds that make up the Big Piney Ranger District or 3) no potential habitat was found within the project area. These species are in regular type (i.e. not bolded) in Table 1.

The proposed action will have "*no effect*" on these 20 species or their habitat and they will not be considered further in this BA/BE. No further consultation with the US Fish and Wildlife Service for these species is required. The remaining federally listed species will be given further consideration in this document due to their known occurrence on the Big Piney Ranger District or the presence of potential habitat within the Project Area. These species are indicated in **bold print** in Table 1.

**Critical Habitat**

The Endangered Species Act (1973) defines "critical habitat" for a threatened or endangered species as follows:
"(i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of this Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and(ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of this Act, upon a determination by the Secretary that such areas are essential for the conservation of the species."

There is no critical habitat for any federally-listed species on the BPRD of the OSFNF. There is no known occupied or unoccupied habitat required for recovery of any of the species discussed here in the project area, or the BPRD.

**Table 1: Occurrence record of threatened and endangered species in this review**

| Scientific Name | Common Name | Status | Ozark NF Presence | Project Area Presence | Comments |
|---|---|---|---|---|---|
| ***Myotis grisescens*** | **Gray Bat** | **E** | **1** | **Y** | **Hurricane Creek, Haw Creek, and Big Piney Creek. Occupied habitat.** |

| Scientific Name | Common Name | Status | Ozark NF Presence | Project Area Presence | Comments |
|---|---|---|---|---|---|
| ***Myotis sodalis*** | **Indiana Bat** | **E** | **1** | **Y** | **Secondary Bat Zones on Forest Assume occupied habitat.** |
| ***Myotis septentrionalis*** | **Northern long-eared bat** | **T** | **1** | **Y** | **Mist net surveys confirm that Northern long-eared bats are on the Big Piney Ranger District. Assumed occupied habitat.** |
| *Corynorhinus townsendii ingens* | Ozark Big-eared Bat | E | 1 | | Not reported on the BPRD although potential habitat exists. Mist net, cave, and anabat surveys across the district have not indicated their presence. |
| *Cambarus zophonastes* | Hell Creek Cave Crayfish | E | 2 | 3 | Cave streams in Benton County, AR. No element of occurrence records or potential habitat in the analysis area |
| *Cambarus aculabrum* | Cave Crayfish | E | 3 | | Only occurs in Northwest Arkansas. No element of occurrence records or potential habitat |
| *Amblyopsis rosae* | Ozark Cavefish | T | 2 | | Only occurs in Northwest Arkansas. No element of occurrence records or potential habitat |

| Scientific Name | Common Name | Status | Ozark NF Presence | Project Area Presence | Comments |
|---|---|---|---|---|---|
| *Scaphirhynchus albus* | Pallid Sturgeon | E | 3 | | Known from the St. Francis and Mississippi Rivers. No element of occurrence records or potential habitat |
| *Etheostoma moorei* | Yellow-cheek darter | E | 2 | | The yellow-cheek darter is endemic to the Little Red River. On the BPRD it is found in the South Fork of the Little Red in Van Buren County, AR. Critical Habitat is outside of the Forest Boundary. |
| *Alligator mississippiensis* | American Alligator | T | 3 | | Found on St. Francis National Forest. No element of occurrence records or potential habitat. |
| *Nicrophorus americanus* | American Burying Beetle | E | 1 | | Occurs on western edge of Magazine District. No element of occurrence records on BPRD and not likely to occur. |
| *Inflectarius magazinensis* | Magazine Mountain Shagreen | T | 1 | | This snail occurs in restricted habitat on Mt. Magazine. No element of occurrence records or potential habitat |
| *Campephilus principalus* | Ivory-billed Woodpecker | E | 3 | | Not reported on the Ozark NF. No element of occurrence records or potential habitat |

| Scientific Name | Common Name | Status | Ozark NF Presence | Project Area Presence | Comments |
|---|---|---|---|---|---|
| *Sterna antillarum* | Interior Least Tern | E | 3 | | Found on St. Francis NF. No element of occurrence records or potential habitat |
| *Lesquerella filiformis* | Missouri Bladderpod | T | 2 | | Not reported on the Ozark NF. No element of occurrence records or potential habitat |
| *Lindera mellissifolia* | Pondberry | E | 3 | | Not reported on the Ozark NF. No element of occurrence records or potential habitat |
| *Geocarpon minimum* | Geocarpon | T | 3 | | Known from only 4 southern AR counties. Not reported on the Ozark NF. No element of occurrence records or potential habitat |
| *Lampsilis abrupta* | Pink Mucket Mussel | E | 3 | | Not reported on the Ozark NF. No element of occurrence records or potential habitat |
| *Leptodea leptodon* | Scaleshell Mussel | E | 3 | | Not reported on the Ozark NF. No element of occurrence records or potential habitat |
| *Potamilus capax* | Fat Pocketbook Mussel | T | 3 | | Not reported on the Ozark NF. No element of occurrence records or potential habitat |

| Scientific Name | Common Name | Status | Ozark NF Presence | Project Area Presence | Comments |
|---|---|---|---|---|---|
| *Lampsilis streckeri* | Speckled Pocketbook Mussel | E | 2 | | South Fork of the Little Red River. Species not reported on Forest lands but occurs in the watershed downstream. |
| *Cumberlandia monodonta* | Spectaclecase Mussel | E | 2 | | Mulberry River Watershed. Pleasant Hill and Boston Mountain RDs. |
| *Lampsilis rafinesqueana* | Neosho Mucket Mussel | E PCH | 2 | | Illinois River Watershed; proposed critical habitat Wedington Unit and downstream from Forest boundary |
| *Quadrula cylindrica cylindrica* | Rabbitsfoot Mussel | T PCH | 2 | | Illinois River Watershed; War Eagle Creek Watershed; and Buffalo River Watershed (proposed critical habitat downstream of Forest Boundary) No habitat in project area. |

Status Codes

"E" = species is listed as "Endangered" by the USFWS
"T" – species is listed as "Threatened" by the USFWS
"PE" = species proposed as Endangered by the USFWS
"PT" = species proposed as Threatened by the USFWS
"PCH"= proposed Critical Habitat by the USFWS

Ozark NF Presence Codes

1 = Species is known to occur on the Ozark National Forest.
2 = Species is not known to occur on Ozark National Forest managed lands, but has suitable habitat within the Forest and a known distribution which makes occurrence possible.
3 = Species does not occur on Ozark National Forest managed lands and is not likely to occur there due to habitat requirements or geographic distribution.

Project Area Presence Codes

1 = Species is known to occur within the project area.
2 = Species is not currently known from the project area, but may occur there due to the presence of suitable habitat and a known distribution that makes occurrence possible.
3 = Species is not currently known from the project area and is not likely to occur there due to habitat requirements or geographic distribution.

**Evaluation of Federally Threatened and Endangered (T&E) Species**

**White-Nose Syndrome (WNS)**

Recent observations in and around caves across the eastern United States and into Missouri and Oklahoma have been made of hibernating bats partially covered with a white fungus, currently called "white-nose fungus", which appears to be causing the death of hibernating bats. At this time, little is known about the cause or origin of the fungus and how it contributes to the death of bats. Bats have been observed emerging early from their hibernation or dead within the hibernacula with depleted fat storages and poor body condition (USGS, 2010). If it is transmittable and causes bat mortality, it has the potential to decimate large numbers of bats, perhaps entire colonies. Bat and cave researchers are implementing protective measures to reduce the possibility that contamination is spread from equipment or the clothing of cavers. Additional study is ongoing to determine the type of pathogen, its origin, and its virulence. Locally, the OSFNF is discouraging individuals and groups from entering caves until further notice in order to prevent contamination in the event that it is possible to transmit WNS by way of clothing or gear. WNS has been confirmed in Arkansas.

> "WNS is known to affect hibernating bats, and 7 species of bats have been diagnosed with the disease. Five additional species (†) have been found with the fungus, but have not yet developed the disease.
>
> - Big brown bat (*Eptesicus fuscus*)
> - Eastern small-footed myotis (*Myotis leibii*)
> - Gray bat (*Myotis grisescens*)*endangered
> - Little brown bat (*Myotis lucifugus*)
> - Indiana bat (*Myotis sodalis*)*endangered
> - Northern long-eared bat (*Myotis septentrionalis*)*threatened
> - Tri-colored bat (*Perimyotis subflavus*)
> - Southeastern bat (*Myotis austroriparius*)†
> - Silver-haired bat (*Lasionycteris noctivagans*)†
> - Virginia big-eared bat (*Corynorhinus townsendii virginianus*)†
> - Eastern red bat (*Lasiurus borealis*)†
> - Rafinesque's big-eared bat (*Corynorhinus rafinesquii*)†
>
> † Pd-positive (BCI, 2014)"

A current map of WNS spread can be found at www.batcon.org/wns.

It is likely that Arkansas populations of gray, Indiana, and northern long-eared bat will be affected by this fungus and the population will likely decline due to this stressor and not due to forest management. The following sections will concentrate on the potential effects of the project.

Individual species write-ups follow and include the most currently available scientific information on local distribution, habitat requirements and other information that can be used to determine the potential for direct, indirect, or cumulative effects to the species.

**Gray Bat (*Myotis grisescens*)**
Federally Endangered

**Life History/Species and Habitat Description / Distribution**

Gray bats (Federally Endangered) are medium-sized with a wingspan of 10-11 inches, and are the largest *Myotis* species in the eastern United States. They have grayish-brown fur and are the only *Myotis* species whose wing membrane attaches to their ankle instead of the base of the first toe. The gray bat range is limited to the limestone karst areas of the southeastern and central United States.

The gray bat is primarily restricted to limestone cave habitats and will rarely use other habitats. This species has very specific cave requirements; as a result, less than five percent of available caves are utilized. These requirements vary depending on time of year, age, and sex. Summer caves must be warm ($55^{o}$-$77^{o}$ F), or with restricted rooms that can trap the body heat of roosting bats, and winter caves are very cold with a range in temperature between $42^{o}$ and $52^{o}$ F. These caves are deep with vertical walls and act as cold air traps. During transient periods, gray bats may use transient caves that have less restrictive requirements than summer and winter caves. In addition, males and yearling females will use a wider variety of caves and roost sites throughout the year than mature females.

This species will forage some in upland areas but primarily forages over streams and lakes/reservoirs. Summer caves are typically located within 1 mile, rarely over 2 miles, from rivers and reservoirs over which they forage. Gray bats primarily forage on emergent aquatic insects.

Gray bats breed at winter caves during September. Females will store sperm over the winter and become pregnant after emerging in late March. A single offspring is born in late May or early June. Young become volant 20 to 25 days after birth.

Reasons for the decline of the gray bat are as follows:

1. White-nose Syndrome

2. Human disturbance of the bats

3. Human disturbance to the environment such as vegetation manipulation in riparian areas and around caves, and road construction across streams

4. Cave destruction from impoundments

5. Cave commercialization, and

6. Natural sources of mortality

**Site-Specific Effects**

The primary concern is the potential effects on the species prey base from alteration of the riparian habitats and in stream morphology due to the reconstruction of the bridge. Gray bats have been documented through mist net surveys north and south of the confluence of Haw Creeks and Big Piney Creek and are likely using the project area for foraging. No caves or potential geological formations that may have cave habitats were identified in the project area. Telemetry studies have indicated that an occupied cave is present north of the project area. The exact location is unknown at this time but the hypothesized location is not in the immediate area adjacent to the project. With this information, the probability that this project will affect cave habitats is not likely.

The project will affect occupied foraging habitat for this species. The removal of riparian vegetation and manipulation of instream habitats will alter stream flow, destabilize stream banks, substrate types and the natural pool /riffle ratios. These alterations would negatively impact the availability of suitable habitats for many aquatic invertebrates and would likely decrease the abundance of emerging aquatic invertebrates that gray bats feed upon in the immediate area.

Gray bats will use smaller tributaries like Haw Creek but tend to utilize more open and larger streams and reservoirs. The telemetry study showed that the collared bats primarily utilized upstream on Big Piney Creek and during late summer were utilizing several of the fields in that area. These areas will not be affected by this project. In addition, the overall risk to aquatic organisms should be low due to the area that will be affected within the Big Piney Creek drainage, less than 50 acres.

This project will replace an existing bridge that has already affected the natural characteristic of the stream. The new design will decrease the overall effects on the stream and allow the natural migration of aquatic organisms. Sedimentation rates will initially increase but these effects will decline as the area revegetates and the stream morphology begins to stabilize. The use of the BMPs for the bridge construction should decrease the potential alteration of sedimentation rates and the effects on the stream morphology that would affect the species forage base.

Special provisions that restrict right of way tree clearing and grubbing during the summer from April 1 through October 15 will be put in place. Additionally, construction of project during summer months will be limited to day light hours to prevent any disturbance to foraging bats. These provisions will help reduce disturbances to foraging or transient bats in the area.

At this time, the Forest Service does not know of any future state, tribal, local or other private actions that would occur in the project action area.

**Effects Determination**

Gray bats are likely to forage in the project area, but BMP guidelines and special provisions should minimize potential effects on the species prey base and foraging habitats. The determination for gray bats is ***"may affect, not likely to adversely affect."***

**Indiana Bat (*Myotis sodalis*)**
**Federally Endangered**

**Life History/Species and Habitat Description/Distribution**

The Indiana bat (Federally Endangered) is a medium-sized bat with a total length of 3 to 4 inches and a wingspan of 9.5 to 10.5 inches. This bat closely resembles the little brown bat (*Myotis lucifigus*) and the northern long-eared bat (*Myotis septentrionalis*). The Indiana bat usually has a distinctly keeled calcar, and hind feet tend to be small with shorter hairs on the toes that do not extend beyond the toenails. Their fur exhibits a faint three-colored pattern when parted, the basal brownish black which spans 2/3 of the fur is followed by a narrow grayish band and a cinnamon brown tip. The fur of the belly and chest on an Indiana bat is lighter than the flat pinkish-brown fur of the back, but this character is not as distinct for the Indiana bat as the little brown bat and northern long-eared bat. Also, the Indiana bat has a smaller sagittal crest and tends to have a smaller, lower, and narrower braincase than the little brown bat. The Indiana bat is found throughout the eastern half of the United States.

Indiana bats hibernate in caves and mines during the winter. These sites tend to have temperatures between 39° and 46° F and relative humidity above 74% and below saturation. The Indiana bat has been documented using sites other than caves and mines (e.g. hydroelectric dam), but these sites have favorable microclimates.

Summer habitats for Indiana bats are floodplains, and riparian and upland forest with trees that have ex-foliating bark for roosting. This bat will also use old fields and pastures with scattered trees for foraging habitats. Some tree species the Indiana bat will use for roosting are American beech (*Fagus grandifolia*), black gum (*Nyssa sylvatica*), black locust (*Robinia pseudo-acacia*), elm (*Ulmus* spp.), hickory (*Carya* spp.), maple (*Acer* spp.), pine (*Pinus* spp.), oak (*Quercus* spp.), and sassafras (*Sassafras albidum*). Most of these tree species have the proper characteristics for roost sites after they are dead or dying, but species such as shagbark hickory and white oak are used while they are still living. Romme, et al. (1995) found that maternity roost sites were usually located in areas with 60 to 80% canopy cover. Indiana bats will also utilize roosts where the canopy closure is higher than 80% when temperatures are above normal or during periods of precipitation.

Indiana bats forage in and around the forest tree canopy for aquatic and terrestrial flying insects. Some of these insects are moths (Lepidoptera), caddisflies (Trichoptera), stoneflies (Plecoptera), beetles (Coleoptera), flies (Diptera), leafhoppers and treehoppers (Homoptera), and lacewings (Neuroptera). Foraging heights are usually from 6 to 100 feet above ground level. Also, canopy closure for foraging habitat has been found to range from 30% to 100% in floodplain habitats.

Indiana bats begin to swarm in August-September and breeding usually occurs in the latter half of this time period. After mating, females will enter directly into hibernation and store sperm over the winter. Females become pregnant after emerging the following spring. Indiana bats typically form maternity colonies with 100 or fewer adult bats. Young are born in late June or early July, and become volant within a month after birth.

Possible reasons for the decline of the Indiana bat are:

1. White-nose syndrome
2. Human disturbance and vandalism of hibernacula caves
3. Improper cave gates and structures
4. Natural hazards such as cave collapsing or flooding
5. Changes in cave microclimates
6. Changes in land use practices (e.g. fire suppression and an increase in density of forest surrounding hibernacula caves), and
6. Chemical contamination.

**Site-Specific Effects**

Indiana bats have not been documented in the project area. Over 330 mist net nights have been conducted in the southern part of the BPRD. No Indiana bats were captured during these surveys. This past summer a post-lactating female was captured in the Buffalo River Drainage on the northern edge of the district, but due to the time of year the bat was captured, late summer, researchers could not definitively say that the bat's maternity colony was in that area. A transmitter was attached to the bat but the transmitter was never picked up despite several nights of effort. It is believed that the bat migrated out of the area toward its hibernaculum and could have been migrating when captured.

Walk-through surveys were conducted in the project area. Investigations did not find any caves or T&E bat species roost sites. No maternity colonies have been found on the Ozark-St. Francis National Forest but the potential is there. The closest Indiana bat hibernaculum is approximately 14 miles away. The known hibernaculum should not be affected.

The primary concerns for this species are effects on potential summertime habitat, and loss of prey base due to factors such as alteration in the hydrologic and sedimentation regimes of local streams. Indiana bats are not restricted to cave habitats for roosting. Indiana bats usually roost under loose tree bark, such as shagbark hickory, and in tree hollows during March through November. If an unknown population exists in the project area, it is possible that cutting and felling trees could affect this population. This species, during the active months, are highly mobile and are likely to fly and escape any danger, except non volant young. No maternity colonies have been discovered in Arkansas and with the special provisions that tree harvest will not occur during the summer from April 1 through October 15, the probability of this happening is remote. Tree species with exfoliative bark such as shagbark hickory and white oak are common in the area along with snags and den trees. Potential roosting habitat should not be affected by this project.

Indiana bat's forage may temporarily be affected locally by the reduction in prey base. See the gray bat Site Specific Effects section for a more detailed discussion on potential effects on aquatic organisms. Indiana bats will forage more over terrestrial habitats throughout the summer than gray bats. This bridge reconstruction could affect a linear strip up to 160' wide and 0.42 mile long of terrestrial habitat but should not affect the overall foraging suitability of the area due to the amount of area being affected and being linear in nature. It would be likely if the species was in the area, they would utilize the corridor for travel and foraging on the edges.

At this time, the Forest Service does not know of any future state, tribal, local or other private actions that would occur in the project action area.

**Effects Determination**

Indiana bats have not been documented in the vicinity of the project area but the area is considered habitat for the species. BMP guidelines and special provisions limiting clearing and construction should help maintain water quality and habitat. The determination for Indiana bats is ***"may affect, not likely to adversely affect."***

**Northern Long-eared Bat (*Myotis septentrionalis*)**
**Federally Threatened**

**Life History/Species and Habitat Description/Distribution**

*Myotis septentrionalis* is a medium sized bat, similar to the Gray and Indiana, with a body length of 3-3.7 inches and a wingspan of 9-10 inches; however, this bat can be distinguished by longer ears as compared to other *Myotis* species. The northern long-eared bat is distributed across the eastern and north central United States and into Canada. During the winter, the bats will hibernate in caves or mines with high humidity and constant temperatures without drafts. During the summer, this species can be found in small groups or solitarily in both live or dead trees under bark, in cavities or in crevices; however, some individuals may roost in caves and mines or, rarely, in structures (USFWS, 2015).

Northern long-eared bats will forage in forested habitats feeding on moths, flies, leafhoppers, caddisflies, and beetles which will be caught in flight via echolocation or by gleaning from leaf and water surfaces (USFWS, 2015).

Threats to this species include alteration of caves and mines, structures that restrict access and passage in caves and mines, wind turbines, forest development, and white-nose syndrome. Timber management that degrades summer roosting and foraging is also a threat, but timber management may also improve forest conditions for summer habitat (USFWS, 2015).

**Site-Specific Effects**

Bat surveys across the district from the 1990's through 2012 have regularly recorded *Myotis septentrionalis*, and they have been recorded immediately adjacent to the project area. For this reason and it is one of the most common bats captured on the district, habitat within the project area will be assumed occupied by this species. Neither winter caves nor transient caves were identified in the project area during the terrestrial walk through.

Concerns for this species are similar to the Indiana bat. Cave habitat should not be affect by this project due to the fact no caves or geological formation that could have a cave was found within the project area during terrestrial surveys. Removal of trees and snags with a dbh as small as three inches that have exfoliative bark or holes large enough for the bat to crawl into will have the potential to affect occupied roost trees and unknown maternity sites. Tree removal will not occur through April 15 to October 1 in order to minimize these potential effects. Overall, the bat could lose as much as 50 acres of summer roost habitat.

Foraging habitat should not be affected for the same reasons identified in the Indiana bat section. It is likely this species will continue to utilize this area for foraging and travel corridor. with the potential effects on summer roosting habitat. timber harvesting during the months between October 1 and April 15 when the bats are not rearing their young and are most likely in hibernation; however, the potential gain from the project would be an unobstructed flight path with insect-harboring vegetation.

**Effects Determination**

Unlike the gray bat, the northern long-eared bat does not restrict itself to caves, mines and rock features year round. In a manner similar to Indiana bats, the northern long-eared bat will hibernate in caves during the winter and emerge to roost in cavities and under loose bark in the summer; however, unlike the Indiana bat, this species has been documented across the entire BPRD. Restricting the season of allowable timber removal to post pup-rearing and hibernation periods will reduce the potential for harassment and harm.

This project is likely to adversely affect the northern long-eared bat; however, there are no effects beyond those previously disclosed in the programmatic biological opinion dated August 5, 2015. Any taking that may occur incidental to this project on Forest Service land is excepted from the prohibitions

for taking threatened species under 50 CFR 17.31 and 17.32. This project is consistent with the forest plan, the biological opinion, and activities exempted from taking prohibitions under the rule adopted under the ESA section 4(d) rule applicable to the northern long-eared bat; therefore, the programmatic biological opinion satisfies the Forest Service's

**Cumulative Effects**

Under Section 7 of the Endangered Species Act cumulative effects are "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." [50 CFR §402.02] Future federal actions are subject to the consultation requirements established in section 7 and, therefore, are not considered cumulative effects. Cumulative effects are defined differently for purposes of the National Environmental Policy Act (NEPA). At this time, the Forest Service does not know of any future state, tribal, local or other private actions that would occur in the project action area.

Prepared by:

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**Regional Forester's Sensitive Species**

Thirty-two species occurring or having the potential to occur on the Ozark-St. Francis National Forest have been identified by the Regional Forester (Region 8) as Sensitive. These species are listed in Table 2 below.

Some Forest Sensitive species were eliminated from further consideration for projects on the Ozark National Forest for one of the following reasons: the species 1) does not occur on the Big Piney Ranger District, 2) does not occur in the project area, and/or 3) does not occur as defined by the known and historic ranges of these species and habitat requirements. These species are in regular type (i.e., not in bold) in the following table. Therefore the proposed project will have "no impact" on these species, and they will not be considered further in this BE.

The remaining Sensitive species will be given further consideration in this document due to their known occurrence on the Big Piney Ranger District, assumed presents, or potential for occurrence due to the presence of suitable habitat and nearby records. These species are indicated in bold print in Table 2.

Table 2: Regional Forester's Sensitive Species List. Bold type indicates those species reviewed in this BE due to occurrence or potential habitat.

| Scientific Name | Common Name | Global Rank | Ozark NF Presence | Project Area Presence | Comments (as related to BPRD) |
|---|---|---|---|---|---|
| ***Myotis leibii*** | **Eastern small-footed bat** | | **1** | | **Mammal. Hibernate in caves or mines. Forage near riparian areas & water sources, canopy openings, and near field edges. Newton, Searcy, Stone, Pope, & Franklin counties.** |
| ***Peucaea/Aimophila aestivalis*** | **Bachman's sparrow** | | **1** | | **Bird. Mature to old growth southern pine woodland that has been subjected to fires creating a well-developed grass/herb layer with limited shrub and midstory. SE section of BPRD.** |

| Scientific Name | Common Name | Global Rank | Ozark NF Presence | Project Area Presence | Comments (as related to BPRD) |
|---|---|---|---|---|---|
| ***Haliaeetus leucocephalus*** | **Bald Eagle** | | **1** | | **Bird. Coastal areas, bays, rivers, & lakes. Food includes fish and waterfowl. Roosts usually in conifers or other sheltered sites. Communal roosts found on the BPRD on Driver and Brock Creeks. Occasional transients along major waterways such as Illinois Bayou.** |
| *Eurycea tynerensis* | Oklahoma salamander | | 1 | | Amphibian. Permanently aquatic confined to small, cold, clear, cherty gravel-bottomed Streams. Taxonomic uncertainty |
| *Notropis ozarcanus* | Ozark shiner | | 1 | | Fish. High-gradient stream sections below riffles in large streams and rivers. Found mostly in the White, Black, & Illinois River Systems. Most abundant in the Buffalo River. |
| ***Percina nasuta*** | **Longnose darter** | | **1** | | **Fish. Silt-free upland large streams and small rivers with cobble & gravel bottoms. Illinois Bayou, Mulberry, Big Piney Creek, White River and other rivers. Presences survey conducted.** |
| *Typhlichthys subterraneus* | Southern cavefish | | 1 | | Fish. Caves and springs. Has not been found on OSFNF. |
| *Orconectes williamsi* | William's crayfish | | 1 | | Crayfish. Under rocks in pools from small, shallow, cool headwater streams of the White River System. |

| Scientific Name | Common Name | Global Rank | Ozark NF Presence | Project Area Presence | Comments (as related to BPRD) |
|---|---|---|---|---|---|
| *Lampsilis rafinesqueana* | Neosho mucket | | 1 | | Mussel. Freshwater mussel endemic to the Illinois and Neosho River drainages. Boston Mtn. Ranger district. |
| ***Paduniella nearctica*** | **Nearctic paduniellan caddisfly** | | **1** | | **Insect. Creeks to medium rivers. Crawford, Johnson, Stone, and Searcy Counties. Buffalo River National Park. Pleasant Hill & Sylamore RDs. Little Red River. Distribution not well known.** |
| ***Lirceus bicuspidatus*** | **An isopod** | | **1** | | **Isopod. Steams that have moving water. Distribution not well known.** |
| ***Amorpha ouachitensis*** | **Ouachita false indigo** | | **1** | | **Plant. Open, sunlit areas with reliable soil moisture. Found on Mt. Magazine and counties of Conway, Van Buren, Johnson, Madison and others south and west** |
| *Callirhoe bushii* | Bush's poppymallow | | 1 | | Plant. Rocky open woods, roadsides, wooded valleys, ravine bottoms, & glade borders. Found in Benton, Logan, Van Buren, Washington, Carroll, and Marion counties. |
| *Castanea pumila var. ozarkensis* | Ozark chinquapin | | 1 | | Plant. Widespread stump sprouts. Chestnut blight is the dominant threat. |
| ***Cypripedium kentuckiense*** | **Southern Lady's slipper** | | **1** | | **Plant. Moist floodplains, creeks, & slopes. Boone, Johnson, Newton, Pope, and Madison counties.** |

| Scientific Name | Common Name | Global Rank | Ozark NF Presence | Project Area Presence | Comments (as related to BPRD) |
|---|---|---|---|---|---|
| ***Delphinium newtonianum*** | **Moore's delphinium** | | **1** | | **Plant. Light to heavy shaded mostly hardwood woodland. Found in Newton, Searcy, Pope, Van Buren, and Johnson counties of OSFNF.** |
| *Delphinium treleasei* | Glade larkspur | | 1 | | Plant. Limestone glades and bald knobs in the White River region and on rocky open limestone exposures and glades elsewhere. North and Northwest Arkansas. |
| *Dodecatheon frenchii* | French's shooting star | | 1 | | Plant. Overhanging sandstone ledges near stream channels. Usually northeastern exposures with short duration of direct sunlight. Newton County. |
| *Draba aprica* | Open-ground draba | | 1 | | Plant. Thin soils with at least partial sun such as glades and open areas. Reported in Washington, Stone, and other counties off the OSFNF. |
| ***Eriocaulon koernickianum*** | **Small-headed pipewort** | | **1** | | **Plant. Shade and competition intolerant. Found near moist to wet areas such as sandstone glade seeps, bogs, & prairie stream banks. Found in Conway, Van Buren, Pope, Johnson, & Madison counties.** |
| *Fothergilla major* | Large witchalder | | 2 | | Plant. Dry habitats of the uplands. Searcy county. Has not been found on the Forest. |

| Scientific Name | Common Name | Global Rank | Ozark NF Presence | Project Area Presence | Comments (as related to BPRD) |
|---|---|---|---|---|---|
| *Juglans cinerea* | Butternut | | 1 | | Plant. Rich woods along base of slopes or bluffs and along streams. Newton, Searcy, and other counties off the District. Limited habitat on Forest. |
| *Neviusia alabamensis* | Alabama snow-wreath | | 1 | | Plant. Steep, rocky, wooded sites or riverbanks. Newton, Pope, Conway, Searcy and Faulkner counties. |
| *Quercus acerifolia* | Mapleleaf oak | | 1 | | Plant. Open woods, ledges and cliff edges, & rocky edges of plateaus. Pope county and Mt. Magazine. |
| *Schisandra glabra* | Bay starvine | | 1 | | Plant. Woods with clean forest floors with few shrubs in mid or understory. Typically occurs in heads of ravines developed on steep slopes. St. Francis NF. |
| *Silene ovata* | Ovate-leaf catchfly | | 1 | | Plant. Talus slopes beneath a sandstone bluff line. Newton, Pope, and Van Buren counties. |
| *Silene regia* | Royal catchfly | | 1 | | Plant. Tall grass prairie. Boone, Newton, & Searcy. |
| *Solidago ouachitensis* | Ouachita Mountain goldenrod | | 2 | | Plant. Moist, well-drained, gravelly soils in shaded, north-facing slopes. Ouachita Mountains. |
| ***Tradescantia ozarkana*** | **Ozark spiderwort** | | **1** | | **Plant. Mainly deciduous woodlands. Boone, Madison, Johnson, Newton, Pope, & Searcy counties.** |

| Scientific Name | Common Name | Global Rank | Ozark NF Presence | Project Area Presence | Comments (as related to BPRD) |
|---|---|---|---|---|---|
| *Trillium pusillum var. ozarkanum* | Ozark least trillium | | 1 | | Plant. Acid cherty-flinty soils of shallow draws of Oak-hickory, pine, or chestnut woodlands. Boone, Madison and Searcy counties. Limestone glades and bald knobs in the White River region. |
| *Valerianella nuttallii* | Nuttall's cornsalad | | 2 | | Plant. Stream bottoms in mixed hardwood stands. Has not been found on the OSFNF. |
| *Valerianella ozarkana* | Ozark cornsalad | | 1 | | Plant. Sunny openings in deciduous woods, sandstone & limestone glades, and roadside ditches. Madison, Searcy, and Conway counties. Limited habitat for this species on the Forest. |

NatureServe Global Conservation Status Ranks

G1 = Critically Imperiled- At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.

G2 = Imperiled- At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.

G3 = Vulnerable- At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.

G4 = Apparently Secure- Uncommon but not rare; some cause for long-term concern due to declines or other factors.

G5 = Secure- Common; widespread and abundant.

G#G# = Range rank- A numeric range rank is used to indicate the range of uncertainty in the status of a species or community. A G2G3 rank would indicate that there is a roughly equal chance of G2 or G3 and other ranks are much less likely. Ranges cannot skip more than one rank.

Rank Qualifiers

Q = Questionable Taxonomy- Taxonomic distinctiveness of this entity at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or the inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority conservation priority.

? = Inexact Numeric Rank- Denotes some uncertainty about the numeric rank. (e.g. G3? – Believed most likely a G3, but some chance of either a G2 or G4).

T#- Intraspecific Taxon (trinomial) - The status of intraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the global rank. Rules for assigning T-ranks fallow the same principles for global conservation status ranks.

Project Area Presence Codes

1= species is known to occur within the project area

2= species is not currently known from the project area but may occur within the project area due to the presence of suitable habitat.

3= species is not currently known from the project area and is not likely to occur there due to habitat requirements or geographic distribution

**Evaluation of Regional Forester's Sensitive Species**

Individual species write-ups follow and include the most currently available information on local distribution, habitat requirements and other information that can be used to determine the potential for direct, indirect, or cumulative effects to the species.

On May 1, 2015, an aquatic survey was conducted by Keith Whalen (USFS), Ben Thesing (AHTD), Kayti Ewing (AHTD), Bree Hall (USFS), and Lynda Hendershot (USFS) at the proposed project location to determine the presence of any threated, endangered, or sensitive species. Specifically the survey was conducted to rule out the possible presence of the longnose darter (*Percina nasuta*). The survey consisted of active electrofishing 400' downstream and 100' upstream of the current bridge location. Five passes, three downstream and two upstream, totaled 4068 seconds of active electro-fishing. All individuals were netted and held in a bucket for identification. Individuals were then released downstream to avoid recapture. A total of 440 individuals representing 18 species were captured. One individual, thought to be a Bigeye shiner, was unidentified due to the size being outside of normal bounds and was preserved and brought back for identification. No longnose darters or other species of concerned were encountered. Species list and count can be found in appendix D.

Vascular plant surveys were conducted on April 28 and May 1, 2015, by AHTD staff Kayti Ewing and Ben Thesing. A total of 161 species were identified (Appendix C). Less than 7% of those are non-native introductions located with the 100 foot area around the proposed project footprint. No plants tracked by the Arkansas Natural Heritage Commission, species listed by the US Fish and Wildlife Service as "Threatened" or "Endangered", nor species listed by the Regional Forester of the Forest Service as "Sensitive" were encountered.

## Eastern Small-footed Bat (*Myotis leibii*)

### Life History/ Habitat Description / Distribution

Eastern small-footed bats are uncommon throughout most of their range. The potential habitat for this species is all Forest Service acres except the St. Francis NF, approximately 900,000 acres. This bat is known to occur in Newton, Searcy and Stone Counties in Arkansas, and more recently during surveys conducted in Pope and Franklin Counties. Very little is known about its feeding habits or reproduction in this species. This bat tends to hibernate near cave entrances where temperatures drop below freezing and where humidity is relatively low; hence it may be vulnerable to freezing in abnormally severe winters. The most serious threat to this cave-dwelling bat is human disturbance during hibernation and white-nose syndrome. Additional surveys are needed to further delineate the distribution of this species on the Forest.

Habitat for the eastern small-footed bat is mostly hilly or mountainous areas, in or near deciduous or evergreen forests, sometimes in mostly open farmland. During summer months, they often inhabit buildings and caves and emerge to forage shortly after sunset and feeding within 3 to 10 feet above the ground typically over ponds and streams (NatureServe 2010). They consume flies, mosquitoes, true bugs, beetles, ants, and other insects.

In the summer, this species utilizes a wide variety of habitats for roost sites: caves, dead or live trees with exfoliating bark, den trees, crevices in bluff-lines, and under loose rock in open habitats.

### Site Specific Impacts

Surveys conducted on the district have documented that eastern small-footed bats occur near, with the assumption in, the project area. During bat surveys, this species has been found in small numbers across the district.

See the gray bat Site Specific Effects section for a discussion on sedimentation. Although there are no known caves with this species in the vicinity, eastern small-footed bats that are using the area for foraging and roosting could be impacted by tree felling operations. Although bats are highly mobile (and the young usually become volant within a month after birth), it is possible that individuals would be impacted. Any activities that will remove trees or cause a disturbance to surface rock may impact eastern small-footed bats. This bat will utilize interstitial spaces under rocks on the ground, trees with exfoliating bark, and snags as roost sites. No timber would be harvested from April 15$^{th}$ and October 1$^{st}$ which would decrease the potential to affect roosting bats, but because this species will roost under rock on the ground, the use of heavy equipment during this period could impact individuals roosting on the ground. This species occurs in low numbers at any given roost site so it is unlikely that impacts to the species would occur but would probably be limited to a small number of individuals, if impacts did occur.

**Impacts Determination**

Inclusion of special provision to prohibit tree clearing during the summer and limit construction actives to day light hours will be in place for federally listed species. For this reason, the determination for the eastern small-footed bat is "***may impact individuals, but it not likely to cause a trend to federal listing or loss of viability***."

**Bachman's Sparrow (*Aimophila aestivalis*)**

**Life History/ Habitat Description / Distribution**

This species is most similar to the field sparrow but has yellow in the bend of the wing, dark upper mandible, purplish back, darker crown and dark tail. Bachman's sparrow is found throughout the southeastern part of the United States and is a ground nesting, ground foraging resident of fire-managed mature pine forests and early successional habitats (Stober and Krementz, 2000).

This species habitat includes dry open pine with an undercover of grasses and shrubs, hillsides with patchy brushy areas, overgrown fields with thickets and brambles, grassy orchards, and large clear-cuts (usually at least 20 ha in Virginia). These habitats remain suitable for only a short period of time unless a frequent disturbance regime is present.

According to NatureServe, their food habits include eating insects, other invertebrates, and seeds of herbaceous plants and pines. The insect portion of its diet is relatively low in winter and increases in warmer months. They are ground foragers in dense grass, palmettos, or shrubs. Nestlings are fed insects (2010). The primary threat to this species is loss of habitat.

**Site Specific Impacts**

This species is an infrequent visitor to the southern half of the district. A decline in vegetation may also decrease available seed and insects. If Bachman's sparrow moves into the area and begins nesting, heavy equipment would be a threat to their nests due to their ground nesting and foraging habits. Right of way maintenance would provide early seral habitat, but would not improve the overall suitability of the project area for this species. This uncommon sparrow prefers mature pine forest with open grassy understory. The project area is mainly composed of a mature beech maple forest which is not suitable habitat for this species. There is no suitable habitat in the area and the road right of way would not be suitable habitat that would sustain this species in the area.

**Impact Determination**

This species has not been documented in the project area and this project is not likely to increase or decrease the site's potential for hosting Bachman's sparrows; therefore, the determination for this species is *"**no impact**"*. Haw Creek does not support suitable habitat for this species.

**Bald Eagle (*Haliaeetus leucocephalus*)**

**Life History/Species and Habitat Description /Distribution**

Bald eagles are large birds with a body length of 32 inches and wingspan of 80 inches. Adult birds have a brown body with a white head and tail. Immatures are brown, mottled irregularly with white until approximately their fourth year. This eagle is similar to the golden eagle, but can be distinguished from it by the bald eagle's much heavier bill, legs feathered halfway down the tarsus, flying with deep strokes, and soaring on flattened wings. Bald eagles occur in most of the United States and Canada.

The bald eagle is associated with aquatic environments throughout the majority of its range. Fish is the primary prey item. They will also feed on many other types of prey such as waterfowl and small mammals, and have been observed feeding on carrion, especially in wintering areas.

Nesting activities may begin as early as January with incubation and rearing of young occurring from March through mid-May. Nesting sites are usually in mature trees along shorelines, but they may also use cliffs or rock outcrops where large trees are not available. These sites are typically within two miles of water. Females lay one to three eggs, depending on environmental conditions and the fitness of the female. Incubation lasts about 35 days, and young fledge 10-14 weeks after hatching. In Missouri, most young fledge from June 1 to mid-July.

Reasons for the decline of the bald eagle have been well documented:

- Environmental contamination, particularly organochlorine insecticides like DDT-caused egg-shell thinning and reproductive failure and the illegal use of pesticides,
- Human disturbance of eagle nests and night roosts,
- Intentional killing by shooting or poisoning, and
- The degradation and alteration of roosting and nesting habitats.

**Site-specific Impacts**

There are no known nests or communal roosts in or near the project area nor were any of these habitats identified during the terrestrial walk through. Bald eagles may still use the area transiently as a secondary roost. The Big Piney Ranger District has no documented nest but has two communal roosts on the southeast corner of the District. These roosts are approximately 20 miles from the project area. The known communal roosts would not be impacted by these activities due to the distance from the project. Under the proposed activities, heavy equipment operation and tree felling should have negligible direct effects on transient bald eagles because they are highly mobile animals and would leave the area during activities if present.

The use of heavy equipment and large tree harvesting may disturb bald eagles and cause them to move temporarily from secondary roosting and foraging areas and may also remove some suitable roosting trees. However, since only transient usage is known within the action area, it is unlikely that such activities would have much impact on bald eagles.

Water quality is important for the health and detection of their primary food source, fish. Some soil movement would be expected during construction; however, per the requirement of implementing erosion control sedimentation is expected to be minimal. Effect to the species prey base should not occur even after taking into account the cumulative actions of the High Mountain project in the adjacent watershed. The High Mountain project activities were not predicted to breech the threshold for sedimentation in the Lower Big Piney Creek watershed, and with the highway expansion being mostly within the Upper Illinois Bayou the rates of sedimentation are not expected to increase above the threshold. This project area is also within an Inventoried Roadless Area (IRA) area; therefore, there are no plans, with the exception of prescribed burning, for additional tree felling or construction activities in the surrounding Upper Illinois Bayou watershed. Typically I hold the analysis to the watershed that will be affected Haw Creek and Big Piney Creek.

**Impacts Determination**

These activities outlined in these alternatives could impact the bald eagles' secondary roost but the risk to individuals of this species is extremely low. The determination is "***may impact individuals, but it not likely to cause a trend to federal listing or loss of viability***."

**Nearctic paduniellan caddisfly (*Paduniella nearctica*)**

**Life History/ Habitat Description / Distribution**

This species is endemic to Arkansas and Missouri and is found in creeks to medium-sized rivers. This species has been found in 2$^{nd}$ and 3$^{rd}$ order streams, 4 to 10 meters in width, with permanently flowing streams that have gravel/cobble or bedrock substrate. Mathis and Bowles (1994) stated that they had collected the most specimens from headwater streams minimally impacted by disturbances in areas of low velocities and large stable substrates (p. 365).

*Paduniella nearctica* was previously known to occur in Arkansas only in Devils Den State Park, but the distribution was later expanded to cover the 4th level watersheds of Robert S. Kerr Reservoir, Frog-Mulberry, Dardanelle Reservoir, and Little Red. It has recently been identified from the Buffalo River National Park in the Buffalo River 4th level watershed (Mott and Laurans 2004) and on the Ozark-St. Francis National Forest at the Barkshed Recreation Area on the Sylamore Ranger District in North Sylamore Creek (4th level watershed) (Moulton and Stewart 1996). The dominant vegetative type where the species is found is upland hardwood. Distribution of this species on the Ozark NF is largely unknown.

This species is in the family Psychomyiidae, which is known to be intolerant of disturbance. Because of the family's low tolerance for disturbance, the Nearctic paduniellan caddisfly would likely be affected by siltation.

**Site specific Impacts**

Increases in sedimentation and changes in hydrology are caused by soil disturbing activities, e.g., timber harvesting and road construction which would negatively impact this species. The BMPs for this project would help minimize the potential impacts of these activities. Caddisflies are terrestrial as adults and able to fly; therefore, the Nearctic paduniellan caddisfly should be able to colonize new available habitat fairly quickly (USDA FEIS, 2005). In addition the bridge is designed to minimize the potential impacts to the natural hydrology and morphology of the stream to allow for aquatic organisms passage.

**Impacts Determination**

This species has not been documented in the project area; however, adequate surveys have not been conducted to support their absence. Little is known about the life cycle and distribution of this aquatic species. The determination for the Nearctic paduniellan caddisfly is "***may impact individuals, but it not likely to cause a trend to federal listing or loss of viability.***"

**An Isopod (*Lirceus bicuspidatus*)**

**Life History/ Habitat Description / Distribution**

This isopod is found in small cave streams, seeps and small headwater streams but optimal habitat is believed to be spring runs. Little is known about the life history and distribution of this species. It has been recorded in the Arkansas River drainage in the Boston and Ouachita Mountains eco-regions, and White River drainage in the Boston Mountain and Ozark Highlands eco-regions. Threats to species are believed to be point source pollution and sedimentation from resource extraction.

**Site Specific Impacts**

Impacts to the Isopod would be similar to those of the Nearctic paduniellan caddisfly. It is not known to be in the area, but distribution is not well known.

**Impacts Determination**

The determination for the Isopod is "***may impact individuals, but it not likely to cause a trend to federal listing or loss of viability.***" This is due to the lack of springs located within the project area.

**Longnose darter *(Percina nasuta)***

**Life History/ Habitat Description / Distribution**

This species is typically found in medium to large streams to small rivers. Spawning takes place in the riffles sections of the streams from late March to mid-May. Reduction in range is primarily attributed to creation of reservoirs and other impoundments. This species is moderately sensitive to increases in siltation. Historically, this species was found in northeast Oklahoma, southern Missouri and to the edge of the Ouachita/Ozark highlands in Arkansas. It is currently believed to occur in four major drainages in Arkansas including the Arkansas River drainage, the White River drainage, the St. Francis River drainage, and the Ouachita River drainage, and It is believed to be very rare and possibly extirpated from Oklahoma and Missouri (Guillory, et al, 1978).

**Site Specific Impacts**

This species has been found in the Big Piney Creek drainage. The potential impact associated with the proposed activities is temporary increasing sedimentation. Increases in sedimentation and altering of the hydrology are caused by activities that cause soil disturbance. To what extent they have an impact are primarily associated with locations of disturbance, amount of area affect, and intensity. Where these activities could have the greatest impacts are in the riparian zones, steep slopes and on highly erosive soils. The project is located on a tributary to the Big Piney and should not directly impact the species. Erosion control measures should minimize the potential impacts on sedimentation rates, hydrology and this species.

**Impacts Determination**

This species is found in the watershed area. The proposed activities could impact the species, but BMPS and the location of the project area in comparison to known populations should be adequate to protect the species. The determination is "***may impact individuals, but it not likely to cause a trend to federal listing or loss of viability.***"

## Ouachita false indigo (*Amorpha ouachitensis*)

### Life History/ Habitat Description / Distribution

Ouachita false indigo prefers open, sunlit areas in oak-hickory-pine or oak-pine forests, along rocky hillsides, rocky stream banks and in floodplains. The beech-maple woods at Haw Creek have a dense canopy cover resulting in a very shady understory, which is not conducive for this species. Along Haw Creek, the forest canopy opens up and habitat potentially favors the species. ANHC records indicate a few occurrences further west in Johnson County along a wet hillside above Spadra Creek. The project specific vascular plant survey of the area did not find any Ouachita false indigo.

### Site Specific Impacts

Vascular plant surveys conducted within the project area did not identify Ouachita false indigo. Although the vascular plant survey did not detect the species within the project area, there is the possibility that individuals of this species could be overlooked. Temporary soil disturbance, creation of early successional habitat, and sedimentation should not have any direct effects on this species.

Under the proposed activities, temporary soil disturbance may allow non-native species to become established. Potentially invasive species noted in the project area include Japanese stilt grass (*Microstegium vimineum*), sericea lespedeza (*Lespedeza cuneata*), Chinese privet (*Ligustrum sinense*), and Japanese honeysuckle (*Lonicera japonica*).

### Impacts Determination

The proposed highway construction activities should have "***no impact***" for Ouachita false indigo. Vascular plant surveys conducted within the project area did not identify the Ouachita false indigo and the majority of available habitat is not conducive of occupancy.

## Ozark spiderwort (*Tradescantia ozarkana*)

### Life History/ Habitat Description / Distribution

This species is endemic to the Ozark Mountains of Arkansas, Oklahoma, and Missouri and the Ouachita Mountains of Arkansas and Oklahoma. It can be found growing in deciduous forest on steep, rocky, hillsides along with dolomite and limestone ravines. Ozark spiderwort flowers from late April through May. Flower color varies from white to light shades of pink and purple.

**Site Specific Impacts**

Vascular plant surveys conducted within the project area did not identify Ozark spiderwort. Although the vascular plant survey did not detect the species within the project area, there is the possibility that individuals of this species could be overlooked. Temporary soil disturbance, creation of early successional habitat, and sedimentation should not have any direct effects on this species.

Under the proposed activities, temporary soil disturbance may allow non-native species to become established. Potentially invasive species noted in the project area include Japanese stilt grass (*Microstegium vimineum*), sericea lespedeza (*Lespedeza cuneata*), Chinese privet (*Ligustrum sinense*), and Japanese honeysuckle (*Lonicera japonica*). Japanese stilt grass is of special concern because it is shade tolerant and can displace natural vegetation under a forest.

**Impacts Determination**

The proposed highway construction activities should have "***no effect***" for Ozark spiderwort. The rich woods at Haw Creek have some rocky slopes and sandstone ledges, which may be conducive for Ozark spriderwort; however, the lack of a limestone or dolomite derived substrate may conclude why it was not located in the vascular plant survey. Although the species was not detected within the project area, potential habitat does exist and there is a possibility for future colonization of the area.

**Southern Lady-slipper (*Cypripedium kentuckiense*)**

**Life History/ Habitat Description / Distribution**

This orchid occurs within the Interior Highlands of Arkansas, Missouri, and Oklahoma, the Gulf Coastal Plain of Texas, Louisiana, Alabama, and Mississippi, and the Cumberland Plateau of Kentucky and northern Tennessee (NatureServe 2009). It has also recently been found in eastern Virginia. The southern lady-slipper is common in the state of Arkansas. It is less common in Oklahoma, the western extent of its range.

The habitat for this species can be described as mesic floodplain forest along stream terraces and along margins of seeps and springs. These areas are often inundated annually and have a complete canopy. This species is also found on mesic north slopes in hardwood forests. It is most abundant above the flood level and away from spring-saturated soils. It is one of the most common and widespread Sensitive plant species on the Ouachita National Forest.

Protective measures established under the Forest Plan (USDA FS 2005a) and FEIS (USDA FS 2005b) to ensure the integrity of streamside management areas and seeps/springs have greatly reduced the potential for impacts to this species during resource management activities.

**Site Specific Impacts**

Vascular plant surveys conducted within the project area did not identify the southern lady-slipper. Although the vascular plant survey did not detect the species within the project area, there is the possibility that individuals of this species could be overlooked although unlikely due to the unique characteristic flower. Temporary soil disturbance, creation of early successional habitat, and sedimentation should not have any direct effects on this species.

Under the proposed activities, temporary soil disturbance may allow non-native species to become established. Potentially invasive species noted in the project area include Japanese stilt grass (*Microstegium vimineum*), sericea lespedeza (*Lespedeza cuneata*), Chinese privet (*Ligustrum sinense*), and Japanese honeysuckle (*Lonicera japonica*). Japanese stilt grass is of special concern because it is shade tolerant and can displace natural vegetation under a forest.

**Determination of Effects**

The proposed highway construction activities ***"no effect"*** for southern lady-slipper. Vascular plant surveys conducted within the project area did not identify the southern lady-slipper. Although the species was not detected within the project area, potential habitat does exist and there is a possibility for future colonization of the area.

**Moore's delphinium (*Delphinium newtonianum*)**

**Life History/ Habitat Description / Distribution**

Moore's delphinium prefers light to heavy shade in sloping, rich, mesic forests underlain by loamy clay soils derived from calcareous rock (Moore 1939). Haw Creek was found to have calcareous sandstone interbedded with shale which appears to be suitable habitat. A vascular plant survey did not find any Moore's delphinium, however suitable habitat is present.

**Site Specific Impacts**

Vascular plant surveys conducted within the project area did not identify the Moore's delphinium. Although the vascular plant survey did not detect the species within the project area, there is potential habitat present. Individuals of this species could be overlooked or not avoided during highway construction activities is possible. Temporary soil disturbance, creation of early successional habitat, and sedimentation should not have any direct effects on this species.

Under the proposed activities, temporary soil disturbance may allow non-native species to become

established. Potentially invasive species noted in the project area include Japanese stilt grass (*Microstegium vimineum*), sericea lespedeza (*Lespedeza cuneata*), Chinese privet (*Ligustrum sinense*), and Japanese honeysuckle (*Lonicera japonica*). Japanese stilt grass is of special concern because it is shade tolerant and can displace natural vegetation under a forest.

**Impacts Determination**

The proposed highway construction activities should have ***"no effect"*** for Moore's delphinium. Vascular plant surveys conducted within the project area did not identify the Moore's delphinium. Although the species was not detected within the project area, there is the possibility that individuals of this species could be overlooked or not avoided during highway construction activities.

**Small-headed pipewort (*Eriocaulon koernickianum*)**

**Life History/ Habitat Description / Distribution**

Small-headed pipewort is described as being intolerant of shade and an early successional species. This species is found in permanent wet or moist area, such as sandy hillside seep areas or sandstone glade seeps with little vegetation cover (NatureServe Explorer). In Oklahoma, Watson et al. (1994) found that the lack of disturbance in small-headed pipewort habitat was a contributing factor to population loss, especially fire suppression. The mature beech-maple forest community is one that forms in the absence of disturbance. Furthermore, no areas with shallow soils and little vegetation cover were found in or immediately adjacent to the project area. Habitat for small-headed pipewort is not present and a vascular plant survey did not find any individuals.

**Site Specific Impacts**

Vascular plant surveys conducted within the project area did not identify small-headed pipewort. Although the vascular plant survey did not detect the species within the project area, there is the possibility that individuals of this species could be overlooked or not avoided during highway construction activities is possible. Temporary soil disturbance, creation of early successional habitat, and sedimentation should not have any direct effects on this species.

Under the proposed activities, temporary soil disturbance may allow non-native species to become established. Potentially invasive species noted in the project area include Japanese stilt grass (*Microstegium vimineum*), sericea lespedeza (*Lespedeza cuneata*), Chinese privet (*Ligustrum sinense*), and Japanese honeysuckle (*Lonicera japonica*). Japanese stilt grass is of special concern because it is shade tolerant and can displace natural vegetation under a forest.

**Impacts Determination**

The proposed highway construction activities should have "***no effect***" for small-headed pipewort. Vascular plant surveys conducted within the project area did not identify the small-headed pipewort. Suitable habitat was not identified within the project area. Although there is the possibility that individuals of this species could be overlooked it is not likely found in the area.

**Cumulative Effects**

Under Section 7 of the Endangered Species Act cumulative effects are "those effects of future State or private activities, not involving Federal activities that are reasonably certain to occur within the action area of the Federal action subject to consultation." [50 CFR §402.02] Future federal actions are subject to the consultation requirements established in section 7 and, therefore, are not considered cumulative effects. At this time, the Forest Service does not know of any future state, tribal, local or other private actions that would occur in the project action area.

The National Environmental Policy Act (NEPA) defines cumulative effects as "the incremental environmental impact or effect of the proposed action, together with impacts of past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

Four cumulative effects have been identified that have the potential to impact species. Those actions include prescribed fire, stream bank stabilization, vegetation management plan and highway passing lane projects. Each of these actions has the potential to affect aquatic or terrestrial flora and fauna.

A prescribed burn unit identified as "Piney Block A" is 5,730 acres located south of highway 123 and partially within the project area. This prescribed burn is scheduled to occur no more than once every three years. Prescribed fire is a valuable tool in forest management. Terrestrial species such as the eastern small-footed bat, Bachman's sparrow, or bald eagle may temporarily avoid the areas being burned due to smoke and fire. This disturbance is not thought to negatively impact species in the long term management goals of the forest. Aquatic species such as the long-nosed darter, nearctic paduniellan caddisfly, or the isopod may be temporarily impacted by ash or soot entering the streams after a rain event. With fire being a nature processes it will likely not be detrimental to any aquatic species. Ouachita false indigo, Ozark spiderwort, Moore's delphinium, southern-lady slipper, and small-headed pipewort that are present within the burned area could suffer direct mortality, but are adapted well enough to be resilient and overall not be affected on population level. Fire have proven to be an integral part of the continued health and vitality of forest ecosystems.

The Fort Douglas stream bank stabilization project on the Big Piney Creek directly upstream from the confluence of Haw Creek was completed in the summer of 2014. This project involves the stabilization of approximately 435 feet of stream bank that has banks with an average cut of 15' in height. Banks were sloped back, a flood bench was created and a rock series of rock vanes were installed. During construction of the project soil disturbance would have temporarily increased within the main channel. Terrestrial species such as the eastern small-footed bat or bald eagle potentially could be affected by this

project due to the temporary increase in sedimentation resulting in a temporarily decrease in foraging ground on Big Piney Creek. The Bachman's sparrow would experience little to no impacts from this project. Aquatic species may be temporarily impacted by the increased sedimentation during construction. Individual plant species, if present in the construction area of this project, may be removed or crushed during construction. The goal of the project is to decrease sedimentation through the stabilization of the bank and planting of the riparian vegetation. In the long term this project should be beneficial to all sensitive species.

The High Mountain vegetation management plan is located southwest of the community of Pelsor with boundaries of Highway 7 to the east, Highway 123 to the north, and Big Piney Creek to the west. This project involves a combination of silviculture and roadside management techniques including selective mechanical and chemical vegetation removal. Due to the distance away from the project all terrestrial species may be temporarily disturbed by the mechanical removal of vegetation. Aquatic species will not be foreseeably impacted by any activities associated with the vegetation management plan at High Mountain. Plant species located within the vegetation management area could be crushed or chemically removed if within the direct area of treatment. With the selective process of application all impacts will be minimized.

The Arkansas Highway and Transportation Department is planning the construction of passing lanes along selected sections of Highway 7. Passing lanes consist of widening current right of way that will result in the clearing of adjacent trees. The clearing of trees could impact the eastern small-footed bat due to widening of the road making travel across these cleared sections more difficult. Potential roost trees could be felled during the construction process as well. Temporary increased sedimentation in streams associated with highway construction jobs could potentially decrease available forging grounds for the bat. Bald eagles and Bachman's sparrow are likely going to be unaffected by the passing lane additions. Aquatic species may also be impacted by the temporary increase of sedimentation. Of the listed plant species, it is possible that plants may be crushed by heavy equipment during the construction process in the direct foot print of the passing lane project.

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**Databases and Websites**

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http://www.agfc.com/wildlife-conservation/endangered/ozark-big-eared-bat.aspx

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**Personal Communications:**

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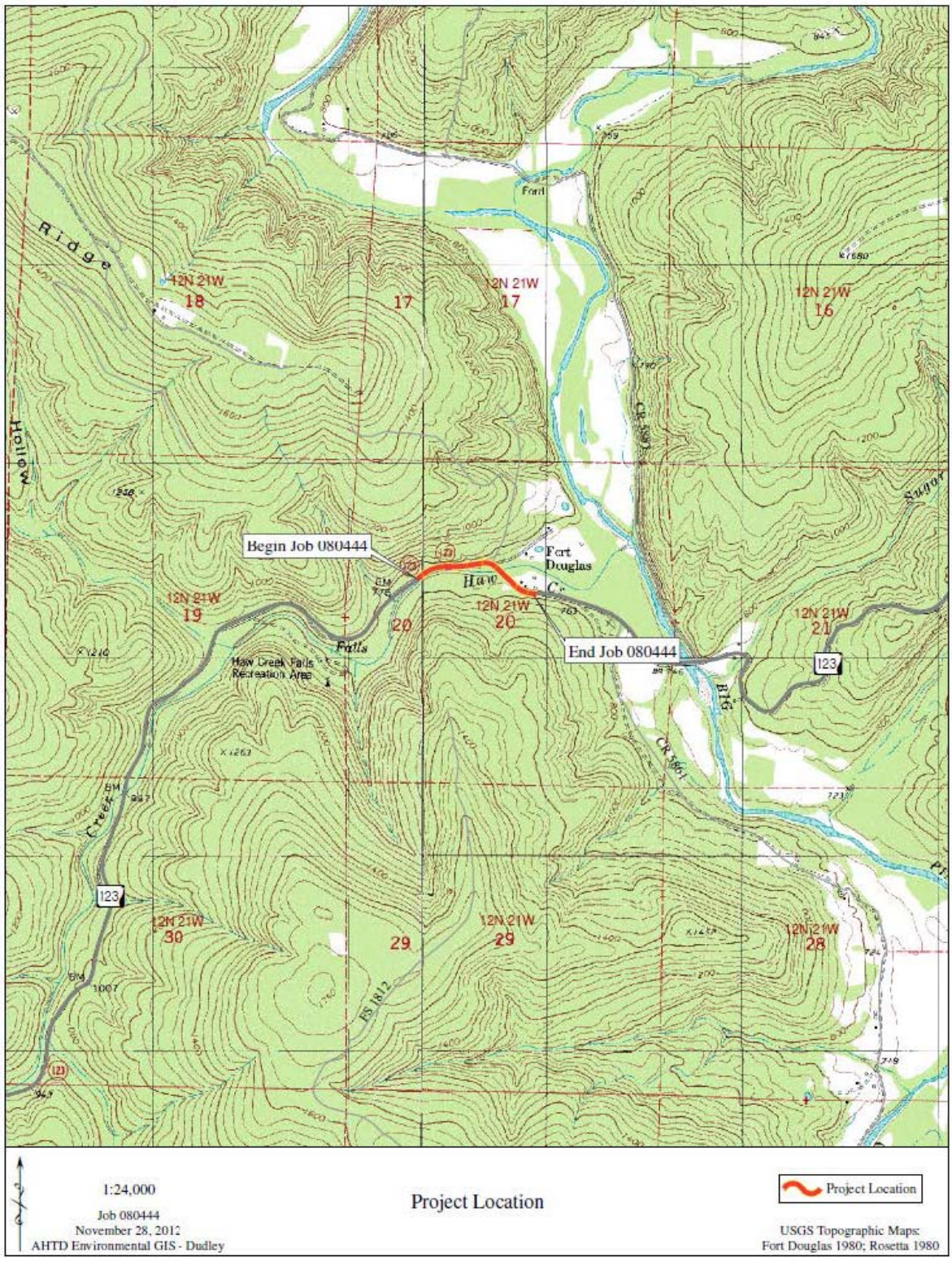
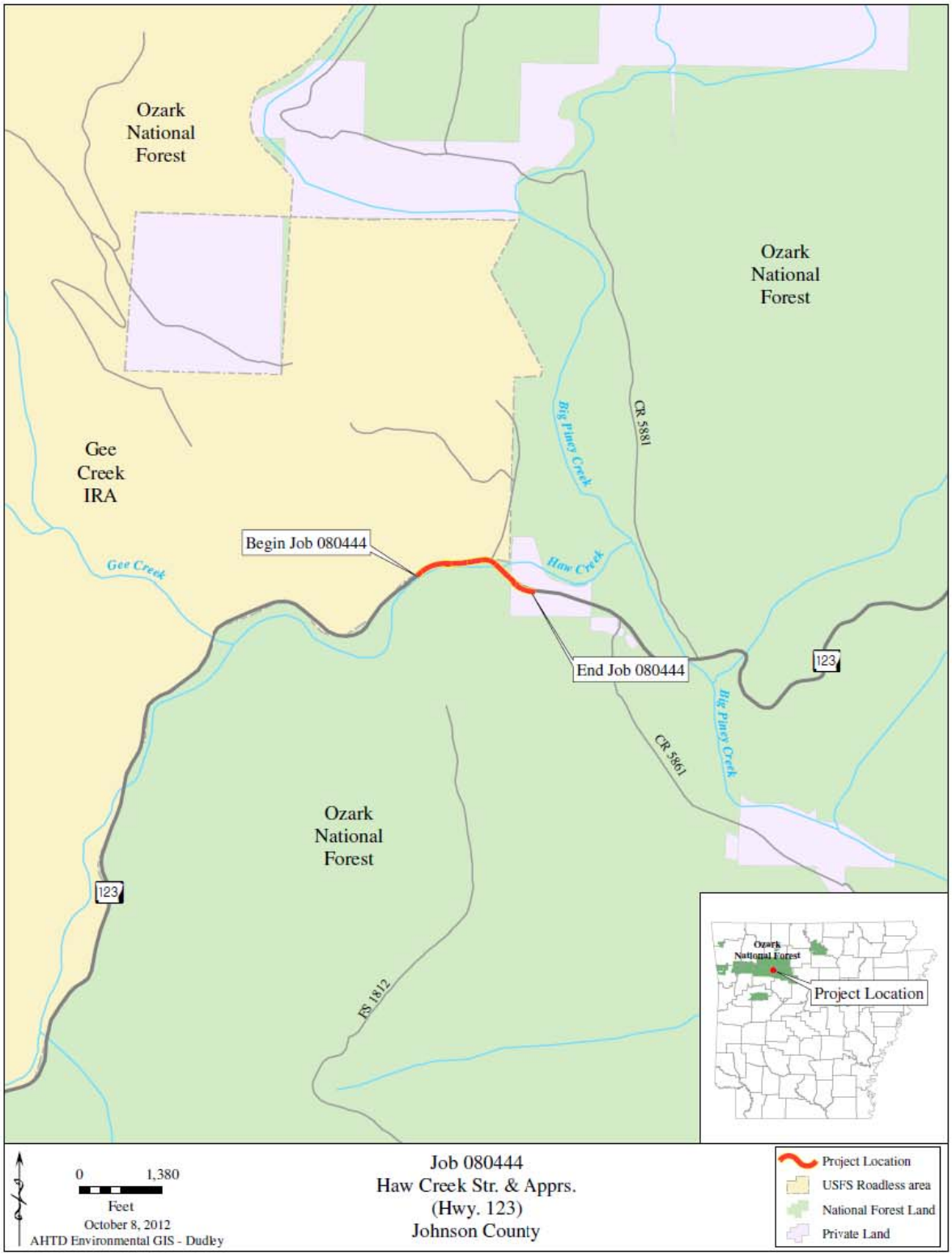
Mulford, Michael. NEPA Coordinator, USFS Big Piney Ranger District, Jasper AR. February, 2013.

Seagraves, Josh. Section Head Special Studies, Arkansas Highway and Transportation Department. 2015.

## Appendix A – Project Location

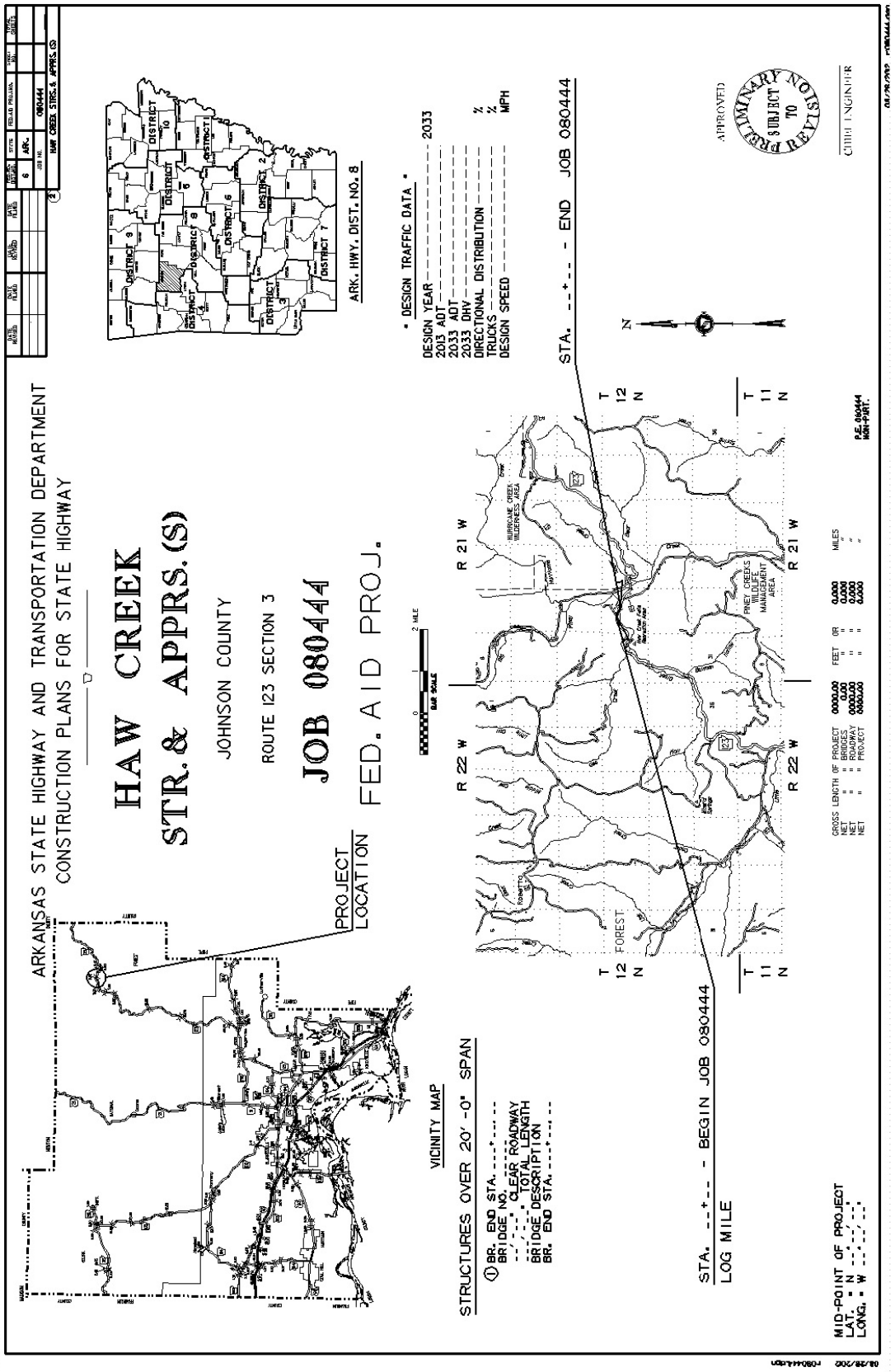


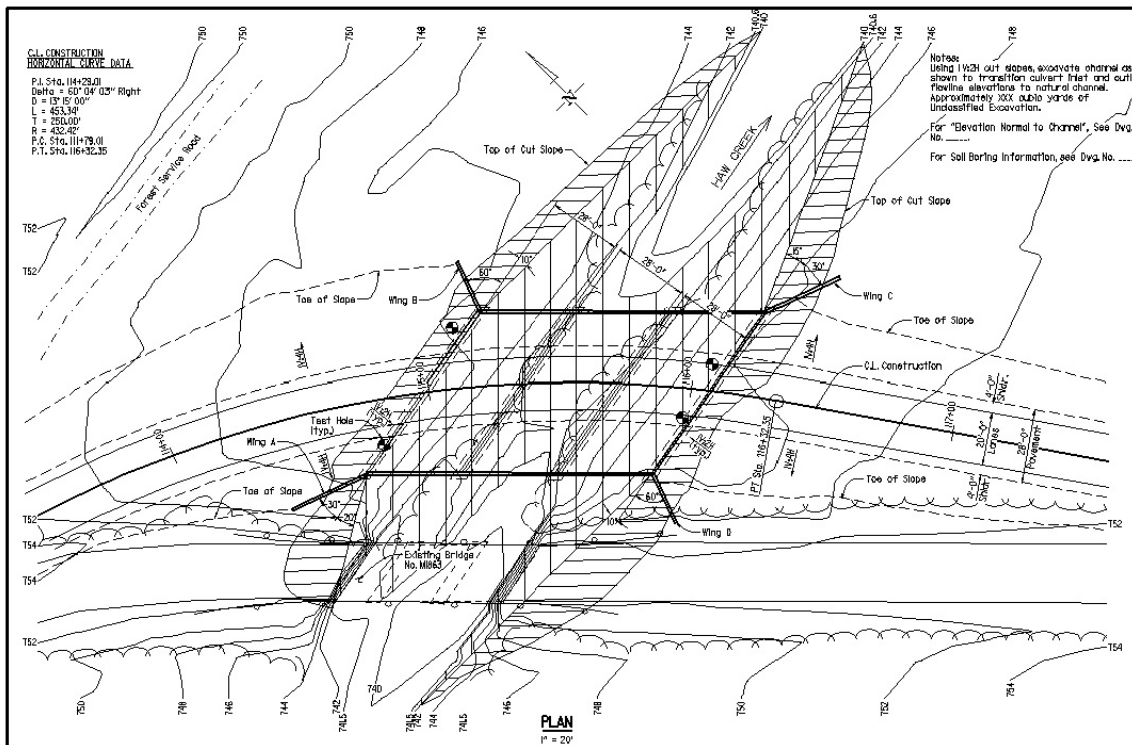

Ozark
National
Forest
Ozark
National
Forest
Gee
Creek
IRA
Big Piney Creek
CR 5881
Begin Job 080444
Gee Creek
Haw Creek
End Job 080444
123
Big Piney Creek
CR 5861
Ozark
National
Forest
123
FS 1812
Ozark
National Forest
Project Location
0
1,380
Feet
October 8, 2012
AHTD Environmental GIS - Dudley
Job 080444
Haw Creek Str. & Apprs.
(Hwy. 123)
Johnson County
Project Location
USFS Roadless area
National Forest Land
Private Land

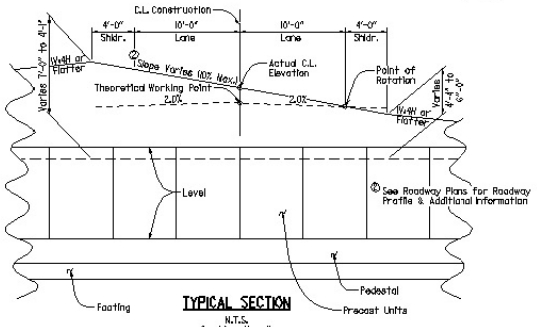
Existing Bridge with Stone Masonry Piers

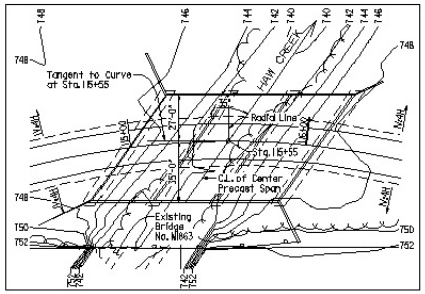
Existing Bridge with Stone Masonry Piers

**Appendix B – Project Design**






Notes:
Using 1V:2H cut slopes, excavate channel as shown to transition culvert inlet and outlet flowline elevations to natural channel.
Approximately XXX cubic yards of Unclassified Excavation.

For "Elevation Normal to Channel", See Dwg. No. .....

For Soil Boring Information, see Dwg. No. .....

| DATE REVISED | DATE FILED | DATE REVISED | DATE FILMED | RELEASED FOR | SHEET | FED. AID PROJ. NO. | CONST. NO. | REG. CHECK |
|---|---|---|---|---|---|---|---|---|
| | | | | | 1 of 2 | | | |
| | | | | | JOB NO. | 080444 | | |
| | | | | 1 | LAYOUT | | | |

GENERAL NOTES

BENCHMARK: Vertical control data is shown on the Survey Control Data Sheets.

CONSTRUCTION SPECIFICATIONS: Arkansas State Highway and Transportation Department Standard Specifications for Highway Construction (2014 edition) with applicable Supplemental Specifications and Special Provisions. Unless otherwise noted in the plans, Section and Subsection refer to the Standard Construction Specifications.

DESIGN SPECIFICATIONS: AASHTO LRFD Bridge Design Specifications, Sixth Edition (2012), with 2013 Interim Revisions.

LIVE LOADING: HL-93
SEISMIC PERFORMANCE ZONE: 1

BORING LOGS: Boring logs may be obtained from the Construction Contract Procurement Section of the Program Management Division.

FOOTINGS: Footings shall be set either to a minimum of 1'-0" into material designated as Sandstone or Shale with Sandstone Seams on the boring legend, or the top of footing shall be set at or below Elev. 733.5. Foundations for footings shall be prepared in accordance with Subsection 801.04. Rock excavations shall be made to neat lines of the concrete footings. Care shall be exercised to avoid shattering of rock faces by excessive blasting. Concrete in footings shall be poured directly against excavated surfaces of rock. Excavations shall be backfilled and compacted to the channel flow line grade in accordance with Subsection 801.08.

THREE-SIDED PRECAST CULVERT: Precast Culvert shall be fabricated and constructed in accordance with the details shown and Job Special Provision "Three-Sided Precast Culvert".

EXISTING BRIDGE: Existing Bridge No. M863, L.M. 6.52 is 22.3' wide and 66' long. The existing bridge consists of corrugated metal decking with asphalt overlay on steel beams supported by rock masonry piers and abutments.

REMOVAL AND SALVAGE: After the new structure is open to traffic, existing Bridge No. M863 shall be removed in accordance with Section 805. All material from the existing bridge shall become the property of the Contractor.

MAINTENANCE OF TRAFFIC: See Roadway Plans.

## HYDRAULIC DATA

| FLOOD DESCRIPTION | FREQUENCY | DISCHARGE | ① NATURAL WATER SURFACE ELEVATION | WATER SURFACE ELEV. WITH BACKWATER |
|---|---|---|---|---|
| | YEARS | CFS | FEET | FEET |
| Design | 25 | 7,000 | 752.9 | 753.1 |
| Base | 100 | 10,100 | 754.3 | 755.3 |
| Extreme | 500 | 15,000 | 756.8 | 757.0 |
| Overtopping | 50 | 8,800 | 753.8 | 755.3 |

① Unconstricted water surface without structure or roadway approaches.

Q100 backwater elevation for existing structure = 755.3
Hydraulic Model Proposed Low Chord Elev. = 749.60

Drainage area = 15.3 square miles
Historical H.W. Elev = 753.5

PRELIMINARY SUBJECT TO REVISION
BRIDGE DIVISION
PRINT DATE mm-dd-yyyy
SCRUBEL
BRIDGE ENGINEER

SHEET 1 OF 2
LAYOUT OF
THREE-SIDED PRECAST CULVERT
OVER HAW CREEK

HAW CREEK STR. & APPRS. (S)
JOHNSON COUNTY

ROUTE 123 SEC. 03
ARKANSAS STATE HIGHWAY COMMISSION
LITTLE ROCK, ARK.

DRAWN BY: ACP DATE: 09-26-13 FILENAME: b080444_ll.dgn
CHECKED BY: _____ DATE: _____ SCALE: As Shown
DESIGNED BY: _____ DATE: _____

PRINT DATE: datepinted

Example of Three-Sided Box Culvert (size and dimensions not to project specifications)

## Appendix C - Vascular Plant Survey

**TREES (39 species)**

| | | |
|---|---|---|
| *Acer rubrum* | red maple | |
| *Acer saccharum* | sugar maple | |
| *Alnus serrulata* | alder | |
| *Asimina triloba* | pawpaw | |
| *Carpinus carolinana* | American hornbeam | |
| *Carya tomentosa* | mockernut hickory | |
| *Celtis occidentalis* | hackberry | |
| *Cercis canadensis* | redbud | |
| *Cornus florida* | flowering dogwood | |
| *Cornus drummondii* | rough-leaf dogwood | |
| *Diospyros virginiana* | persimmon | |
| *Fagus grandifolia* | beech | |
| *Fraxinus americana* | white ash | |
| *Fraxinus pennsylvanica* | green ash | |
| *Gleditsia tricanthos* | honey locust | |
| *Hamamelis vernalis* | Ozark witch-hazel | |
| *Ilex decidua* | deciduous holly | |
| *Juglans nigra* | black walnut | |
| *Juniperus virginiana* | eastern red cedar | |
| *Liquidambar styraciflua* | sweetgum | |
| *Magnolia tripetala* | umbrella magnolia | |
| *Morus rubra* | red mulberry | |
| *Nyssa sylvatica* | blackgum | |
| *Ostrya virginiana* | hop hornbeam | |
| *Pinus echinata* | shortleaf pine | |
| *Platanus occidentalis* | sycamore | |
| *Prunus serotina* | black cherry | |
| *Quercus alba* | white oak | |
| *Quercus muhlenbergii* | chinquapin oak | |
| *Quercus rubra* | northern red oak | |
| *Quercus shumardii* | shumard oak | |
| *Quercus velutina* | black oak | |
| *Salix nigra* | black willow | |
| *Sassafras albidum* | sassafras | |
| *Sideroxylon lanuginosum* | gum bully | |
| *Tilia americana* | basswood | |
| *Ulmus alata* | winged elm | |
| *Ulmus americana* | American elm | |
| *Viburnum rufidulum* | rusty black haw | |

**SHRUBS (16 species)**

| | | |
|---|---|---|
| *Amorpha fruticosa* | indigo-bush | |
| *Callicarpa americana* | American beautyberry | |
| *Crataegus sp.* | hawthorn | |
| *Dirca palustris* | leatherwood | |
| *Forsythia viridissima* | forsythia | nn |
| *Hydrangea aborescens* | wild hydrangea | |
| *Hypericum prolificum* | shrubby St. John's-wort | |
| *Ligustrum sinense* | Chinese privet | nn |
| *Lindera benzoin* | spicebush | |
| *Rhamnus caroliniana* | Carolina buckthorn | |
| *Rhus aromatica* | fragrant sumac | |

| | | |
|---|---|---|
| *Rhus glabra* | smooth sumac | |
| *Rosa carolina* | Carolina Rose | |
| *Rosa multiflora* | multiflora rose | nn |
| *Symphoricarpos orbiculatus* | coral berry | |
| *Vaccinium arboreum* | farkleberry | |

**WOODY VINES and BRAMBLES (11 species)**

| | | |
|---|---|---|
| *Berchemia scandens* | rattan vine | |
| *Campsis radicans* | trumpet creeper | |
| *Lonicera japonica* | Japanese honeysuckle | nn |
| *Lonicera sempervirens* | trumpet honeysuckle | |
| *Parthenocissus quinquefolia* | Virginia creeper | |
| *Rubus sp.* | blackberry | |
| *Smilax bona-nox* | cat brier | |
| *Smilax rotundifolia* | common greenbrier | |
| *Toxicodendron radicans* | poison ivy | |
| *Vitis aestivalis* | summer grape | |
| *Vitis rotundifolia* | muscadine grape | |

**DICOT FORBS (72 species)**

| | | |
|---|---|---|
| *Actaea pachypoda* | doll's-eyes | |
| *Allium canadense* | wild onion | |
| *Ambrosia trifida* | giant ragweed | |
| *Amsonia tabernaemontana* | eastern bluestar | |
| *Antennaria plantaginifolia* | pussytoes | |
| *Apios americana* | groundnut | |
| *Arisaema dracontium* | green-dragon | |
| *Arisaema triphyllum* | jack in the pulpit | |
| *Asarum canadense* | wild ginger | |
| *Asclepias quadrifolia* | four-leaf milkweed | |
| *Boehmeria cylindrica* | false nettle | |
| *Cardamine concatenata* | toothwort | |
| *Chenopodium album* | lamb's-quarters | nn |
| *Leucanthemum vulgare* | ox-eye daisy | nn |
| *Claytonia virginica* | spring beauty | |
| *Cynoglossum virginianum* | wild comfrey | |
| *Desmodium rotundifolium* | dollar-leaf | |
| *Desmodium sp.* | tick-trefoil | |
| *Dicentra cucullaria* | Dutchman's-breeches | |
| *Dioscorea villosa* | wild yam | |
| *Elephatopus carolinianus* | Carolina elephant's-foot | |
| *Erythronium rostratum* | yellow trout-lily | |
| *Euonymus americanus* | strawberry-bush | |
| *Euphorbia corollata* | flowering spurge | |
| *Fragaria virginiana* | wild strawberry | |
| *Galium aparine* | cleavers | |
| *Galium circaezans* | wild licorice | |
| *Geum canadense* | white avens | |
| *Geranium maculatum* | wild geranium | |
| *Heuchera americana* | American alumroot | |
| *Hypericum hypericoides* | St. Andrew's cross | |
| *Iris cristata* | dwarf crested iris | |
| *Krigia biflora* | two-flower dwarf-dandelion | |
| *Lespedeza cuneata* | Sericea lespedeza | nn |

| | | |
|---|---|---|
| *Maianthemum racemosum* ssp. *racemosum* | false Solomon's-seal | |
| *Mitchella repens* | partridge-berry | |
| *Monarda bradburiana* | Bradbury's beebalm | |
| *Ornithogalum umbellatum* | star-of-Bethlehem | nn |
| *Osmorhiza longistylis* | sweet anise | |
| *Oxalis stricta* | yellow wood-sorrel | |
| *Oxalis violacea* | violet wood sorrel | |
| *Packera obovata* | round-leaf ragwort | |
| *Pedicularis canadensis* | wood-betony | |
| *Persicaria virginiana* | jumpseed | |
| *Phacelia hirsuta* | hairy scorpion-weed | |
| *Phlox divaricata* ssp. *laphamii* | wild blue phlox | |
| *Plantago sp.* | plantain | |
| *Podophyllum peltatum* | mayapple | |
| *Polygonatum biflorum* | Solomon's-seal | |
| *Prenanthes spp.* | rattlesnake-root | |
| *Ranunculus recurvatus* | hooked buttercup | |
| *Rudbeckia laciniata* | cutleaf coneflower | |
| *Salvia lyrata* | lyre-leaf sage | |
| *Sanguinaria canadensis* | bloodroot | |
| *Sedum ternatum* | woodland stonecrop | |
| *Silene virginica* | fire pink | |
| *Sisyrinchium angustifolium* | blue-eyed-grass | |
| *Stellaria media* | common chickweed | nn |
| *Thalictrum thalictroides* | rue anemone | |
| *Thaspium barbinode* | meadow-parsnip | |
| *Thaspium trifoliatum* var. *aureum* | meadow-parsnip | |
| *Torilis arvensis* | field hedge-parsely | nn |
| *Trillium sp.* | trillium | |
| *Trillium viridescens* | green trillium | |
| *Triodanis perfoliata* | clasping Venus' looking-glass | |
| *Uvularia grandiflora* | large-flower bellwort | |
| *Valerianella radiata* | cornsalad | |
| *Verbesina virginica* | frostweed | |
| *Vicia sativa* | garden vetch | nn |
| *Vinca major* | big-leaf periwinkle | |
| *Viola palmata* | three-lobe violet | |
| *Viola spp.* | violet | |

**GRASSES AND SEDGES (15 species)**

| | | |
|---|---|---|
| *Arundinaria gigantea* | river cane | |
| *Carex blanda* | sedge | |
| *Carex retroflexa* | sedge | |
| *Carex spp.* | sedge | |
| *Chasmanthium latifolium* | inland sea-oats | |
| *Cyperus sp.* | flatsedge | |
| *Danthonia spicata* | poverty grass | |
| *Dichanthelium sp.* | panic grass | |
| *Elymus canadensis* | Canada wildrye | |
| *Festuca sp.* | fescue | |
| *Luzula bulbosa* | wood-rush | |
| *Melica mutica* | two-flower melic | |
| *Microstegium vimineum* | Japanese stilt grass | nn |
| *Scleria sp.* | nut-rush | |
| *Setaria parviflora* | knot-root foxtail | |

**FERNS (8 species)**

| | |
|---|---|
| *Asplenium platyneuron* | ebony spleenwort |
| *Asplenium rhizophyllum* | walking fern |
| *Botrychium virginianum* | rattlesnake fern |
| *Cheilanthus tomentosa* | woolly lip fern |
| *Pellaea atropurpurea* | purple-stem cliff-brake |
| *Phegopteris hexagonoptera* | broad beech fern |
| *Polystichum acrosticoides* | Christmas fern |
| *Woodsia obtusa* | blunt-lobe cliff fern |

**nn = Non-native

## Appendix D - Fish Survey

| Common | Species | pass 1 | pass 2 | pass 3 | pass 4 | pass 5 | Total |
|---|---|---|---|---|---|---|---|
| Green Sunfish | *Lepomis cyanellus* | 18 | 17 | 3 | 11 | 1 | 50 |
| Longeared Sunfish | *Lepomis megalotis* | 7 | 10 | | 2 | | 19 |
| Banded Darter | *Etheostoma zonale* | 4 | 1 | 1 | 3 | 2 | 11 |
| Blackspotted Topminnow | *Fundulus olivaceus* | 3 | | | | | 3 |
| Central Stone Roller | *Campostoma anomalum* | 17 | 39 | 34 | 34 | 30 | 154 |
| Slender Madtom | *Noturus exilis* | 7 | 8 | 5 | 9 | 7 | 36 |
| Small Mouth Bass | *Micropterus dolomieui* | 2 | 1 | | | | 3 |
| Green Sided Darter | *Etheostoma blennioides* | 8 | 1 | 3 | 5 | 9 | 26 |
| Orange Throat Darter | *Etheostoma spectabile* | 28 | 11 | 3 | 6 | 6 | 54 |
| Fantail Darter | *Etheostoma flabellare* | 1 | | 1 | 7 | 2 | 11 |
| Brooks Silverside | *Labidesthes sicculus* | 1 | | | | | 1 |
| Bigeye shiner | *Notropis boops* | | 16 | 5 | 17 | 10 | 48 |
| Bluntnose minnow | *Pimephales notatus* | | 4 | | 3 | | 7 |
| Steelcolor shiner | *Notropis whipplei* | | 6 | 4 | 1 | 1 | 12 |
| Creek Chub | *Semotilus atromaculatus* | | 1 | | | | 1 |
| Chestnut Lamprey | *Ichthyomyzon castaneus* | | | 2 | | | 2 |
| Sunburst Darter | *Etheostoma mihileze* | | | | 1 | | 1 |
| Striped Shiner | *Luxilus chrysocephalus* | | | | 1 | | 1 |
| Total | | 96 | 115 | 61 | 100 | 68 | 440 |
| Time (sec) | | 1200 | 609 | 603 | 865 | 791 | 4068 |
| CPUE | | 0.08 | 0.19 | 0.10 | 0.12 | 0.09 | 0.11 |