

APPENDIX D

Reference

REFERENCES

United States Army Corp of Engineers. 1987. Corps of Engineers Wetland Delineation Manual.
U.S. Corps of Engineers Waterways Experiment Station. Wetlands Research Program
Technical Report Y-87-1.

VEGETATION AND WILDLIFE FIELD STUDY

U.S. 70 five miles east of Broken Bow, OK to
Arkansas State Line
McCurtain County, Oklahoma

Introduction

This field study has been written in support of and in compliance with 23 CFR 771, 777 and FHWA Technical Advisory T6640.8A for the Oklahoma Department of Transportation (ODOT) of the results of a survey for vegetation and wildlife along the above-referenced project.

The proposed project will expand an existing two-lane highway into a divided four-lane highway with center median. This project will provide improvements to the capacity, operation, circulation and safety along the highway. The proposed expansion would require the acquisition of additional right-of-way (ROW).

Two alternatives were assessed for impacts on vegetation and wildlife. Alternative #1 encompassed an area extending 150 feet north of existing U.S. 70 while Alternative #2 encompassed an area extending 150 feet south of existing U.S. 70 (**Appendix A, Exhibit 1, Sheets 1-4**).

Vegetation

The proposed project lies within the Oak and Bluestem Parkland section of the Prairie Parkland Province (Bailey 1995). This province ranges from the Texas Gulf Coast up the eastern side of the Great Plains to the southern end of Lake Michigan. It is defined by gently rolling to flat plains of prairies and savannas. It is part of the grassland-forest transition area of the central United States. This area is dominated by various short and medium-to-tall grasses with a few hardy tree species. This vegetation makeup is likely due to the amount of rainfall, fire frequency, and grazing. Trees in this province are typically evergreen and widely spaced with soil type being a key determiner of local distribution. Fine, heavy soils generally support grassland vegetation, while coarse, lighter soils result in a predominance of savanna. Within the province, bluestems are the principal grasses.

Within the Oak and Bluestem Parkland ecosystem, the project area was more specifically located in the Quachita Mountain ecoregion (Department of Oklahoma Wildlife Conservation-Oklahoma 2005). Predominant vegetation in this ecoregion consists of loblolly and shortleaf pine. Lesser areas of a shortleaf-oak type (southern red, scarlet, black, post, and blackjack oaks) and oak-hickory (black, scarlet, post, and white oaks and pignut and mockernut hickories) occur within this ecoregion (McNab and Avers 1994).

A site visit was conducted in May 5 and 6, 2004 to determine the type and composition of plant communities within the proposed project corridor. The site visit was also conducted to survey the corridor for the presence or absence of rare plants. No rare plant species or plant communities were observed within the corridor. Grasses and annual forbs dominated vegetation along the existing ROW. The wooded corridor consisted mainly of mature pine trees and hardwoods. Range and pasture fields were also observed along parts of the ROW. **Table 1** presents a list of the typical plant species identified along the ROW.

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Vegetation Impacts

The project has the potential to impact vegetation through clearing, grading, and paving during construction. Vegetation along the project corridor would be directly impacted by ROW construction and expansion associated with the proposed improvements. Approximately 135 acres of vegetation would be impacted by either alternative. Approximately 65 acres of wooded area and 70 acres of grassland/pasture would be impacted by Alternative #1, while Alternative #2 would impact 90 acres of wooded habitat and 40 acres of grassland/pasture. Although disturbed areas that are not paved will be revegetated with grasses, these areas would be routinely maintained (i.e., mowed). Therefore, loss of wooded areas would be permanent as woody vegetation will not be allowed to reestablish in the right-of-way.

Table 1. Plant Species Identified within the US 70 Expansion Project Corridor

Common Name (Classification*)	Scientific Name	Common Name (Classification*)	Scientific Name
American elm (T)	<i>Ulmus americana</i>	Little bluestem (H)	<i>Schizachyrium scoparium</i>
Bald Cypress (T)	<i>Taxodium distichum</i>	Loblolly Pine (T)	<i>Pinus taeda</i>
Bedstraw (H)	<i>Galium</i> sp.	Narroleaf woodoats (H)	<i>Chasmanthium laxum</i>
Black willow (T)	<i>Salix nigra</i>	Plantain (H)	<i>Plantago</i> sp.**
Bois d'arc (T)	<i>Maclura pomifera</i>	Poision ivy (V)	<i>Toxicodendron radicans</i>
Boxelder (T)	<i>Acer negundo</i>	Post Oak (T)	<i>Quercus stellata</i>
Broadleaf woodoats (H)	<i>Chasmanthium latifolium</i>	Redbud (T)	<i>Cercis canadensis</i>
Chinkapin Oak (T)	<i>Quercus muhlenbergii</i>	Ryegrass (H)	<i>Lolium perenne</i>
Cottonwood (H)	<i>Populus deltoides</i>	Shorleaf pine (T)	<i>Pinus echinata</i>
Dandelion (H)	<i>Taraxacum officinale</i>	Shumard's Oak (T)	<i>Quercus shumardii</i>
Dewberry (S)	<i>Rubus trivialis</i>	Silverleaf nightshade (H)	<i>Solanum elaeagnifolium</i>
Dotted gayfeather (H)	<i>Liatris punctata</i>	Singletary pea (H)	<i>Lathyrus hirsutus</i>
Engelmann daisy (H)	<i>Engelmannia pinnatifida</i>	Spikerush (H)	<i>Eleocharis</i> sp.**
Flameleaf sumac (T)	<i>Rhus copallinum</i>	Sumpweed (H)	<i>Iva annua</i>
Fox sedge (H)	<i>Carex vulpinoidea</i>	Sunflower (H)	<i>Helianthus annuus</i>
Frog fruit (H)	<i>Phyla lanceolata</i>	Sweetgum (T)	<i>Liquidambar styraciflua</i>
Giant ragweed (H)	<i>Ambrosia trifida</i>	Sycamore (T)	<i>Platanus occidentalis</i>
Goldenrod (H)	<i>Solidago</i> sp.	Texas bluegrass (H)	<i>Poa arachnifera</i>
Greenbrier (H/V)	<i>Smilax bona-nox</i>	Texas thistle (H)	<i>Cirsium texanum</i>
Hackberry (T)	<i>Celtis occidentalis</i>	Thin-scale sedge (H)	<i>Carex hyalinolepis</i>
Hairy vetch (H)	<i>Vicia villosa</i>	Vervain (H)	<i>Verbena halei</i>
Honey locust (T)	<i>Gleditsia triacanthos</i>	Virginia wildrye (H)	<i>Elymus virginicus</i>
Honeysuckle (V)	<i>Lonicera</i> sp.	Water Oak (T)	<i>Quercus nigra</i>
Hop sedge (H)	<i>Carex lupulina</i>	Wild carrot (H)	<i>Daucus</i> sp.**
India mustard (H)	<i>Brassica juncea</i>	Wild onion (H)	<i>Allium</i> spp.**
Japanese brome (H)	<i>Bromus japonicus</i>	Willow baccharris (S)	<i>Baccharis salicina</i>
Johnsongrass (H)	<i>Sorghum halepense</i>	Willow oak (T)	<i>Quercus phellos</i>
Little barley (H)	<i>Hordeum pussillum</i>		

*T=Tree, S=Shrub, V=Vine, H=Herbaceous

**Species identified to the genus level due to level of specimen development.

Minimization of Impacts to Vegetation

Minimization of vegetation impacts will consist of removing only the amount of vegetation required for construction, to the extent possible. Additionally, implementation of erosion and sediment control measures, as required in the Oklahoma Pollution Discharge Elimination System (OPDES) General Permit for Construction Activities, will reduce the impacts of the project on vegetation communities. Disturbed areas that are not paved will be re-vegetated following construction.

Wildlife

According to Bailey (1995), no bird or mammal species is uniquely abundant in this province. However, whitetail deer, nine-banded armadillo, ringtail, raccoon, fox squirrel, wild turkey, mourning dove, bobwhite quail, and several species of hawks and owls can be expected to be seen within the province. Predominant fauna within the Ouachita Mountain ecoregion includes of white-tailed deer, black bear, bobcat, gray fox, raccoon, gray squirrel, fox squirrel, eastern chipmunk, white-footed mouse, pine vole, short-tailed shrew, and cotton mouse. The turkey bobwhite, and mourning dove are game birds in various parts of this Section. Songbirds include the red-eyed vireo, cardinal, tufted titmouse, wood thrush, summer tanager, blue-gray gnatcatcher, hooded warbler, and Carolina wren. The herpetofauna include the box turtle, common garter snake, and timber rattlesnake. Endemics are Fourche Mountain salamander, Caddo Mountain salamander, Rich Mountain salamander, Ouachita madtom, Ouachita Mountain shiner, Kiamichi shiner, Ouachita darter, peppered shiner, and Rich Mountain slitmouth snail.

Table 2 contains a list of wildlife species observed, visually or by sign, along the project corridor during surveys by biologists conducted in May 2004.

Table 2. Wildlife Species Observed in the Vicinity of the Project Corridor

Common Name	Scientific Name
Birds	
American Crow	<i>Corvus brachyrhynchos</i>
Blue Jay	<i>Cyanocitta cristata</i>
Cattle Egret	<i>Bubulcus ibis</i>
Great Blue Heron	<i>Ardea herodias</i>
Mallard	<i>Anas platyrhynchos</i>
Mourning Dove	<i>Zenaida macroura</i>
Turkey Vulture	<i>Cathartes aura</i>
Mammals	
Eastern Cottontail	<i>Sylvilagus floridanus</i>
Raccoon	<i>Procyon lotor</i>
White-tailed Deer	<i>Odocoileus virginianus</i>

The Endangered Species Act of 1973 prohibits the taking of listed wildlife and the destruction of habitats critical to the survival of federally listed species. A listed species is a species that appears on the Secretary of the Interior's list of species that appear in danger of extinction across part or all of their range. The designation of endangered indicates that the entire species appears to be in danger of extinction. A designation of threatened indicates a species for which protective measures appear to be required in order to prevent it from becoming endangered.

Table 3 contains federally listed species for McCurtain County, Oklahoma. None of the federally listed threatened or endangered species listed in McCurtain County were observed along the

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project corridor during the field survey. Potential impacts to the species listed in Table 3, along with the appropriate effects determinations, are presented in the following paragraphs.

Table 3. Federal Listed Threatened and Endangered Species of McCurtain County, Oklahoma.

Common Name	Scientific Name	Federal Status	Effect Statement
American Burying Beetle	<i>Nicrophorus americanus</i>	Endangered	
Interior Least Tern	<i>Sterna antillarum</i>	Endangered	No Effect
Ouachita Rock Pocketbook Mussel	<i>Arkansia wheeleri</i>	Endangered	May Effect, Unlikely to Adversely Affect ²
Piping Plover	<i>Chadradrius melodus</i>	Threatened	No Effect – lack of habitat
Red-Cockaded Woodpecker	<i>Picoides borealis</i>	Endangered	No Effect – lack of habitat
Scaleshell mussel	<i>Leptodea leptodon</i>	Endangered	May Effect, Unlikely to Adversely Affect ²
Winged Mapleleaf Mussel	<i>Quadrula fragosa</i>	Endangered	May Effect, Unlikely to Adversely Affect ²
American Alligator	<i>Alligator mississippiensis</i>	Threatened, Similarity of Appearance	No Effect – lack of habitat
Leopard Darter	<i>Percina pantherina</i>	Threatened	May Effect, Unlikely to Adversely Affect ²
Leopard Darter Critical Habitat			No Effect

¹The appropriate effects determination and mitigation measures proposed for the American burying beetle will be addressed in the programmatic biological assessment and conservation strategy, and formalized in a Memorandum of Understanding and through conclusion of formal consultation among the Federal Highway Administration, ODOT and the U.S. Fish and Wildlife Service, prior to May 20, 2008.

²No effect anticipated due to use of appropriate BMPs during construction. Bridges would be replaced with bridges and culverts would be replaced with culverts that allow flows in the stream to continue as they currently do.

Source: Oklahoma Natural Heritage Inventory. 2003. *Federal and State Endangered, Threatened, and Candidate Species in Oklahoma by County*. Oklahoma Natural Heritage Inventory, Oklahoma Biological Survey. Norman, Oklahoma. Website Accessed February 29, 2008. (<http://www.biosurvey.ou.edu/heritage/info.html>)
U.S. Fish and Wildlife Service. 2008. *County Lists of Threatened and Endangered Species for Oklahoma*. U.S. Fish and Wildlife Service, Southwest Region Ecological Services. Albuquerque, New Mexico. Website accessed February 29, 2008. (<http://ifw2es.fws.gov/EndangeredSpecies/lists/ListSpecies.cfm>).

Habitat requirements for the **American burying beetle** (*Nicrophorus americanus*), appear to be variable. This species has been found in several habitat types including oak-pine woodlands, open fields, oak-hickory forest, open grasslands, and edge habitat. In Oklahoma the beetle is currently known to occur in 22 counties, including McCurtain County. Given that habitats within the corridor appear to be suitable for this beetle, the potential to affect this species exists and consultation with the USFWS appears necessary. The appropriate effects determination and mitigation measures proposed for the American burying beetle will be addressed in the programmatic biological assessment and conservation strategy, and formalized in a Memorandum of Understanding and through conclusion of formal consultation among the Federal Highway Administration, ODOT, and the U.S. Fish and Wildlife Service, prior to May 20, 2008.

Interior Least Terns (*Sterna antillarum*) favor islands or sandbars along large rivers for nesting. The sand must be mostly clear of vegetation. They prefer shallow, relatively clear water for fishing. In Oklahoma, it is known to nest along most of the larger rivers. Suitable nesting habitat for this species is not present in the study corridor. Likewise, there are no records in the

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Oklahoma Biological Survey database for Interior Least Terns in McCurtain County (Oklahoma Biological Survey 2007). No impacts to this species are expected due to the fact that the birds would be able to feed, uninterrupted, areas far away from the proposed project. Operation or use of the finished roadway is not expected to change over the current conditions in the corridor. Additionally, no Interior least tern habitat is present within the proposed right-of-way. Therefore, no impacts related to operation of the roadway are expected.

The **Ouachita rock pocketbook mussel** (*Arkansia wheeleri*) inhabits pools, backwaters, and side channels of certain rivers and large creeks in or near the southern slope of the Ouachita Uplift. The species occupies stable substrates containing gravel, sand, and other materials and always occurs within large mussel beds containing a diversity of mussel species. Recent surveys have found it in small sections of the Little River in Oklahoma, at one locality in the Ouachita River in Arkansas, and within an 88-mile section of the Kiamichi River upstream from Hugo Reservoir (USFWS 2007i). Given that known habitat is present within the project area, Little River (Mountain Fork), the potential to affect this species exist and consultation with the USFWS appears necessary for this species. However, it is assumed that, through consultation impacts to the species can be avoided using sensitive construction techniques and appropriate BMPs to project water quality.

Piping Plovers (*Charadrius melodus*) nest on sandy beaches of the ocean or lakes. Along rivers, they use the bare areas of islands or sandbars. During the winter, they use algal, mud, and sand flats along the Gulf Coast. Piping Plovers migrate through Oklahoma each spring and fall (USFWS 2007g). There are no records in the Oklahoma Biological Survey database for Piping Plover in McCurtain county and no suitable habitat exists for them within the project corridor (Oklahoma Biological Survey 2007). Therefore, no impacts to this species are anticipated.

Red-cockaded Woodpeckers (*Picoides borealis*) live in old-growth loblolly, shortleaf, and especially slash and longleaf pine forests. Nesting and roosting are made only in living pine trees over 60 years old. Ideal colony sites are located in park-like stands of pines with little or no understory growth. In Oklahoma, they have been restricted to the shortleaf pine areas of southeastern Oklahoma. The Red-cockaded Woodpecker once occupied Bryan, Latimer, LeFlore, McCurtain, Pittsburg, and Pushmataha counties. The current distribution in Oklahoma includes only limited areas of McCurtain and Pushmataha counties (USFWS 2007h). Within the project corridor, there is no suitable habitat (i.e., no old-growth stands of pine with open understory). Therefore, no impacts to this species are foreseen.

Scaleshell mussels (*Leptodea leptodon*) live in medium-sized and large rivers with stable channels and good water quality. They historically occurred across most of the eastern U.S. However, during the last 50 years they have become increasingly rare within their reduced range. Of the 55 historical populations, 14 remain within the Mississippi River basin in Arkansas, Missouri, and Oklahoma (USFWS 2007m). The scaleshell mussel is only found in the Kiamichi and Little River systems in Oklahoma. Suitable habitat may be present at the larger stream crossings, also known habitat is present within the project area, Little River (Mountain Fork). The potential to affect this species exist and consultation with the USFWS appears necessary for this species. However, it is assumed that, through consultation impacts to the species can be avoided using sensitive construction techniques and appropriate BMPs to project water quality.

Winged mapleleaf mussels (*Quadrula fragosa*) are found in riffles, with clean gravel, sand, or rubble bottoms and in clear, high quality water. In the past, this species may also have been found in large rivers and streams on mud, mud-covered gravel, and gravel bottoms. The range

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of this species once included 13 states where it was found in large streams that flow into the Mississippi River and in one river that flows into the Missouri River. Today it is found in the St. Croix River in Minnesota and Wisconsin, the Ouachita and Saline Rivers in Arkansas, and the Bourbeuse River in Missouri. The winged mapleleaf mussel has been observed in the Kiamichi River in Oklahoma, and in August 2005, a population of what is believed to be this species was discovered in the Little River (Vaughn 2005). Some of the habitat at the stream crossings in the corridor could be suitable for this species, and the project crosses a river with a recorded population (Little River, Mountain Fork). Consultation with the USFWS should be conducted for this species since habitats in the corridor (i.e., at the larger stream crossings) match the description of habitat for this species and the project crosses a stream with a known population. However, it is assumed that, through consultation impacts to the species can be avoided using sensitive construction techniques and appropriate BMPs to project water quality.

American alligators (*Alligator mississippiensis*) inhabit rivers, swamps, estuaries, lakes, and marshes. Oklahoma represents the northwestern-most reaches of their range. The historic distribution in Oklahoma was limited to the Red River and Little River drainages in southeastern Oklahoma. Currently, they are considered occasional visitors along the Red River in McCurtain County. The American alligator is also found in the Little River drainage and on the Little River National Wildlife Refuge. Given that the American alligator is known to exist within the Little River drainage system, and habitat occurs within the project corridor, but that the species' mobility would likely preclude any impacts, the proposed project may affect, not likely to adversely affect, this species.

The **leopard darter** (*Percina pantherina*) is found in intermediate to larger streams. They are typically not found in smaller, headwater streams. From May to February, they prefer large, quiet pools with rubble and boulder substrates. Spawning occurs on gravel substrates; however, the dominant riffle substrate may be gravel, rubble, boulder, and bedrock. In Oklahoma, it occurs within the Little River drainage (Mountain Fork, Glover, and Little Rivers) in LeFlore, McCurtain, and Pushmataha counties. Designated critical habitat exists for this species in McCurtain and Pushmataha counties. The closest critical habitat to the project is the Glover River, approximately 25 miles from the project area. Because the project crosses a river that contains a known population (Little River, Mountain Fork) of leopard darters, the potential to affect this species exists and consultation with the USFWS appears necessary for this species. However, it is assumed that, through consultation, impacts to the species can be avoided using sensitive construction techniques and appropriate BMPs to protect water quality. Since designated critical habitat does not occur within or near the project area, the proposed project will have no effect on leopard darter critical habitat.

Wildlife Impacts

The project could result in impacts to wildlife and wildlife habitat along the corridor due to the operation of the existing and/or proposed roadways (i.e., collisions between wildlife and vehicles, disturbance from presence/noise, etc.) and the construction (i.e., removal and/or alteration of habitat). However, these impacts would be minor and limited to the ROW corridor.

Construction and operation of the proposed interchange will result in minor impacts to wildlife and wildlife habitat in the project corridor. Construction activities will result in indirect impacts to wildlife from destruction of habitat along the ROW, noise and human activity/presence. Animals may be temporarily or permanently displaced as a result of construction activities. However, similar habitats are available adjacent to those that would be affected by construction. Existing U.S. 70 has already fragmented habitats within the proposed project area. Mammals and reptiles/amphibians would be particularly susceptible to impacts from additional habitat

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fragmentation. It is likely that these effects would be lessened somewhat by the presence of culverts or bridges at the water crossings. Animals tend to concentrate near water sources and these structures would allow movement by the animals across the roadway at these key locations.

Minimization of Impacts to Wildlife

As with impacts to vegetation, impacts to wildlife would be minimized by limiting the disturbed area to the extent necessary for construction. As noted above, effects of the project on listed species could occur as a result of the project.