Appendix K – Biological Resources Technical Report

Job No. 100512, Walnut Ridge – Missouri State Line (Future I-57) P.E.

Prepared by Garver for the
Arkansas Department of Transportation
In cooperation with the Federal Hwy Administration

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Chapter 1 – Introduction

1.1 Project Overview

A Draft Environmental Impact Statement (DEIS) is being conducted to study transportation improvements between Walnut Ridge in Arkansas and the Missouri State line. The Arkansas Department of Transportation (ARDOT) is providing direct oversight and management of the proposed project on behalf of the Federal Highway Administration (FHWA).

The overall study area for this technical report is shown in **Figure 1**. The study area is located in Clay, Greene, Lawrence, and Randolph Counties in northeast Arkansas. Construction of the proposed project would complete the improvements of future Interstate 57 (I-57) within Arkansas. The project includes improvements to the United States Highway (Hwy.) 67 corridor in northeastern Arkansas between the Hwy. 67/Hwy. 412 interchange in Walnut Ridge, Arkansas and the Missouri State line. The purpose of the project is to enhance connectivity and continuity of the National Highway System, provide a more resilient roadway, and provide for increased opportunity for economic development in northeast Arkansas.

The proposed project is needed to address a deficiency in the National Highway System in northeast Arkansas. The project is needed because there is a gap in the system linkage which diminishes connectivity and mobility of the National Highway System. Construction of the action alternative would complete the improvements of Future I-57 within Arkansas. Additionally, there is a lack of reliable transportation infrastructure to support economic development and a need to enhance resiliency to extreme weather events along the route. Furthermore, legislation designated this route as future Interstate Route 57. The project needs and supporting information are discussed further in Chapter 1 of the DEIS.

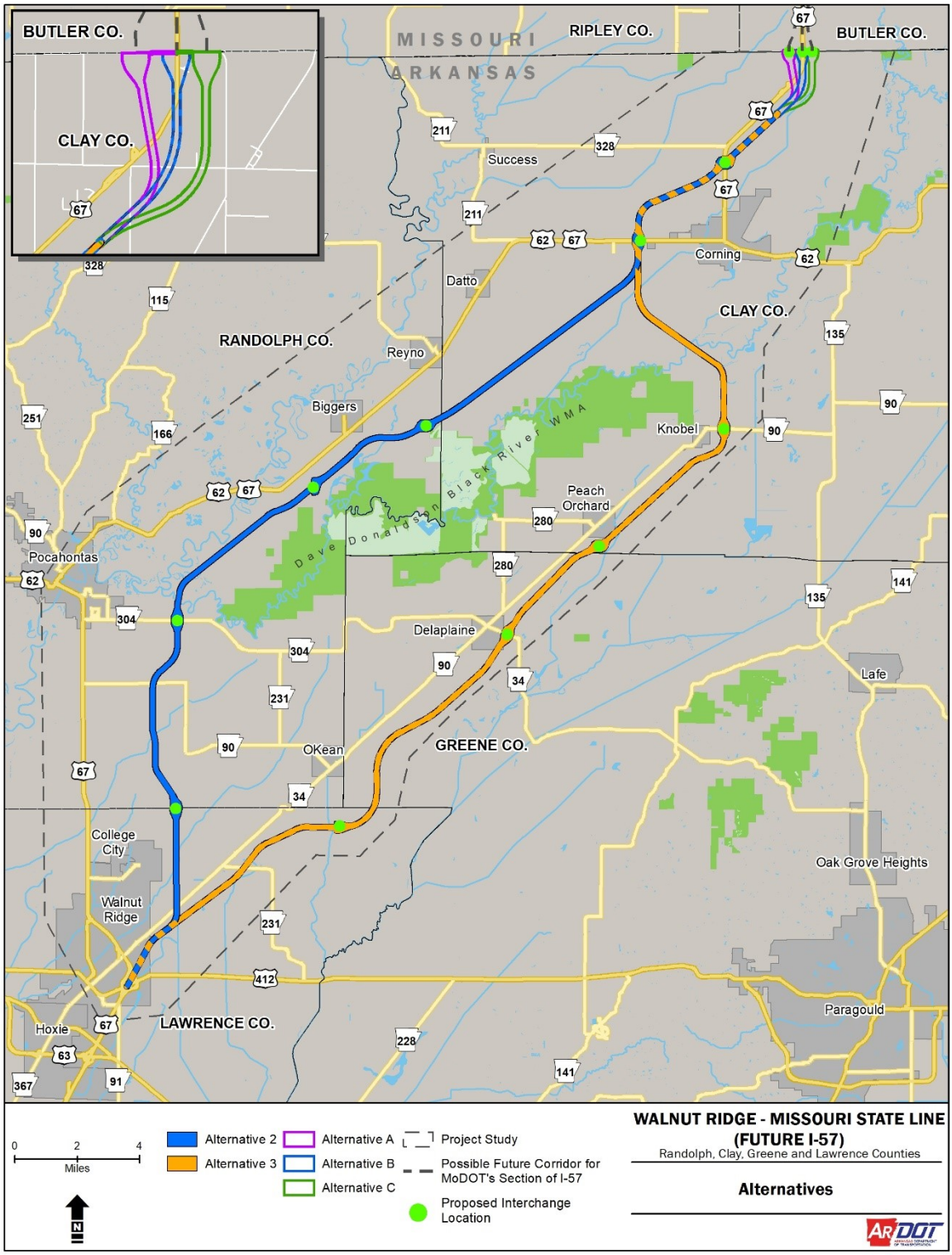
1.2 Project Alternatives

As shown in **Figure 1**, the following alternatives are considered and evaluated.

- No Action Alternative
- Alternative 2 (Western alignment on new location – 39.2 miles) – 2,249 acres
- Alternative 3 (Eastern alignment on new location – 41.3 miles) – 2,337 acres
- Alternative A (Missouri connector to west of Hwy. 67 – 2.5 miles) – 142 acres
- Alternative B (Missouri connector partially centered on Hwy. 67 – 2.3 miles) – 139 acres
- Alternative C (Missouri connector to east of Hwy. 67 – 2.8 miles) – 159 acres

The No Action Alternative would not involve the construction of the proposed highway but would include normal activities that involve providing for the safety and maintenance of local roadways. The No Action Alternative was compared against the action alternatives developed for this project. Selection of the No Action Alterative would avoid major state and federal spending but would not achieve project goals.

Figure 1: Future I-57 Action Alternatives



1.3 Resources Evaluated in this Technical Report

This technical report includes the evaluation of resources discussed in the corresponding chapters listed as follows:

- Chapter 2 – Ecosystems, Habitat, and Wildlife
- Chapter 3 – Federally-protected Species
- Chapter 4 – State-listed Species of Concern
- Chapter 5 – National Domestic Listing Workplan Species

Chapter 2 – Ecosystems, Habitat, and Wildlife

2.1 Regulatory Context, Methodology, and Data

This chapter covers the analysis of the following topics:

- Terrestrial Ecological Characterization
- Terrestrial Cover Types and Vegetation
- Terrestrial Wildlife
- Migratory Birds
- Aquatic Ecology and Biota
- Invasive Species and Noxious Weeds
- Sensitive Areas

Many of the regulations protecting wildlife and their habitats are associated with federally-listed threatened and endangered (T&E) species and species of conservation concern. With the exception of migratory birds, discussions of species protected by federal regulations, such as the Endangered Species Act (ESA) and the Bald and Golden Eagle Protection Act, are covered in Chapter 3 – Federally-protected Species and Chapter 4 – State-listed Species of Concern of this technical report. The Migratory Bird Treaty Act of 1918 (16 U.S. Code 703–712; MBTA) prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (USFWS), such as through permits obtained through legal hunting. The MBTA protects nearly all native birds in the U.S., covering more than 1,000 species.

Several federal regulations also pertain to invasive species. A summary of USFWS laws and regulations under which the USFWS conducts invasive species activities is available online at https://www.fws.gov/invasives/laws.html.

The overall study area for this chapter is shown in **Figure 1**. The study area is used as it fully encompass the action alternatives and is very similar to the study area used in initial agency coordination for the project. The study area is approximately 382 square miles in size and was used for general data collection efforts.

Project impacts were quantified based on the anticipated right of way (ROW) footprint of each action alternative. The footprint of each action alternative is defined as a consistent 400-foot-wide ROW with larger areas at the proposed interchanges. The footprints of Alternatives A and C also include a 0.29-mile and 0.17-mile section, respectively, of County Road 278 to accommodate a temporary, two-lane roadway that would tie each alternative back to Hwy. 67. The two-lane section to Hwy. 67 would be an interim condition that would be replaced with the proposed interchange connecting to MoDOT's proposed future corridor. The interim sections of Alternatives A and C that are along County Road 278, would be a two-lane highway with an approximately 140 foot and 120 foot wide ROW, respectively. Detailed views of the alternative footprints are provided in **Attachment A**. The locations of the proposed interchanges can be seen in **Figure 1**. Unless otherwise noted, it is assumed that all areas within the ROW footprint would be directly affected by construction activities. The size of each action alternative's footprint is listed below:

- Alternative 2 (Western alignment on new location – 39.2 miles) – 2,249 acres
- Alternative 3 (Eastern alignment on new location – 41.3 miles) – 2,337 acres
- Alternative A (Missouri connector to west of Hwy. 67 – 2.2 miles) – 137 acres
- Alternative B (Missouri connector partially centered on Hwy. 67 – 2.3 miles) – 139 acres
- Alternative C (Missouri connector to east of Hwy. 67 – 2.6 miles) – 156 acres

Ecoregion data based on the U.S. Environmental Protection Agency (EPA) data as well as those supplemented by others (Woods et al., 2004) were used to qualify the terrestrial and aquatic habitats of the study area. Various levels of the EPA ecological regions are differentiated through the adoption of a Roman numeral hierarchical scheme. Level I is the coarsest level, dividing North America into 15 ecological regions. Level II divides the continent into 52 regions (Commission for Environmental Cooperation Working Group, 1997). At level III, the continental U.S. contains 104 ecoregions and the conterminous U.S. has 84 ecoregions (EPA, 2003). Level IV ecoregions are further subdivisions of level III ecoregions. Explanations of the methods used to define the EPA's ecoregions are given in Omernik (1995), Omernik and others (2000), and Gallant and others (1989). Level IV ecoregions were used in this chapter. Additionally, ecoregion data were supplemented with ecological systems descriptions provided by NatureServe (2009).

Terrestrial land cover types were identified using the 2016 National Land Cover Database (NLCD) produced by the U.S. Geological Survey (USGS). This 2016 dataset is the most recent year available and considered acceptable given the relatively slow growth rate for the region. Aerial imagery, topographic maps, and field investigations were used to confirm land cover types. Specific accounts of terrestrial and aquatic vegetation were based on information collected during field investigations, literature reviews, and on accounts provided by the Arkansas Game and Fish Commission (AGFC). Data on wildlife habitat impacts and documented wildlife species within the study area and alternative footprints were collected through aerial imagery of vegetative cover and incidental observations of wildlife species and related habitat made during field investigations. Additionally, state and county faunal records, NatureServe (2021) species reports, Arkansas Natural Heritage Commission (ANHC) data, and species occurrence lists provided by the AGFC were used in conjunction with known habitat preferences, to generate examples of mammals, birds, reptiles, and amphibians expected to occur within the alternative footprints. Wildlife travel corridors, which were identified based on aerial photography, were defined as any wooded or densely vegetated area that was not maintained and at least 10 feet in width.

In an attempt to inform the assessment on impacts to wildlife travel corridors, identified corridors were compared to 2015-2022 wildlife-vehicle collision data provided by the Arkansas Department of Public Safety, Arkansas State Police (ECrash Database) and the ARDOT, Traffic Safety Section (Crash Database). However, the available data were limited and do not provide information on what species were involved in the collision, making it very hard to draw any solid conclusions. Additional caveats to the data include:

- Most animal crashes are not reported to police.
- Reports are often taken over the phone just for insurance purposes and the driver cannot give a precise location. Thus, the location on the report will be given very generally, for example, "Hwy. 67 in Randolph County", and as a result a random spot on Hwy. 67 gets chosen.

Data on migratory birds were obtained through desktop research, literature reviews, and observations during field investigations. Existing bridges in the alternative footprints that were accessible via public ROW were inspected for evidence of past or present use by migratory birds. Other man-made structures such as culverts, barns, sheds, grain bins (i.e., silos), or abandoned buildings also may function as suitable nesting habitat for migratory birds. The number of these structures present with each action alternative was assessed using aerial imagery.

Data on aquatic ecology and biota were obtained from the Arkansas Wildlife Action Plan, published by the AGFC for the project's ecobasin. These data are presented in the Aquatic Ecology and Biota section. Additionally, ANHC data, NatureServe (2021) species reports, and species occurrence lists provided

by the AGFC were used in conjunction with known habitat preferences to generate examples of fish and mussel species expected to occur within the alternative footprints. Impacts to aquatic systems were based on similar metrics used by the AGFC to assess aquatic health.

Data on invasive species and noxious weeds were obtained from the Dave Donaldson Black River Wildlife Management Area (hereafter referred to as the Black River WMA) Master Plan, and correspondence with the Arkansas Department of Agriculture and the AGFC.

2.2 Existing Conditions

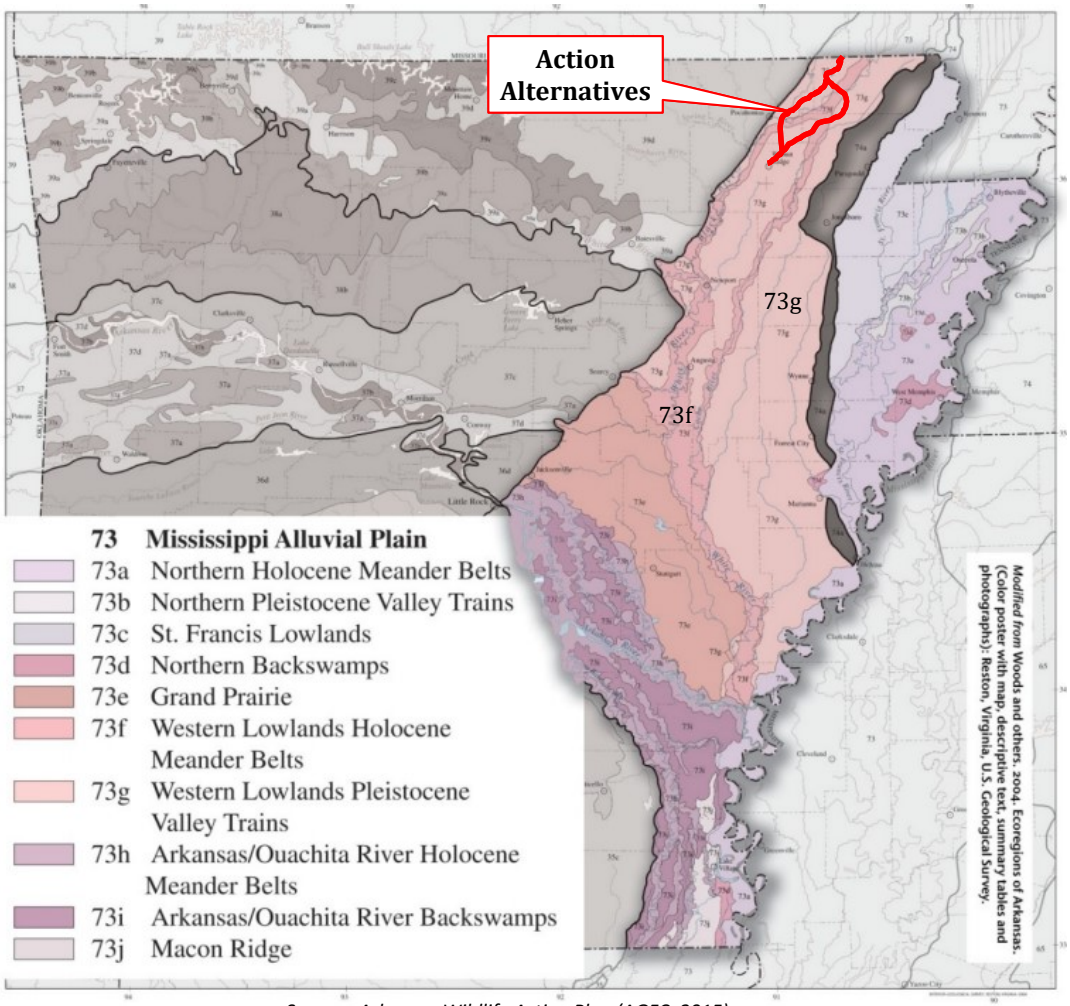
Terrestrial Ecological Characterization

Arkansas has been divided into 32 Level IV ecoregions based on areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. As shown in **Figure 2**, the project occurs within two Level IV ecoregions of the Mississippi Alluvial Plain. Approximately 84% of the alternative footprints occur within Ecoregion 73g (the Western Lowlands Pleistocene Valley Trains) and 16% within Ecoregion 73f (Western Lowlands Holocene Meander Belts). The Mississippi Alluvial Plain, which extends from southern Illinois at the confluence of the Ohio and Mississippi rivers southward to the Gulf of Mexico, provides important habitat for fish and wildlife, includes the largest continuous system of wetlands in North America, and is also a major bird migration corridor used in fall and spring migrations (Woods et al., 2004). Historically the region contained substantially more wetlands than exist today. From the 1780s to the 1980s, Arkansas lost about 72% of their original wetland acreage (Dahl, 1990). Holder (1969) estimated that 90% of the wetland loss in the last 40 years was due to the expansion of soybean production.

Native vegetation in the Western Lowlands Pleistocene Valley Trains (Ecoregion 73g) is bottomland hardwood forest with an abundance of green ash (*Fraxinus pennsylvanica*), bottomland oaks (*Quercus* spp.), American elm (*Ulmus americana*), eastern cottonwood (*Populus deltoides*), sugarberry (*Celtis laevigata*), sweetgum (*Liquidambar styraciflua*), water tupelo (*Nyssa aquatica*), and bald cypress (*Taxodium distichum*); in limited areas, loblolly pine (*Pinus taeda*) also occur (Woods et al., 2004). Sand ponds, which are interdunal depressions with silty bottoms that are either in contact with the water table or have a perched aquifer, also occur in the ecoregion. Sand pond forest communities are generally dominated by overcup oak (*Quercus lyrate*), water hickory (*Carya aquatica*), willow oak (*Q. phellos*), and pin oak (*Q. palustris*); understory in a few sand ponds may include pondberry (*Lindera melissifolia*), which is a shrub species listed by USFWS as endangered (details provided in Chapter 3). This ecoregion is a wintering ground for waterfowl, and duck hunting is widespread.

The Western Lowlands Holocene Meander Belts ecoregion (Ecoregion 73f) contains some of the most extensive remaining tracts of native bottomland hardwood forest in the Mississippi Alluvial Plain although cropland also occurs. These bottomland forests provide important roosting and foraging habitat for bat species, including the federally-listed gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), and northern long-eared bat (*Myotis septentrionalis*). Native vegetation is bottomland hardwood forest and woodland dominated by oak communities. Eastern cottonwood, green ash, cherrybark oak (*Quercus pagoda*), Nuttall oak (*Q. texana*), water oak (*Q. nigra*), willow oak, and sweetgum are common (Woods et. al., 2004).

Figure 2: The Mississippi Valley Alluvial Plain (Ecoregion 73) and Component Ecoregions



Source: Arkansas Wildlife Action Plan (AGFC, 2015).

Terrestrial Cover Types and Vegetation

Despite its length, the project limits contain a relatively homogeneous landscape due to its flat topography and abundance of agricultural practices. Based on the 2016 NLCD prepared by USGS, the vast majority of the land cover identified within the project limits consists of cropland. Based on the site investigation conducted March 2021, rice, corn, and soybeans were the main crops within the proposed ROW footprint. **Figure 3** depicts the immense quantities of farmland, which is shown in brown, within the entire region.

Figure 4 and **Figure 5** identify each of the land cover types present within the ROW footprints of the action alternatives. As shown in these figures, the alternative footprints primarily consist of cropland and developed areas, followed by forested wetlands, herbaceous wetlands, and some open water.

Figure 3: Land Cover Types Based on the National Land Cover Database

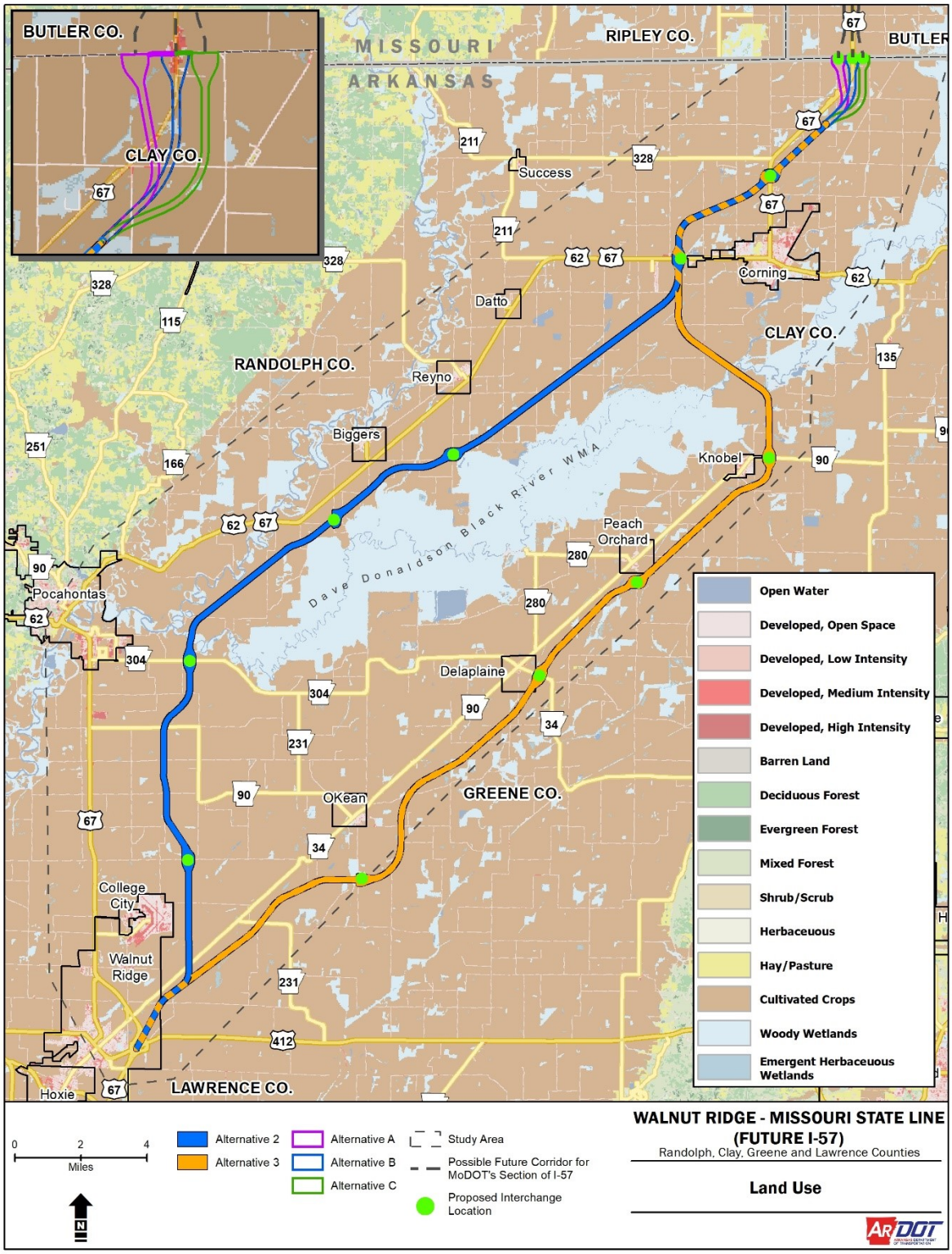
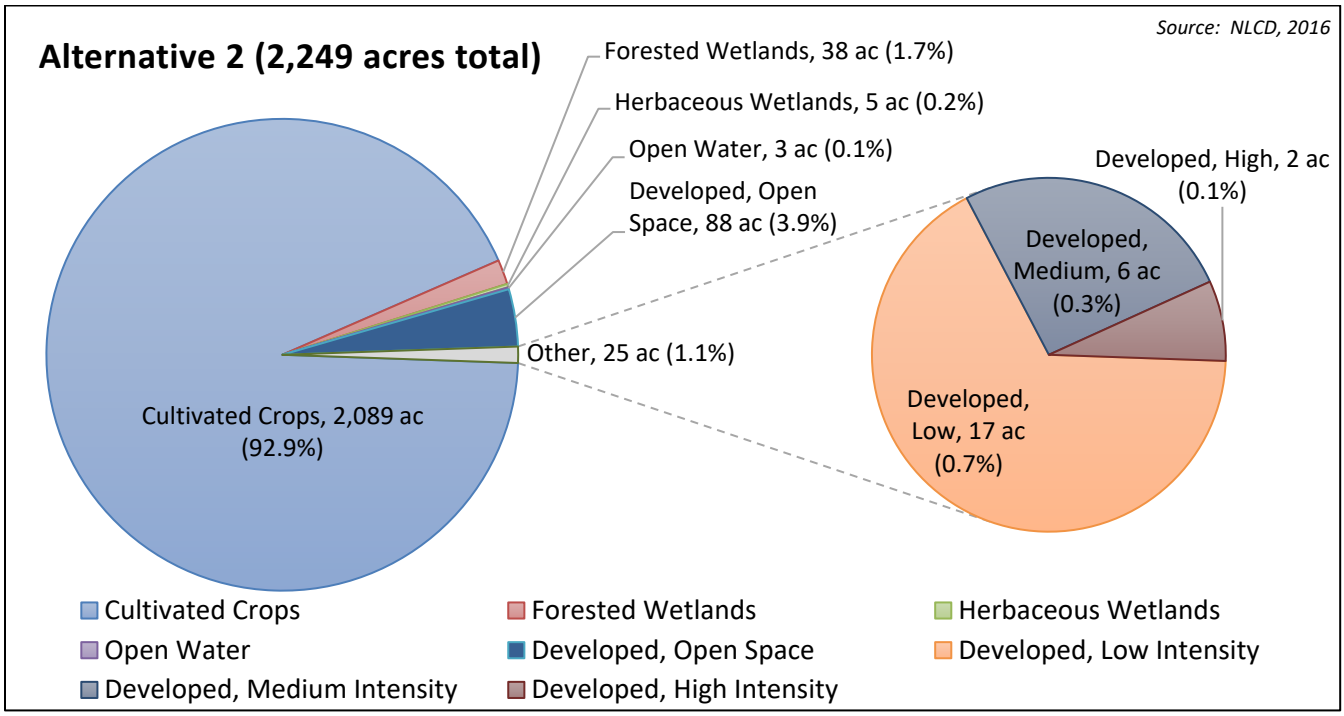


Figure 4: Land Cover Types Present in Alternatives 2 and 3



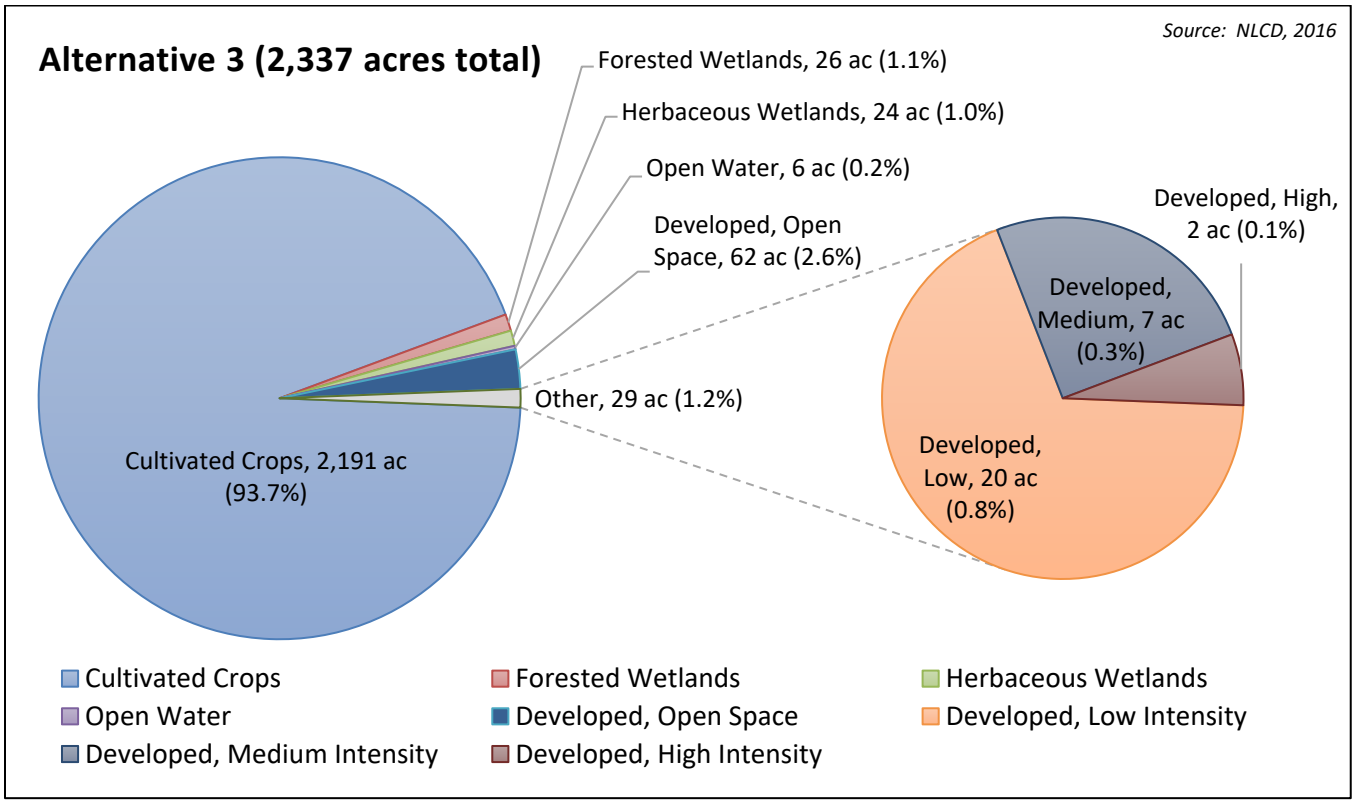
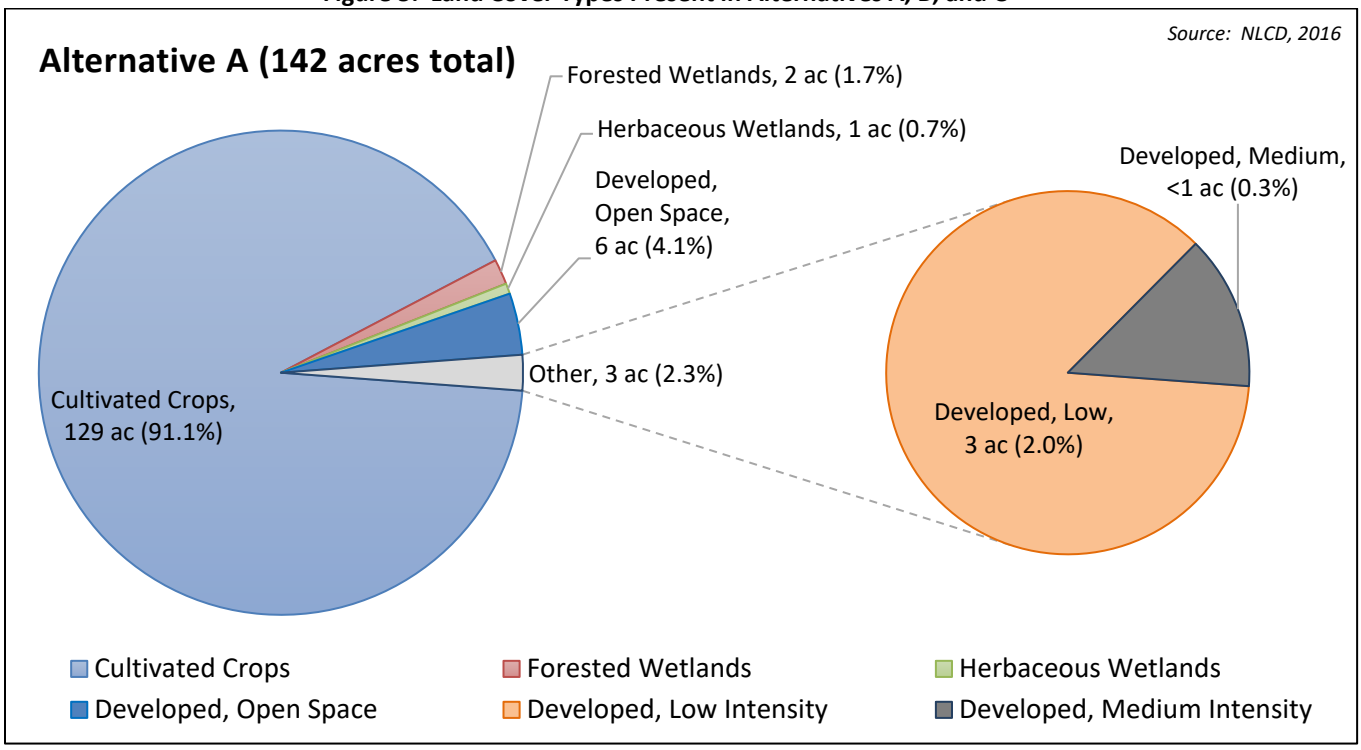
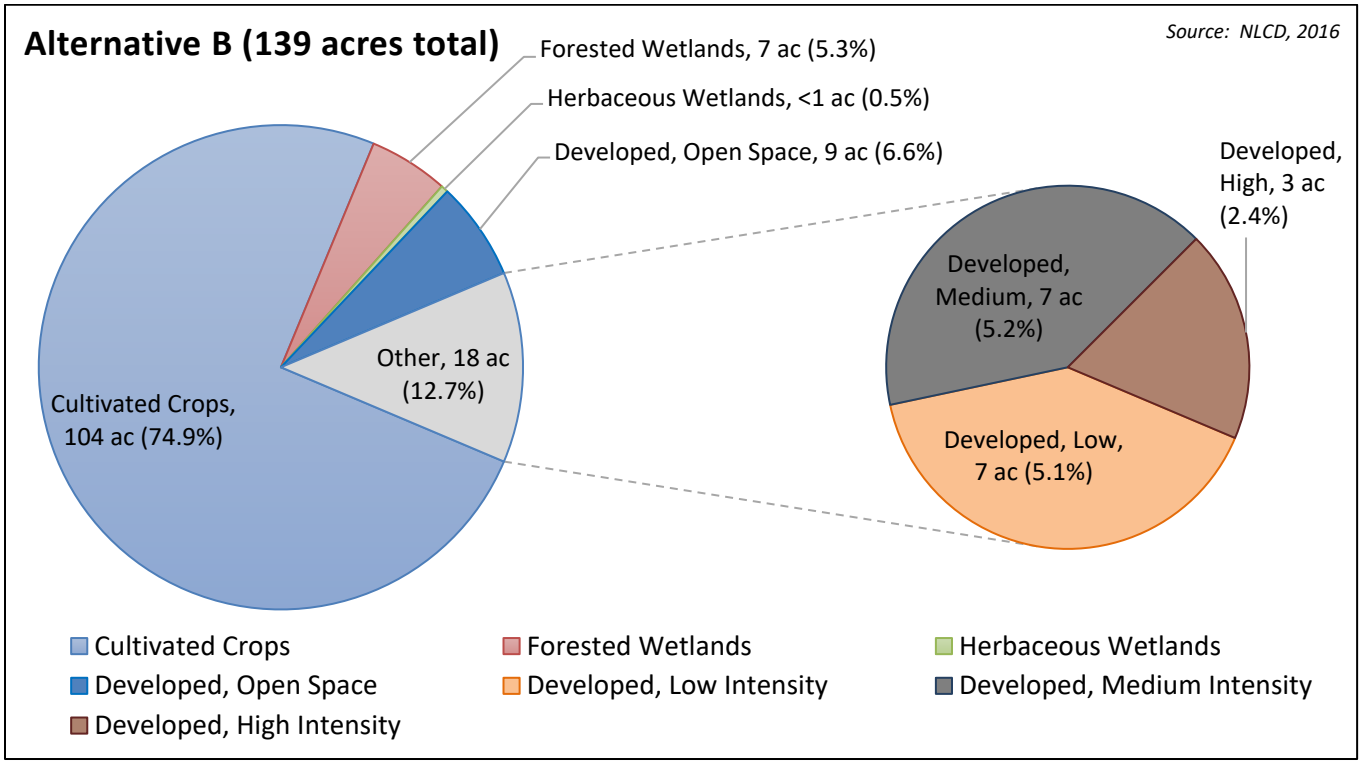
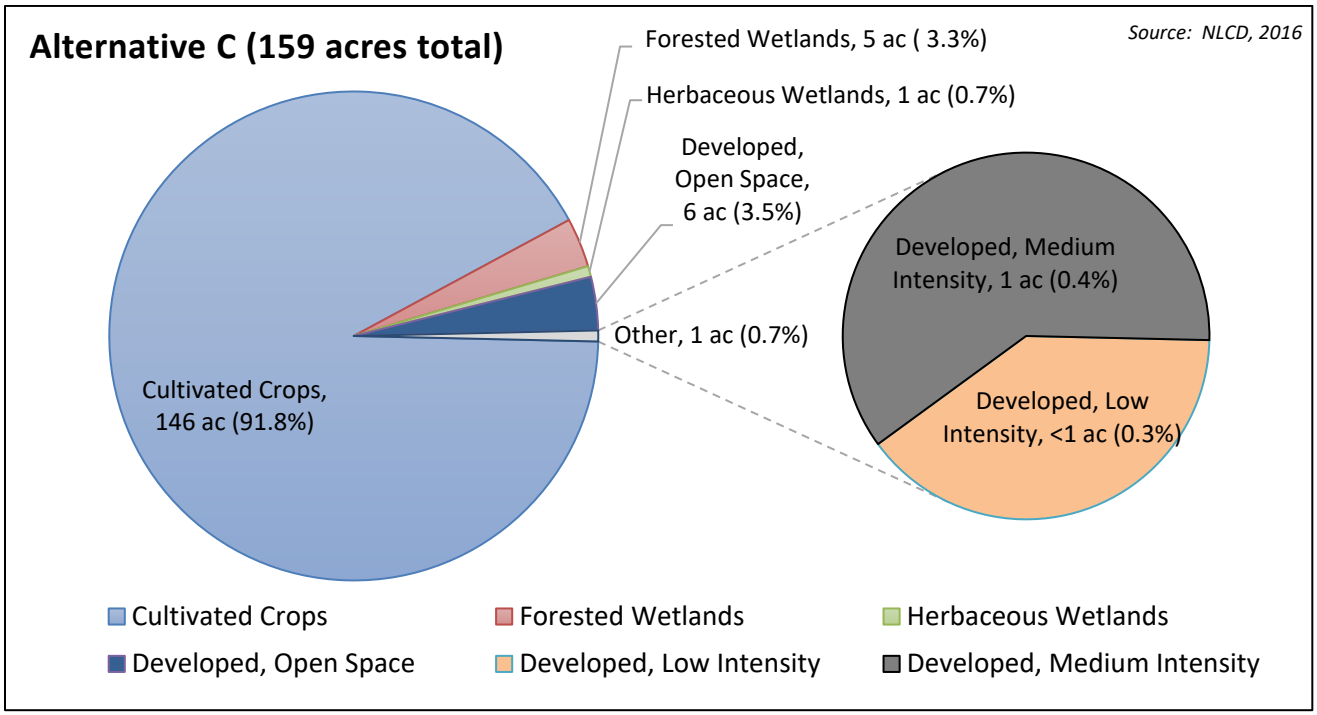


Figure 5: Land Cover Types Present in Alternatives A, B, and C







Although cropland can provide some species with foraging habitat and some species also utilize developed areas, these categories are not considered vegetated land cover types and are not discussed within this section. A short discussion on wildlife utilization of cropland and developed areas is provided in the following Terrestrial Wildlife section. Similarly, areas classified as open water are not considered significant vegetated land cover types within the alternative footprints. Aquatic habitats are discussed in the Aquatic Ecology and Biota section. Details on streams and wetlands within the project limits are included in the Waters Technical Report, which is provided as an appendix to the DEIS. Thus, forested and herbaceous wetlands represent the dominant types of natural vegetated land cover within the alternative footprints.

Forested wetlands within this ecological system are more accurately defined as bottomland hardwood wetlands, which are primarily present along riparian zones associated with the Black and Current Rivers, and as narrow wooded riparian zones of their tributaries. Most bottomland hardwood wetlands contain trees and other herbaceous vegetation adapted for growing in rich, moist, hydric soils. Dominant species known to occur in these bottomland hardwood wetlands, and those favored by wintering waterfowl, include Nuttall oak, overcup oak, willow oak, and water oak. Overcup oak is common in lower elevations. American elm, sweetgum, sugarberry, green ash, persimmon (*Diospyros virginiana*), red maple (*Acer rubrum*), hickory (*Carya* spp.), birch (*Betula* spp.), mulberry (*Morus* spp.), and white oak (*Quercus alba*) trees are also common throughout the study area and have been documented at the Black River WMA by AGFC. Bald cypress, tupelo, and willow (*Salix* spp.) are also likely present within or adjacent to the alternative footprints as these species also occur along the network of waterways within the nearby Black River WMA. Some small trees and shrubs likely present in the alternative footprints include buttonbush (*Cephalanthus occidentalis*), flowering dogwood (*Cornus florida*), deciduous holly (*Ilex decidua*), southern arrowwood (*Viburnum dentatum*), and American hornbeam (*Carpinus caroliniana*). Muscadine (*Vitis rotundifolia*), pepper vine (*Ampelopsis arborea*), and trumpet vine (*Campsis radicans*) are common vines; native cane (*Arundinaria gigantea*) is considered sparse. Herbaceous vegetation observed include riverhemp (*Sesbania* spp.), great

ragweed (*Ambrosia trifida*), giant foxtail (*Setaria faberi*), and rose mallow (*Hibiscus moscheutos*). An example of a bottomland hardwood wetland is shown in **Figure 6**.

Figure 6: Example of Typical Bottomland Hardwood Wetland

Herbaceous wetlands within the alternative footprints are primarily present within the floodplains associated with the Black River or other large waterbodies. Herbaceous wetlands occur in semi-permanently flooded to saturated depressional areas that have a distinctly longer hydroperiod than other parts of the landscape. Bare ground is often prevalent due to extensive saturation, but broadleaf cattail (*Typha latifolia*), floating primrose-willow (*Ludwigia peploides*), smartweed (*Persicaria* and *Polygonum* spp.), sedges (*Carex* spp.), nutsedges (*Cyperus* spp.), bulltongue arrowhead (*Sagittaria lancifolia*), waterweeds (*Elodea* spp.), pondweeds (*Potamogeton* spp.), duckweeds (*Lemna* spp.), and hornwort (*Ceratophyllum* spp.) may be found. Dominant vegetation observed during the site investigation includes dock (*Rumex* spp.), great ragweed, sedges, buttercup (*Ranunculus* spp.), and pennywort (*Hydrocotyle* spp.).

Natural land cover is also present within the alternative footprints as upland woods that primarily exist as small patches of wooded areas and linear wooded and scrub-shrub areas that are present along parcel boundaries, agricultural ditches, and along existing infrastructure ROW. These narrow, vegetated areas, which are immediately adjacent to agricultural fields, create edge habitat. Edge habitat is the alternative footprints where two habitat types meet, such as woodlands and pastures. Edges provide greater plant diversity, cover, nesting areas, and travel corridors for wildlife (McPeake, University of Arkansas Cooperative Extension Service). Common edge plant species within the alternative footprints include great ragweed, goldenrod (*Solidago* spp.), asters (*Symphyotrichum* spp.), poison ivy (*Toxicodendron radicans*), blackberries (*Rubus* spp.), honeysuckles (*Lonicera* spp.), trumpet vine, and young trees.

Terrestrial Wildlife

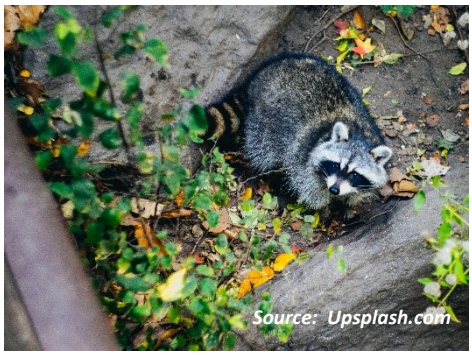
As discussed in the previous section, dominant habitat types (i.e., natural land cover types) present within the alternative footprints primarily include bottomland hardwood wetlands, upland woods, and herbaceous wetlands. Cropland and developed areas occupy the vast majority of the project limits. The species of mammals, birds, reptiles, and amphibians expected to use or be present within the proposed alternative footprints are discussed below and organized by their primary habitat type. Additional T&E wildlife or those species of concern that are likely utilizing the study area are covered in Chapters 3 and 4.

Agricultural expansion and intensification have been identified as leading causes of wildlife decline and habitat loss (World Wildlife Fund, 2016), consequently, the cropland in the alternative footprints provides habitat for very few species. However, some cropland, in the form of farmed wetlands, provides foraging habitat for migratory birds. Also, croplands/farmed wetlands with some remaining crop residue, or those that are managed for waterfowl, are generally more valuable foraging habitat for migratory birds than croplands where the residue has been burned or tilled under. Animals such as white-tailed deer (*Odocoileus virginianus*), red-winged blackbirds (*Agelaius phoeniceus*), common grackles (*Quiscalus quiscula*), cowbirds (*Molothrus* spp.), geese, ducks, rats, and mice are commonly

reported to forage on rice crops, which were observed to be the dominant crop within the alternative footprints during the March 2021 site investigation. Corn and soybean fields also occur within the alternative footprints. Wildlife commonly reported to forage on corn crops primarily include white-tailed deer, raccoons (*Procyon lotor*), blackbirds (Family Icteridae), gulls, and geese. Wildlife commonly reported to forage on soybean crops primarily include white-tailed deer, raccoons, squirrels (*Sciurus* spp.), groundhogs (*Marmota monax*), Canada geese (*Branta canadensis*), and wild hogs (*Sus scrofa*). Wildlife observed during the site visit in the agricultural fields included red-winged blackbirds, other blackbirds, northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), killdeer (*Charadrius vociferus*), eastern meadowlark (*Sturnella magna*), American kestrel (*Falco sparverius*), and raccoon.

Developed areas, such maintained ROW and residential areas, provide habitat for very few species of wildlife compared to natural cover types. Similar to cropland, most wildlife species within developed areas of the project are likely only utilizing these areas as foraging habitat. Typically, only a few habitat generalists, i.e., those species not restricted to a particular habitat type, and those with a higher tolerance of human disturbance are able to persist in developed areas. These adaptable species can include bobcat (*Lynx rufus*), coyote (*Canis latrans*), white-tailed deer, black bear (*Ursus americanus*), red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), cottontail rabbit (*Sylvilagus floridanus*), American robin (*Turdus migratorius*), northern cardinal (*Cardinalis cardinalis*), northern mockingbird (*Mimus polyglottos*), and red-tailed hawk. Other species persist because they can take advantage of food supplied by humans. These exploiter species, which are typically omnivorous, can include raccoon (**Figure 7**), Virginia opossum (*Didelphis virginiana*), grey squirrel (*Sciurus carolinensis*), house mouse (*Mus musculus*), European starling (*Sturnus vulgaris*), house finch (*Haemorhous mexicanus*), rock dove (*Columba livia*), American crow (*Corvus brachyrhynchos*), Eurasian collared dove (*Streptopelia decaocto*), house sparrow (*Passer domesticus*), and other songbirds that use backyard feeders.

Figure 7: Raccoon in Developed Area



Unlike species utilizing cropland and developed areas, many species are adapted to very specific habitat types, such as the bottomland hardwood wetlands found within the study area. Bottomland hardwood wetlands often harbor a higher biodiversity of animals than most other habitat types. Exemplary bottomland hardwoods and their associated wildlife occur within the Black River WMA, which is located between Alternatives 2 and 3. While the Black River WMA is very intentionally not impacted directly by the action alternatives, its close proximity makes it probable that its documented wildlife also occur within the woodlands of the action alternatives, especially within the vegetated corridors directly connected to the Black River WMA. Many of these vegetated corridors function as passageways for traveling wildlife. Several mammals such as the American beaver (*Castor canadensis*), American mink (*Neovison vison*), and southern bog lemming (*Synaptomys cooperi*) are specifically adapted to life in moist environments of forested wetlands. Other mammals likely to occur in the forested wetlands of the alternative footprints include white-tailed deer, raccoon, squirrel (*Sciurus* spp.), swamp rabbits (*Sylvilagus aquaticus;* **Figure 8**),

Figure 8: Swamp Rabbit

Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), southeastern myotis (*Myotis austroriparius*), and the Indiana bat (*Myotis sodalis*). Upland wildlife like deer, elk (*Cervus canadensis*) and bears (*Ursus* spp.) commonly use forested wetlands for food and shelter.

Figure 9: Waterfowl at Black River WMA

Bottomland hardwood wetlands in the study area provide habitat to many species of Neotropical migrants and particularly to wintering waterfowl such as mallards (*Anas platyrhynchos;* **Figure 9**). Other waterfowl documented by the AGFC to occur within the Black River WMA, which is adjacent to both Alternatives 2 and 3, include Canada geese, snow geese (*Chen* spp.), pintail (*Anas acuta*), American wigeon (*Mareca americana*), teal (*Anas* spp.), wood duck (*Aix sponsa*), scaup (*Aythya* spp.), merganser (*Mergus* spp.), and American coot (*Fulica americana*). Many species of waterfowl rely on these habitats for foraging and nesting. Additional details on migratory birds are provided in the following section. Other non-game species of birds likely to occur in the bottomland hardwoods of the study area include the red-shouldered hawk (*Buteo lineatus*), belted kingfisher (*Megaceryle alcyon*), American woodcock (*Scolopax minor*), prothonotary warbler (*Prothonotaria citrea*), Swainson's warbler (*Limnothlypis swainsonni*), Kentucky warbler (*Geothlypis formosa*), hooded warbler (*Setophaga citrina*), Acadian flycatcher (*Empidonax virescens*), wood thrush (*Hylocichla mustelina*), yellow-billed cuckoo (*Coccyzus americanus*), and eastern wild turkey (*Meleagris gallapavo silvestris*).

Bottomland habitats are also home to a vast array of reptiles and amphibians. Reptiles listed by the AGFC as occurring within the Black River WMA, and thus that also have the potential to occur within the project limits, include the western cottonmouth (*Agkistrodon piscivorus leucostoma*), red-bellied mudsnake (*Farancia abacura*), Mississippi green watersnake (*Nerodia cyclopion*), plain-bellied watersnake (*N. erythrogaster*), diamond-backed watersnake (*N. rhombifer*), kingsnake (*Lampropeltis* spp.), red-eared slider (*Trachemys scripta elegans*), snapping turtle (*Chelydra serpentina*), spiny softshell turtle (*Apalone spinifera*), and eastern musk turtle (*Sternotherus odoratus*). Amphibians listed by the AGFC as occurring within the Black River WMA include salamanders (*Ambystoma* spp.), eastern spadefoot toad (*Scaphiopus holbrookii;* **Figure 10**), gray treefrog (*Hyla versicolor*), green treefrog (*Hyla cinerea*), and the eastern narrow-mouthed toad (*Gastrophryne carolinensis*). Due to the close proximity of the project to the Black River WMA, these same species have the potential to occur within the alternative footprints.

Figure 10: Eastern Spadefoot Toad

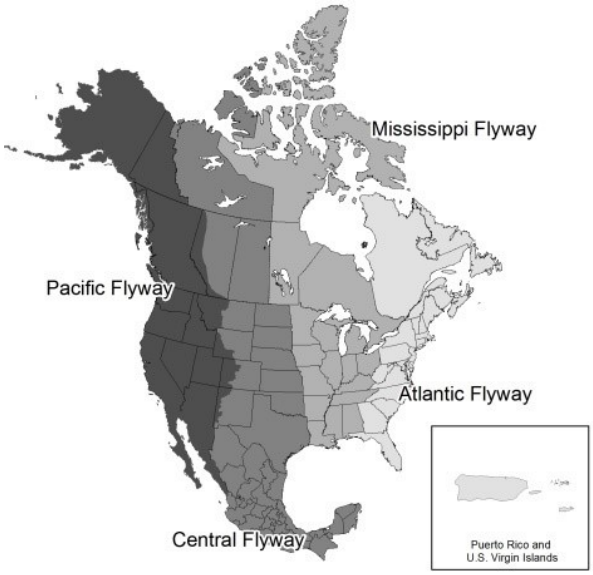
Herbaceous wetlands within the study area are often located adjacent to forested wetlands and primarily occur in the floodplain of the Black River. Herbaceous wetlands can provide nesting/roosting, loafing, and/or foraging habitat for many of the same species of mammals utilizing forested wetlands. Other mammals common to herbaceous wetlands include the marsh rice rat (*Oryzomys palustris*) and muskrat (*Ondatra zibethicus*). During low-water conditions in the spring, open water habitats transition to herbaceous wetlands and smartweed along with other beneficial plants germinate here, providing additional food sources to birds and especially to wintering waterfowl. Other birds potentially occurring in herbaceous wetlands of the alternative footprints include the great blue heron (*Ardea herodias*), American bittern (*Botaurus lentiginosus*), black-crowned night-heron (*Nycticorax nycticorax;* **Figure 11**), yellow-crowned night heron (*Nyctanassa violacea*), least bittern (*Ixobrychus exilis*), sedge wren (*Cistothorus platensis*), and red-winged blackbirds. Reptiles and amphibians present in herbaceous wetlands of the alternative footprints may include the American bullfrog (*Lithobates catesbeianus*), northern cricket frog (*Acris crepitans*), chorus frog (*Pseudacris streckeri*), and common snapping turtle (*Chelydra serpentina*).

Figure 11: Black-crowned Night-heron

Migratory Birds

The project occurs within the Mississippi Flyway (**Figure 12**), which extends from Canada and the headwaters of the Mississippi River to the Gulf of Mexico. More than 325 bird species make the round-trip each year along the Mississippi Flyway, migrating from their breeding grounds in Canada and the northern U.S. to their wintering grounds along the Gulf of Mexico and in Central and South America (National Audubon Society, 2021). According to the National Audubon Society, nearly half of the bird species and up to 40% of the waterfowl of North America spend part of their lives in the Mississippi Flyway. With spectacular forests, grasslands, and wetlands, the route provides good sources of food and water, with no mountainous areas to navigate along the entire route. Wetlands along the route are particularly vital to many migratory bird species that winter in flooded bottomland forests and marshes in the southern United States. Additionally, the flooded and even the dry croplands within the action alternatives are significantly used in the winter by foraging waterfowl. The Mississippi Flyway is used by large numbers of geese, ducks, shorebirds, sparrows, blackbirds, thrushes, and warblers. It is highly likely that many of these migratory bird species pass through the alternative footprints during their annual migrations. Waterfowl hunting within the nearby Black River WMA and on private lands is a major recreational activity in the study area.

Figure 12: Flyways of Canada, the U.S., and Mexico



Source: https://www.fws.gov/birds/management/flyways.php

Other migratory birds (and non-game species) that are likely to occur in the alternative footprints are barn swallows (*Hirundo rustica*) and cliff swallows (*Petrochelidon pyrrhonota*). Barn swallows use man-made structures for semi-colonial nesting and live in close association with humans. Cliff swallows nest communally in mud nests under bridges and in barns and caves. Cliff swallows, whose nests are shown in **Figure 13**, are neotropical migrants, spending the winter in South or Central America and nesting in North America in the summer. Both species commonly use bridges and culverts in Arkansas for nesting. Other migratory birds can also nest on man-made structures.

Figure 13: Cliff Swallow Nests at the Hwy. 67 / Hwy. 412 Interchange in Walnut Ridge

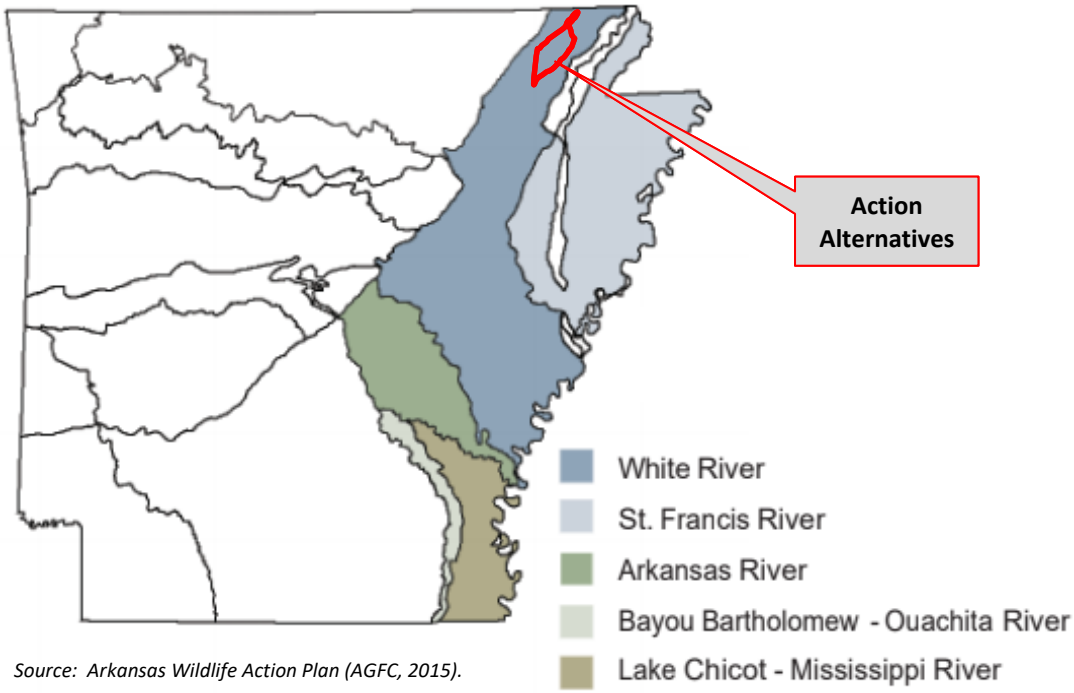
Bald eagles are large predatory birds that typically build their nests in large trees near rivers or coasts. A typical nest is around five feet in diameter. Eagles often use the same nest year after year. Over the years, some nests become enormous, as much as 9 feet in diameter, weighing two tons. Wooded areas surrounding the Black River are the only areas within the project limits to contain potentially suitable nesting habitat for the bald eagle. Bald eagle foraging habitat includes rivers, lakes, and reservoirs as well as marshes. Although there are no reservoirs located within or adjacent to Alternatives 2 or 3, some farming practices do include flooding fields for short periods of time, creating temporary "lakes" that could provide stopover habitat for foraging during migration. Additionally, William H. Donham State Fish Hatchery is located adjacent to Alternatives 2 and 3 just west of Corning. Hatcheries are known to be used by eagles as foraging habitat. According to ANHC occurrence data, one bald eagle nest is recorded within the Black River WMA, approximately 4.2 and 3.3 miles from Alternative 2 and Alternative 3, respectively. However, no eagles or nests were observed within the project area during the site visits.

Aquatic Ecology and Biota

Aquatic habitats differ from terrestrial habitats in that the mobility of associated aquatic species is often limited to these habitats. Aquatic ecosystems were delineated using ecobasins established by the AGFC. Ecobasins are a version of the level III ecoregions described by Woods and others (2004) that are then further subdivided by major river basins to form the 18 ecobasins in Arkansas.

The study area occurs entirely within the White River ecobasin of the Mississippi Alluvial Plain (**Figure 14**). According to the AGFC, streams in this ecobasin are some of the most productive, species rich, bottomland hardwood, low gradient systems in the state. Low gradient streams have wider channels and floodplains than high gradient streams and have a tendency for the stream to meander. Natural channels in this ecobasin are tortuously meandering, having silt, sand, and gravel substrates and abundant cover consisting of mainly large, woody debris. Riparian zones are dense, having some of the largest hardwood trees in the state. Currently, land use changes have decreased riparian zones significantly and caused substantial increases in turbidity due to sedimentation. While stream and connected oxbow lakes are still some of the most productive in the state, native fish fauna, especially large river fishes, have decreased due to upstream flow and thermal modifications from numerous impoundments. Soils in some sub-watersheds have high levels of magnesium and sodium, contributing to higher total dissolved solids. The Black River, which occurs within the footprint of both Alternatives 2 and 3, is an example of a stream in this ecobasin.

Figure 14: Mississippi Alluvial Plain Ecobasin

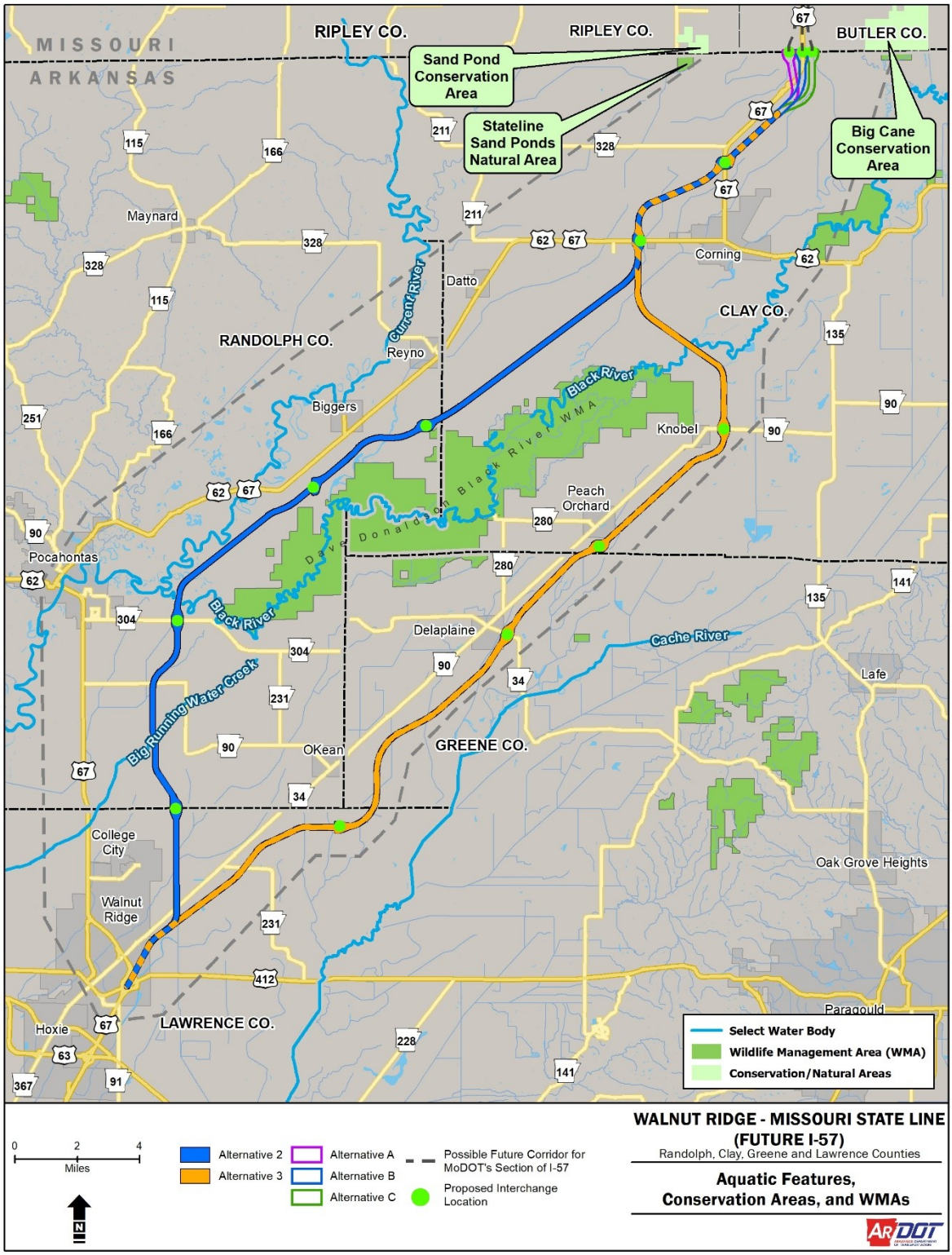


Source: Arkansas Wildlife Action Plan (AGFC, 2015).

Streams and rivers within the project's ecoregion have also been described as having very low gradients and fine-grained substrates, with many reaches having ill-defined stream channels. Point bars, natural levees, swales, and abandoned channels are common in the region and may occur in the study area along the Black River (**Figure 15** and **Figure 16**), which represents the largest stream in the alternative footprints. The Black River flows generally southwest and passes through the Black River WMA, through Randolph County to Pocahontas, and then beyond the study area. The Black River's Arkansas tributaries are the Little Black, Spring, and Strawberry rivers, and with its connection to the White River, it is part of the Mississippi River watershed.

Figure 15: Black River

Figure 16: Major Aquatic Features and Natural/Conservation Areas Near the Project



Aquatic habitats present within each action alternative occur primarily at river and stream crossings, but also within agricultural canals, wetlands, and ponds. Each of these habitats contains a variety of plants, fish, macroinvertebrates, and other aquatic organisms. The Black River passes through both Alternatives 2 and 3 and contains the greatest source of aquatic biota within the alternative footprints. The main species of sport fish occurring in the Black River are blue catfish (*Ictalurus furcatus*), channel catfish (*I. punctatus*), flathead catfish (*Pylodictus olivaris*), white crappie (*Pomoxis annularis*), black crappie (*P. nigromaculatus*), largemouth bass (*Micropterus salmoides*), spotted bass (*M. punctulatus*), yellow bass (*Morone mississippiensis*), and walleye (*Sander vitreus*). Other fish species known to occur within the Black River include numerous sunfish species (*Lepomis* spp.), gar (*Lepisosteus* spp.), river carpsucker (*Carpiodes carpio*), mosquito fish (*Gambusia oiffinis*), gizzard shad (*Dorosoma cepedianum*), golden shiner (*Notemigonus crysoleucas*), and blackspotted topminnow (*Fundulus olivaceous*). Fallfish (*Semotilus corporalis*), tadpole madtom (*Noturus gyrinus*), and grass carp (*Cyprinus carpio*) have also been reported. Historically, the Black River had large populations of river mussels; however, overharvesting and silt in the river caused by farming and dredging drastically reduced mussel populations (Cavaneau, 2018). Federally-protected mussels potentially occurring in the Black River are discussed in Chapter 3. Additional state and federally-listed species are discussed in Chapters 3 and 4 of this technical report.

The Current and Cache Rivers are two other large perennial waterbodies located nearby (**Figure 16**). The Current River is located within the study area while the Cache River is not; neither river is impacted by an action alternative. The Current River is located northwest of the project and flows southward and roughly parallel to portions of Alternative 2. The Cache River is located southeast of the project and flows southward and roughly parallel to portions of Alternative 3. Other major streams in the study area and their hydrologic characteristic, as well as quantitative information on wetlands, are detailed in the Waters Technical Report, which is provided as an appendix to the Draft EIS document. A summary of this information is also provided in the Draft EIS document.

Invasive Species and Noxious Weeds

An invasive species is one that is not native to an ecosystem and which causes, or is likely to cause, economic or environmental harm or harm to human health (USFWS, 2012). The Bureau of Land Management considers plants invasive if they have been introduced into an environment where they did not evolve. As a result, they usually have no natural enemies to limit their reproduction and spread (Westbrooks, 1998). Some invasive plants can produce significant changes to vegetation, composition, structure, or ecosystem function. (Cronk and Fuller, 1995). Many noxious weeds are also considered invasive species. Legally, a noxious weed is any plant designated by a Federal, State, or county government as injurious to public health, agriculture, recreation, wildlife, or property (Sheley et al., 1999). A noxious weed is also commonly defined as a plant that grows out of place and is "competitive, persistent, and pernicious." (James et al., 1991). Invasive and exotic plant species thrive in vegetative edge and fragmented forest environments, competing with and often displacing native plant species. This results in a reduction in diversity of native plant and animal species and overall health of the ecological community (Swearingen et al., 2010). Information on invasive species and noxious weeds known to occur or with the potential to occur within the project limits was obtained from the AGFC.

According to the Black River WMA Master Plan, the nutria (*Myocastor coypus*) is an invasive species in the area reported to reside in very small numbers on the WMA. The nutria is a large semi-aquatic rodent that lives in colonies along rivers, lakes, and wetlands. Native to South America, nutria can cause damage to levees and vegetative communities. Feral hogs also have been documented to exist on the WMA in small numbers. The WMA staff is exhausting all efforts at their disposal to eliminate all feral hogs within the WMA and its borders to keep small populations from becoming established.

According to the Aquatic Nuisance Species Coordinator with the AGFC, the only known aquatic invasive species within the Black River are silver carp (*Hypophthalmichthys molitrix*), bighead carp (*H. nobilis*), and alligator weed (*Alternanthera philoxeroides*). Northern snakehead (*Channa argus*), which is a fish native to China, are in the White River but the AGFC has not had any confirmed sightings in the Black River.

According to the Arkansas Department of Agriculture, the project area is currently outside of the USDA Imported Fire Ant Quarantine, which extends only as far north as White County. Any dirt moving equipment that has been used within the USDA Imported Fire Ant Quarantine must be cleaned of mud/dirt before moving into areas outside of the quarantine so as to not introduce fire ants into areas that do not yet have them.

Figure 17: Purple Loosestrife

According to the AGFC, there is an historic population of purple loosestrife (*Lythrum salicaria;* **Figure 17**) in the project vicinity. Purple loosestrife is a highly invasive species to wetlands in North America and is listed as a prohibited plant in Arkansas. This European native was imported as an ornamental and quickly spread throughout the Great Lakes Region of the U.S. and Canada. It is a perennial plant that can spread from roots or seeds. It grows tall with a spike of showy purple flowers that bloom most of the summer. The flowers produce tiny seeds that can remain dormant for many years. The plant requires abundant sunshine and water to survive/thrive and is usually found growing in shallow water along the banks of bodies of water. The known historic population of purple loosestrife is located in Big Running Water Creek, which is located just north of Walnut Ridge and shown in **Figure 16**. Alternative 2 crosses Big Running Water Creek approximately 2.5 miles north of the Lawrence-Randolph County line. This plant was discovered in the late 1990's and with help from the state plant board, a section of the creek was hand sprayed (by boat and foot) for about three consecutive years to the point that AGFC felt it had been removed. However, according to the AGFC, there could be dormant seeds in the creek sediment or along the banks that may be able to re-establish if the soil is disturbed through construction or vegetation removal.

The zebra mussel (*Dreissena polymorpha*) is an exotic species that is threatening native aquatic life. The zebra mussel is not known to currently occur in the Black River.

No species surveys were conducted during the March 2021 site visit, and the site visit was limited to existing ROW. During the site visit, the most common noxious weeds observed within the alternative footprints were johnsongrass (*Sorghum halepense*) and giant foxtail (*Setaria faberi*). No purple loosestrife or aquatic invasive species were observed.

Ecologically Sensitive Areas

Ecologically sensitive areas were considered wildlife management areas, conservation/natural areas, or other state-designated habitats deemed valuable or as possessing unique habitats. Each of the below-discussed sensitive areas are identified in **Figure 16**.

The Black River WMA, which is owned by the AGFC, occurs within the center of the study area and adjacent to Alternative 2. The Black River WMA represents one of the largest remaining tracts of mature bottomland hardwood forest habitat type in the lower Mississippi Alluvial Valley (AGFC, 2021)

and is, therefore, a critical area for wildlife dependent on this system. At its nearest point, Alternative 2 is located approximately 180 feet from the Black River WMA.

The Big Cane Conservation Area, which is managed by the Missouri Department of Conservation (MDC), is a 2,155-acre wooded area located approximately 2 miles east of the Missouri connector Alternatives A, B, and C. Conservation areas are lands the MDC owns or manages to conserve natural diversity and provide conservation-related recreation and education opportunities. Known wildlife at the Big Cane Conservation Area include swamp rabbit, white-tailed deer, mourning dove (*Zenaida macroura*), northern bobwhite (*Colinus virginianus*), wild turkey, bullfrogs, black bass, white bass, catfish, and sunfish are common. At its nearest point, Alternative C is located approximately 1.6 miles from the Big Cane Conservation Area.

The Sand Pond Conservation Area, which is managed by the MDC, is located approximately 3 miles west of the Missouri connector Alternatives A, B, and C and immediately north of the Stateline Sand Ponds Natural Area, which is managed by the AGFC. Natural areas are special places that protect rare natural communities and provide vital habitat for a host of plant and animal species, some of which are considered to be rare, threatened, or endangered. Stateline Sand Ponds Natural Area is a wooded tract composed of a mix of forest types set within an almost completely cleared agricultural landscape. The natural area includes ancient sand dune/pond complexes (commonly called "sand ponds"), floodplains, terraces, and associated landforms of the Pleistocene Mississippi River and present-day Black and Little Black Rivers. Sand ponds occur in areas of sandy soils that were deposited by the waters of melting glaciers 2.6 million to 11,700 years ago. Then, about 18,000 to 22,000 years ago, winds swept the land and formed these sands into dunes and swales, or ponds. According to the ANHC, the Stateline Sand Ponds Natural Area represents one of the last remaining areas of habitat for the federally-endangered pondberry and is a portion of a larger 1,500-acre conservation site that extends south and west into Arkansas and north and east into Missouri. Sand ponds are also known to support Corkwood (*Leitneria pilosa ozarkana*). Both pondberry and corkwood are associated with seasonally flooded wetlands (bottomland hardwood forests and forested swales), and the margins of sand ponds. At its nearest point, Alternative A is located approximately 2.4 miles from the Stateline Sand Ponds Natural Area.

The Current River, which is located west of Alternative 2, is listed by the Arkansas Division of Environmental Quality as an Extraordinary Resource Water (ERW). A waterbody is classified as an ERW based on a combination of its chemical, physical, and biological characteristics and its watershed which is characterized by scenic beauty, aesthetics, scientific values, broad scope recreation potential, and intangible social values. The Current River is not impacted by any of the action alternatives. At its nearest point, Alternative 2 is located approximately 620 feet from the Current River.

There are no Wild and Scenic Rivers, streams listed on the Nationwide Rivers Inventory, glades, or other unique habitat types within the alternative footprints.

2.3 Environmental Consequences

Terrestrial Vegetation and Wildlife

The overall ecology of the study area has largely been defined by local agricultural practices. The large tracts of agricultural fields are dotted with patches of wooded areas, some of which are interconnected along drainage features. As indicated in various sections of this document, land cover within the alternative footprints is primarily cropland and developed areas, but some natural areas such as woodlands (forested wetlands and upland woods) and emergent wetlands are also present.

Transportation projects often produce unintended consequences for wildlife and habitat. Although some minor mortality would occur to the less mobile species during construction, permanent habitat loss remains the primary impact to terrestrial communities. All action alternatives would involve the physical removal and disturbance of vegetated areas, due to the clearing and grading of land needed to accommodate ROW and for construction of the proposed interstate facility, service roads, and interchanges. Alternatives 2 and 3 would also remove bottomland hardwood forests. This direct vegetation removal reduces the amount of habitat available to wildlife. In areas where woodlands are bisected, the project would increase the amount of edge habitat. Increased edge habitat supports species common to developed areas such as deer and red-tailed hawks, but impacts populations that rely on mature forests such as barred owls (*Strix varia*) and yellow-billed cuckoos (*Coccyzus americanus*); thereby reducing biodiversity. Increased edge-to-interior ratio in forests also results in increased introduction of invasive plant species, resulting in lower plant biodiversity and fewer native plant species that support native wildlife. Other impacts to vegetated areas could result from increased roadway runoff (that can contain pollutants), sedimentation, and the introduction of non-native plant species within disturbed areas. These consequences could lead to terrestrial habitat degradation adjacent to the alternative footprints, and ultimately a decrease in plant and animal species that inhabit these areas. Other impacts to terrestrial wildlife as the result of roadway construction include increases in vehicle-animal collisions (FHWA, 2011). The vast majority of wildlife-vehicle collisions reported in the U.S. involve deer, as they are most likely to cause human injury and vehicle damage due to their size, prevalence, and their common use of edge habitats adjacent to roadways (FHWA, 2008).

To inform the assessment on impacts to wildlife travel corridors, identified corridors were compared to wildlife-vehicle collision data within the project area. Based on 2015-2022 available data, a total of 80 wildlife-vehicle collisions were reported within the approximately 700 square miles of the project area, with each year having more wildlife-vehicle collisions than the year before. However, this is most likely due to better reporting by police agencies rather than more animal strikes (Don Dailey, ARDOT, personal communication, April 6, 2022). Of the 80 reported strikes, 28 of these occurred in the spring and summer (March 20th through September 22nd). When compared to the locations of the identified wildlife travel corridors, no discernable correlation was observed and the data seem to instead reflect areas with highest traffic volumes.

Construction of the action alternatives would also involve some habitat fragmentation to an already highly fragmented area. Many wildlife species in fragmented landscapes such as the study area rely on natural vegetated corridors to move safely within an environmental that is otherwise void of vegetated cover. This is especially true for smaller and less mobile species and less important for avian species. Due to the limited quantity of vegetated cover within and adjacent to the alternative footprints, these travel corridors are particularly important to wildlife. Habitat fragmentation is also well known to reduce biodiversity. Basic conservation theory states that large habitat patches have more species than small ones and connected patches have more species than isolated ones (MacArthur and Wilson, 1967). There is also evidence that roads and highways represent substantial barriers to wildlife movement (Jackson and Griffin, 2000). The approximately 400-foot-wide ROW of the proposed project is anticipated to impede or restrict most wildlife movement through the area; however, it is expected that most species would be able to cross below proposed span bridges and some culverts.

For the above-described reasons, project impacts to terrestrial vegetation and wildlife are quantified based on the acreage of natural habitat types removed and the number of vegetated travel corridors fragmented by each alternative. Impacts to these resources are summarized below for each alternative.

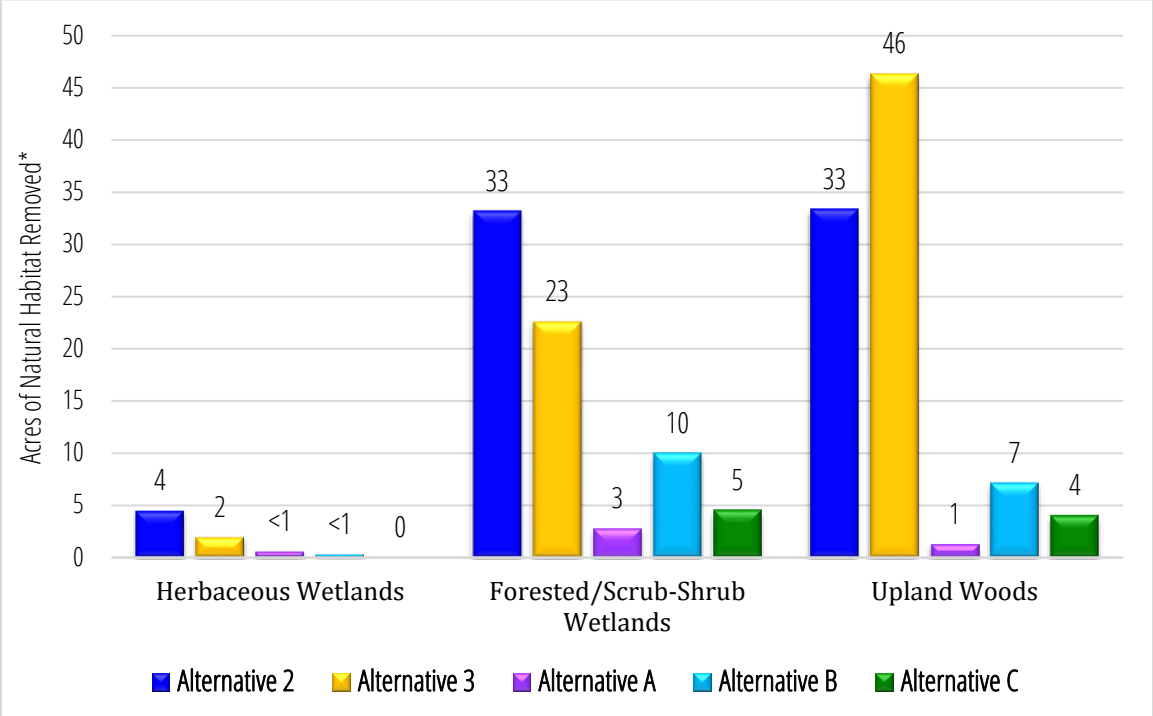
Upon completion of the project, future impacts to terrestrial communities may occur near interchanges from new development years later as a result of increased accessibility. Because the proposed project

would function as a fully controlled access facility, the areas surrounding the proposed interchanges are the primary locations where induced growth may occur. A discussion of induced growth impacts is provided in the Induced Growth and Reasonably Foreseeable Effects Technical Report provided as an appendix to the DEIS.

No Action Alternative
No impacts to terrestrial vegetation or wildlife would occur as a result of the No Action Alternative.

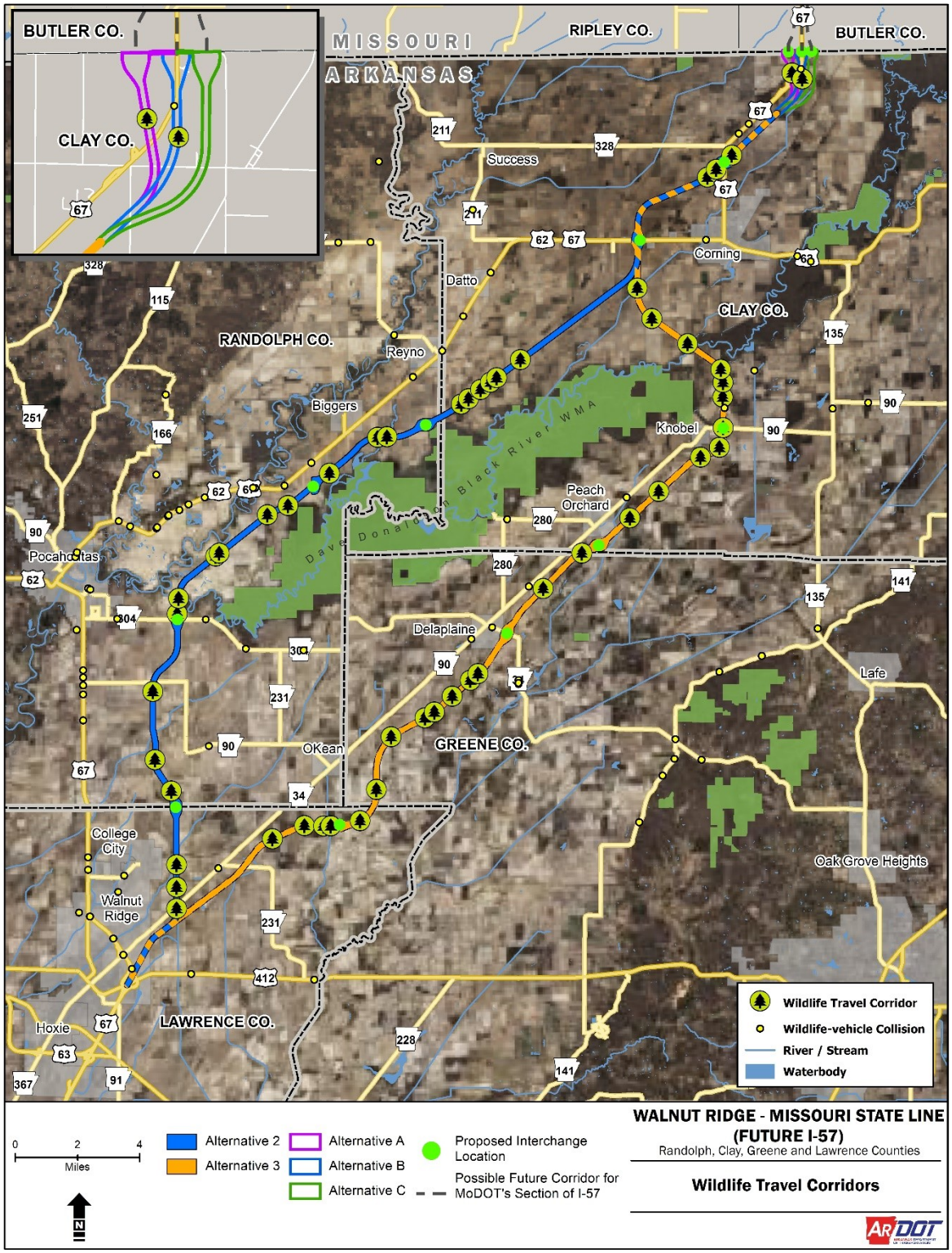
Alternative 2
Alternative 2, which has a proposed ROW footprint of 2,249 acres, would remove a total of 71 acres of natural habitat. Approximately 33 acres of the habitat impacted are forested wetlands, 33 acres are upland woods, and four acres are herbaceous wetlands (**Figure 18**). Alternative 2 would also remove approximately 2,053 acres of cropland. As detailed in the previous Terrestrial Wildlife section, each of these habitat types provide foraging and living spaces to numerous species of mammals, birds, reptiles, and amphibians. Details on forested impacts associated with federally-listed bat species are provided in Chapter 3. Additionally, Alternative 2 would sever 24 wildlife travel corridors (**Figure 19**). These corridors range from 15 to 763 feet in width. The average width of the corridors being impacted by Alternative 2 is 199 feet and the median width is 49 feet.

Figure 18: Comparisons of Natural Habitat Types Removed by each Action Alternative



Source: Project Team, 2021

Figure 19: Wildlife Travel Corridors Fragmented by each Action Alternative



Alternative 3
Alternative 3, which has a proposed ROW footprint of 2,337 acres, would also remove a total of 71 acres of natural habitat. Approximately 23 acres of the habitat impacted are forested/scrub-shrub wetlands, 46 acres are upland woods, and two acres are herbaceous wetlands. Alternative 3 would also remove approximately 2,166 acres of cropland. Additionally, Alternative 3 would sever 28 wildlife travel corridors. These corridors range from 23 to 792 feet in width. The average width of the corridors being impacted by Alternative 3 is 194 feet and the median width is 123 feet.

Alternative A
Alternative A, which has a proposed ROW footprint of 142 acres, would remove a total of five acres of natural habitat, consisting of approximately three acres of forested wetlands, 0.6 acre of herbaceous wetlands, and one acre of upland woods (**Figure 18**). Alternative A would also remove approximately 128 acres of cropland. Additionally, Alternative A would sever one wildlife travel corridor that is approximately 34 feet in width.

Alternative B
Alternative B, which has a proposed ROW footprint of 139 acres, would remove a total of 17 acres of natural habitat, consisting of approximately 10 acres of forested wetlands, 0.3 acre of herbaceous wetlands, and seven acres of upland woods. Alternative B would also remove approximately 106 acres of cropland. Additionally, Alternative B would sever one wildlife travel corridor that is approximately 46 feet in width.

Alternative C
Alternative C, which has a proposed ROW footprint of 159 acres, would remove a total of nine acres of natural habitat, consisting of approximately five acres of forested wetlands and four acres of upland woods. Alternative C would also remove approximately 143 acres of cropland. Alternative C would not sever any wildlife travel corridors.

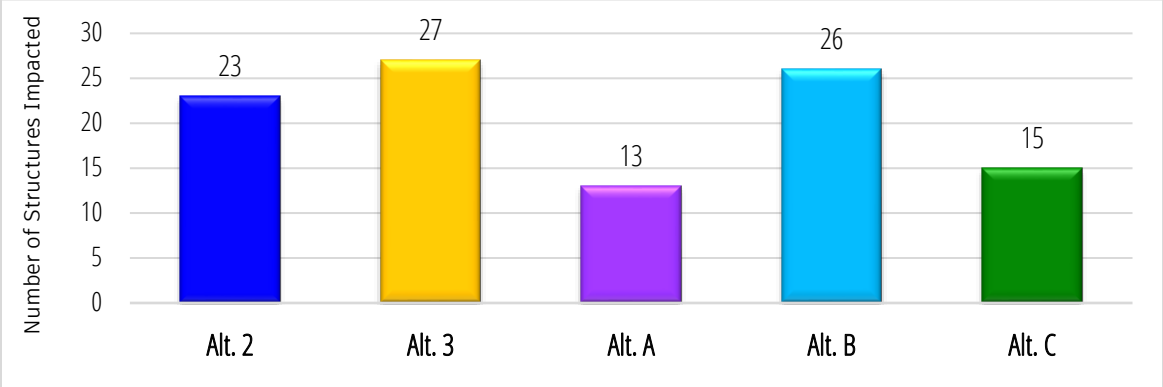
Migratory Birds

Most birds utilizing the Mississippi Flyway during migration are anticipated to use more natural areas, such as the Black River WMA, as opposed to fragmented areas located within the alternative footprints. However, the natural vegetative cover types in the project limits still offer foraging and nesting habitat for many species of migratory birds. Additionally, the project limits primarily contain cropland, which is heavily used by wintering waterfowl, and these available foraging areas would be removed from their available habitat. For some migratory birds, suitable nesting habitat is present within the alternative footprints at existing bridge structures. Thus, existing bridges in the alternative footprints that were accessible via public ROW were inspected for evidence of past and present use by migratory birds. Other bridges on private land and culverts are also present along the action alternatives and these may also function as suitable nesting habitat for migratory birds.

Additionally, all action alternatives contain sheds, barns, detached garages, abandoned buildings, or grain bins (i.e., silos) that may be utilized for nesting by some migratory birds. The number of suitable structures, including bridges, impacted by each action alternative is shown in **Figure 20** and a discussion of each alternative's impacts to migratory birds is provided below.

No Action Alternative
The No Action Alternative would not result in any study-related construction and would, therefore, not directly impact migratory bird habitat.

Figure 20: Number of Structures (Potential Migratory Bird Nesting Habitat) Impacted



Source: Project Team, 2021

Alternative 2

Swallow nests and nests of other migratory birds were observed at all three bridge structures at the Hwy. 67/Hwy. 412 interchange in Walnut Ridge (**Figure 13**). Alternative 2 would impact the Hwy. 67 northbound and southbound ramps at the Hwy. 67/Hwy. 412 interchange in Walnut Ridge. These bridge structures would not be removed but disturbance during construction from noise or the presence of workers and machinery would occur and impacts to species may result. Where Alternatives 2 and 3 share an alignment and cross Hwy. 67 west of Corning, the bridge over Oak Creek Ditch would be impacted by a proposed interchange at this location. This structure may be replaced or extended. The location of this stream and proposed interchange is shown on Sheet 20 of **Attachment A**. Additionally, Alternative 2 would remove 19 structures (barns, sheds, detached garages, abandoned buildings, or grain bins) that may be utilized for nesting by some migratory birds (**Figure 20**). Alternative 2 may also create future habitat for migratory birds by construction of proposed span bridges, such as the one that would be located over the Black River. Conceptual design indicates approximately 18 proposed bridges along Alternative 2; these new structures could provide nesting habitat for migratory birds such as cliff and barn swallows. Cropland suitable as foraging habitat for migratory birds, particularly waterfowl, would also be impacted, with Alternative 2 removing approximately 2,053 acres of agricultural fields. Approximately 5.0 acres of potentially suitable bald eagle habitat surrounding the Black River is present within Alternative 2 and would be removed by the project.

Alternative 3

Alternative 3 would result in the same impacts to the three bridge structures at the Hwy. 67/Hwy. 412 interchange in Walnut Ridge as Alternative 2, as well as to the bridge over Oak Creek Ditch. Alternative 3 would also impact one existing reinforced concrete box (RCB) culvert along Hwy. 90 east of Knobel. During the site investigation, evidence of use by migratory birds was observed at this RCB. This RCB would likely be impacted by Alternative 3 through replacement or widening as an interchange is proposed at this location. The location of this proposed interchange is shown on Sheet 39 of **Attachment A**. Additionally, Alternative 3 would remove 22 structures. Alternative 3 may also create future habitat for migratory birds by construction of proposed span bridges, such as the one that would be located over the Black River. Conceptual design indicates approximately 11 proposed bridges along Alternative 3; these new structures could provide nesting habitat for migratory birds such as cliff and barn swallows. Alternative 3 would remove approximately 2,166 acres of cropland that may be suitable foraging habitat for some migratory birds. Approximately 1.3 acres of potentially suitable bald

eagle habitat surrounding the Black River is present within Alternative 3 and would be removed by the project.

Alternative A
Alternative A would remove 13 structures (barns, sheds, detached garages, abandoned buildings, or grain bins) that may be utilized for nesting by some migratory birds. Alternative A may also create future habitat for migratory birds by construction of the proposed span bridges that would be located over existing Hwy. 67 and County Road 154. Alternative A would remove approximately 128 acres of cropland that may be suitable foraging habitat for some migratory birds. No trees large enough to provide nesting habitat for bald eagles were observed.

Alternative B
Alternative B would remove 26 structures that may be utilized for nesting by some migratory birds. Alternative B may also create future habitat for migratory birds by construction of the proposed span bridge that would be located over County Road 154. Alternative B would remove approximately 106 acres of cropland that may be suitable foraging habitat for some migratory birds. No trees large enough to provide nesting habitat for bald eagles were observed.

Alternative C
Alternative C would remove 15 structures that may be utilized for nesting by some migratory birds. Alternative C may also create future habitat for migratory birds by construction of the proposed span bridge that would be located over County Road 154. Alternative C would remove approximately 143 acres of cropland that may be suitable foraging habitat for some migratory birds. No trees large enough to provide nesting habitat for bald eagles were observed.

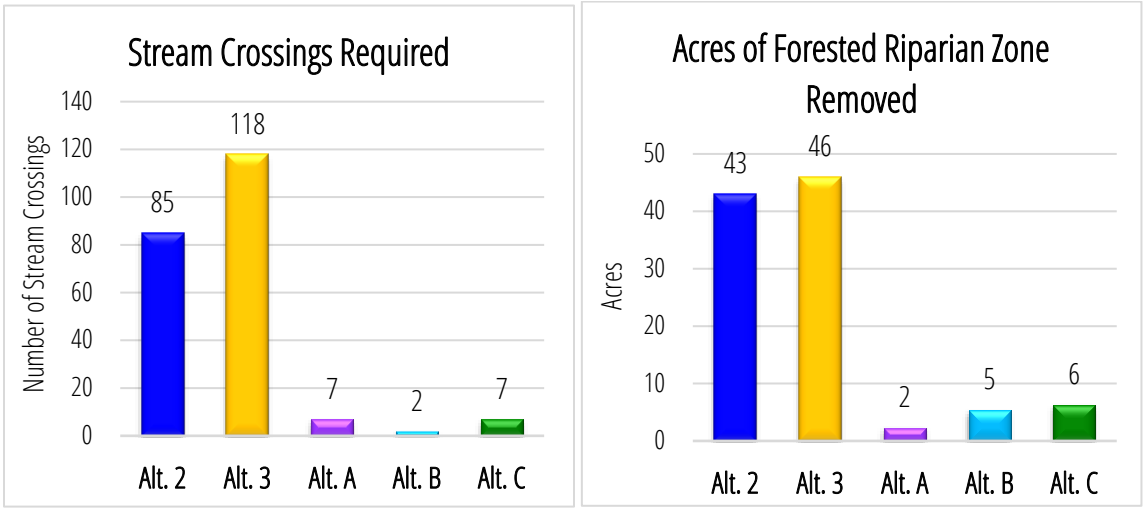
Aquatic Ecology and Biota

For the proposed project, aquatic biota could be impacted by roadway construction and its future operation through direct alteration of aquatic habitat, siltation/sedimentation, and pollutant loading. For stream crossings where culverts are used, impacts to fish passage may result if species cannot easily pass through the culvert. Flow alterations can be temporal as in a stream crossing that in part or completely limits the migration and movement of aquatic species. During culvert installation or during bridge construction, temporary changes in water quality are likely to occur. Additionally, the natural substrate of the stream is changed at these crossings and where four-sided box culverts are used, the substrate is converted to concrete. Direct mortality during construction would be limited to those less mobile species such as aquatic macroinvertebrates and amphibians. Disturbances within forested riparian zones can also damage aquatic habitats. Forested riparian areas provide shading over a stream, affecting water temperature; provide habitat for vertebrates and invertebrates; provide bank stability and thus, better sediment control and filtering capability and provide an energy source for the aquatic species ecosystem (AGFC, 2015). Both stream crossings and riparian zone removal would directly alter aquatic habitat, increase the probability that silt and sediment would enter a stream during construction, and increase the likelihood of pollution entering the watercourse. Increases in sedimentation rates can clog gill filaments of fish and macroinvertebrates, potentially leading to disease or even death. Once the proposed highway is operational, pollution from highway runoff, such as heavy metals (Barber et al., 2006), could also have impact aquatic communities.

For the above-described reasons, the proposed project impacts to aquatic biota are estimated based on the number of stream crossings required by each alternative and by the acreage of forested riparian areas removed. Stream crossings were defined as any ephemeral, intermittent, or perennial watercourse that fully crosses a proposed alignment. Ephemeral and intermittent ditches were also counted as impacts to these features as they can also affect aquatic habitats and biota. Riparian zones

were defined as wooded areas within 328 feet (100 meters) of each side of a stream reach, which is how the AGFC defines the term in their 2015 Wildlife Action Plan. Impacts to aquatic features are summarized below for each alternative and shown in **Figure 21**.

Figure 21: Stream Crossings and Riparian Zone Impacts



Source: Project Team, 2021

No Action Alternative
No impacts to aquatic species or aquatic features would occur as a result of the No Action Alternative as it would require no stream impacts and would not remove any riparian zone vegetation.

Alternative 2
As shown in **Figure 21**, Alternative 2 requires 85 stream crossings and removal of approximately 43 acres of forested riparian zone. Of the 85 crossings, 47 are considered ephemeral or intermittent ditches. Alternative 2's 400-foot-wide ROW footprint also occurs within a 0.25-acre of open water, most of which represents the Black River.

Alternative 3
Alternative 3 requires 118 stream crossings and removal of approximately 46 acres of forested riparian zone. Of the 118 crossings, 58 are considered ephemeral or intermittent ditches. Alternative 3's ROW footprint also occurs within a 0.85-acre of open water, most of which represents the Black River.

Alternative A
Alternative A requires seven stream crossings and removal of approximately two acres of forested riparian zone. Of the seven crossings, six are considered ephemeral ditches. No open water areas would be impacted by Alternative A.

Alternative B
Alternative B requires two stream crossings and no impacts to open water areas. Both crossings are considered ephemeral ditches. Alternative B would require removal of approximately five acres of forested riparian zone.

Alternative C
Alternative C requires seven stream crossings and no impacts to open water areas. All crossings are considered ephemeral ditches. Alternative C would require removal of approximately six acres of forested riparian zone.

Invasive Species and Noxious Weeds

No species surveys were conducted during the March 2021 site visit, and the site visit was limited to existing ROW. During the site visit, the most common noxious weeds observed within the alternative footprints were johnsongrass (*Sorghum halepense*) and giant foxtail (*Setaria faberi*). No purple loosestrife or aquatic invasive species were observed.

No Action Alternative
Because construction activities or changes to the natural environment related to the proposed project would not occur under the No Action Alternative, there would be no impacts to invasive species or noxious weeds.

Alternative 2
Construction of this new location alternative may benefit invasive plant species and/or noxious weeds by creating areas of new ground disturbance, fragmenting woodlands, and introducing additional edge environments. Native plant species may be displaced in these areas. It is likely the ROW along this action alternative would contain a lower biodiversity of native plant species than compared to what previously existed in the natural area. As Alternative 2 crosses 475 linear feet (LF) of Big Running Water Creek, which is where the historic population of purple loosestrife occurred, construction of this action alternative could promote the re-establishment of this invasive plant in aquatic environments.

Construction of a new bridge over the Black River may cause sedimentation and habitat disturbance that may be more detrimental to native than invasive species. However, these construction impacts would be temporary and are not anticipated to cause substantial long-term changes that would reduce native aquatic species. Alternative 2 is not anticipated to benefit other invasive animal species, such as nutria, feral hogs, or fire ants, in ways that would cause them to proliferate.

Alternative 3
Similar to Alternative 2, Alternative 3 may benefit invasive plant species and/or noxious weeds and reduce plant biodiversity in areas of proposed disturbance. Additionally, construction of a new bridge over the Black River would cause temporary construction impacts that may be more detrimental to native than invasive aquatic species. Alternative 3 is not anticipated to affect the area in which purple loosestrife was noted as historically occurring by the AGCF. Alternative 3 is not anticipated to benefit other invasive animal species, such as nutria, feral hogs, or fire ants, in ways that would cause them to proliferate.

Alternatives A and C
These new location alternatives may benefit invasive plant species and/or noxious weeds and reduce plant biodiversity in these areas. Neither the construction of Alternative A nor C would affect the area in which purple loosestrife was noted as historically occurring by the AGFC. Alternatives A and C are not anticipated to benefit invasive animal species, such as nutria, feral hogs, or fire ants, in ways that would cause them to proliferate.

Alternative B
This alternative may benefit invasive plant species and/or noxious weeds and reduce plant biodiversity within the approximately 1.8-mile-long section on new location. Within the 0.5-mile-long

section along existing Hwy. 67 and in an already developed environment, Alternative B would not create additional edge habitat or fragmentation and few changes would occur in plant and animal compositions, including invasive species and noxious weeds. Construction of Alternative B would not affect the area in which purple loosestrife was noted as historically occurring by the AGFC. Alternative B is not anticipated to benefit invasive animal species, such as nutria, feral hogs, or fire ants, in ways that would cause them to proliferate.

Sensitive Areas

No Action Alternative

No designated natural areas, conservation areas, wildlife management areas, Wild and Scenic Rivers, or streams listed on the Nationwide Rivers Inventory would be impacted by the No Action Alternative. Additionally, no glades, sand ponds, or other unique habitat types would be impacted by the No Action Alternative.

Action Alternatives

None of the action alternatives would impact the Black River WMA, Big Cane Conservation Area, or the Stateline Sand Ponds Natural Area. Additionally, no ERWs, Wild and Scenic Rivers, streams listed on the Nationwide Rivers Inventory, or glades would be impacted by any of the action alternatives.

2.4 Avoidance, Minimization, and Mitigation

Impacts to terrestrial wildlife would be unavoidable under any of the action alternatives, primarily due to the associated reduction in the availability of vegetated habitat. However, impacts to important wildlife habitat such as forested wetlands were avoided during initial route selection by positing alternatives around forested habitat to the extent possible and by avoiding the Black River WMA completely. Impacts to wildlife travel corridors, streams, and riparian habitat were minimize where possible by selection of routes that perpendicularly crossed these features. Further review of wildlife crossing opportunities of the proposed roadway and/or assurance of wildlife passage at bridges and culverts would be conducted at the time of design. Moreover, during the design phase(s) of the project, the most current hydraulic and environmental data would be used to inform the culvert structure types and sizes to handle a minimum of a 100-year storm event and additionally include consideration to maintaining aquatic connections. Impacts to terrestrial and aquatic communities would be minimized by limiting construction to the minimum width necessary to meet design safety standards. Mitigation for T&E species habitat loss is discussed in Chapter 3. The use of bridges or properly sized and placed culverts can allow construction to occur across water bodies without hindering the movements of aquatic organisms.

Avoidance and minimization measures would be implemented through ARDOT Special Provisions (SP) for Water Pollution Control, Storm Water Pollution Prevention Plan, and Vegetated Buffer Zone to help limit sediment from entering waterbodies during construction. Erosion and sediment control would follow ARDOT's best management practices (BMPs) to minimize sedimentation during construction and help to minimize sediment and pollutant runoff into surrounding wildlife habitat and/or from entering the Black River or other surrounding streams. BMPs would also include protecting natural stream buffers where feasible. Effects determinations presented in the draft Biological Assessment (BA; **Attachment F**) are based on the current plan for the Black River to be completely spanned. However, there is no current funding for this project and if the plan to avoid in-channel work changes as the project moves to final design and construction, then consultation with USFWS would be re-initiated.

The ARDOT Nesting Sites of Migratory Birds SP would be implemented as part of the project. This special conservation measure will ensure the protection of migratory bird nest sites by either 1) the placement of net barriers during the non-breeding season (generally after August 31 to March 1) on any existing colonized bridges or culverts that will be affected prior to construction taking place; or 2) the removal of inactive nests outside of the breeding/nesting season. Additionally, no activities should occur within 1,000 feet of an active migratory bird nesting colony.

In order to avoid impacts to bald eagles, a survey for eagles and their nests will be conducted for the Selected Alternative within one year of the start of construction. If bald eagle nests are found, further coordination with USFWS may be necessary and project activities would implement conservation/mitigation measures in accordance with the Bald and Golden Eagle Protection Act. No activities would take place within 1,000 feet of a bald or golden eagle nest without first seeking assistance or permits from the USFWS and/or following approved guidelines.

The spread of invasive species within terrestrial and aquatic communities would be minimized by limiting construction to the minimum width necessary to meet design safety standards. Additionally, ARDOT Standard Specifications governing seeding, mulching, etc. contain provisions for testing to prevent or minimize the risk of spreading noxious weeds. Any regulated articles (such as equipment or hay/straw) entering the project area that originated from within the USDA Imported Fire Ant Quarantine would follow recommended guidelines or compliance agreements so as to not introduce fire ants into areas that do not yet have them.

The ARDOT Standard Specification for Zebra Mussel Containment would be implemented for the construction of the bridge over the Black River to slow the spread of zebra mussels within Arkansas.

Chapter 3 – Federally-protected Species

3.1 Regulatory Context, Methodology, and Data

In accordance with the Endangered Species Act (ESA) of 1973, federally-protected T&E species were identified for the action area (AA) using the USFWS online Information, Planning, and Conservation decision support system. Section 7 of the ESA requires federal agencies to "*request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action*" as applied to projects conducted, funded, or permitted by a Federal agency.

The AA boundaries were established by incorporation of all areas where direct and indirect impacts to T&E species could occur. Establishment of the AA also considered potential indirect impacts such as noise, visual, and water quality effects. The AA includes the 400-foot-wide corridor that was developed as a conservative impact footprint. This corridor was used because the area encompasses all potential direct impacts by the proposed project and would also encompass many indirect impacts as it is larger than the actual required ROW. Additionally, a 600-foot-wide buffer of the proposed roadway is included in the AA to account for noise impacts associated with project construction. Based on the noise analysis, 600 feet was found to be the maximum distance from the proposed roadway where a noise impact could occur. Noise impacts were calculated out to a conservative ambient noise level measured for the land uses in the surrounding areas. The AA also includes 300 feet downstream and 100 feet upstream of the proposed crossings at the Black River and proposed crossings of direct tributaries to the Black River to account for potential indirect impacts due to aquatic disturbances. However, none of these additional up and downstream areas extend beyond the 600-foot-wide buffer. This action area was reviewed and evaluated for potentially suitable habitat. **Figure 1** shows the AA and the action alternatives.

In order to identify federally-protected species in accordance with Section 7, initial coordination with the USFWS was completed and resulted in identifying a total of 14 threatened or endangered species listed on the Official Species List for the AA (**Attachment B**).

Habitat assessments were conducted, and direct impacts quantified, within the anticipated ROW footprint of each action alternative. In this chapter, these areas are referred to as the study area of each alternative and are shown in **Attachment A**. The study area of each action alternative is defined as a consistent 400-foot-wide ROW with larger areas at the proposed interchanges. The proposed interchanges can be seen in **Figure 1**. Unless otherwise noted, it is assumed that all areas within the ROW footprint would be directly affected by construction activities. Indirect impacts to species were also evaluated within the AA.

Presence/absence surveys were conducted for federally-listed bat species for 12 nights (August 1-12, 2021) at 25 locations along Alternative 2 and Alternative 3. One mist net for two nights was deployed at each location. The USFWS Range-Wide Indiana Bat Survey Guidelines were followed throughout the surveys. A total of 26 bats representing four species were captured in mist nets. Results from the survey indicated that no federally-listed bat species were captured in the mist nets. Details on the mist net survey methods are provided in **Attachment C**.

A mussel survey was performed at the Black River crossings of Alternatives 2 and 3 to determine if federally-protected mussel species exist within either of the proposed 400-foot-wide corridors. The Alternative 2 corridor was surveyed on October 16-17 and November 6, 2021. The Alternative 3 corridor was surveyed on October 30-31, 2021. The surveyors utilized dive techniques with surface supplied air provided by a Brownies hookah rig apparatus supported from a boat mounted dive

platform. Water depths were determined with a Humminbird 560 Fishfinder boat-mounted depth finder or a Sokkia fiberglass 25-foot depth rod. Dive locations within the survey area were recorded utilizing a Garmin GPSMAP 64st global positioning satellite receiver. Searches were conducted along the entire channel width of the Black River at both alternative crossings. Transects perpendicular to river flow were established at approximately 50-foot intervals from the downstream to the upstream termini for each alternative. A total of 16 dive searches were conducted during the survey. Details on the mussel survey methods are provided in **Attachment D.**

A presence/absence survey of the Preferred Alternative (Alternatives 2 and C) was conducted for pondberry on April 19, 2022 within suitable habitat. No pondberry was found during the survey. The survey memo is provided in **Attachment E**.

3.2 Federally-protected Species

The species listed below by USFWS have the potential to be present in or migrate through the AA that spans portions of Lawrence, Randolph, Greene, and Clay Counties. The federally-protected T&E species identified by the USFWS include the gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*), eastern black rail (*Laterallus jamaicensis* ssp. *jamaicensis*), piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), Curtis pearlymussel (*Epioblasma curtisii*), pink mucket (*Lampsilis abrupta*), rabbitsfoot (*Theliderma cylindrica*), scaleshell mussel (*Potamilus leptodon*), Hine's emerald dragonfly (*Somatochlora hineana*), Missouri bladderpod (*Physaria filiformis*), pondberry (*Lindera melissifolia*), and Ozark hellbender (*Cryptobranchus alleganiensis bishopi*). Additionally, the monarch butterfly (*Danaus plexippus*) is listed as a candidate species and the western fanshell (*Cyprogenia aberti*), pyramid pigtoe (*Pleurobema rubrum*), and the alligator snapping turtle (*Macrochelys temminckii*) were recently proposed for listing as threatened species (see below paragraph for additional details). Bald eagles were removed from the federal list of threatened and endangered species in 2007, and are no longer protected under the ESA. However, bald eagles remain protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Details on bald and golden eagles are provided in Chapter 2.

The alligator snapping turtle, western fanshell, and pyramid pigtoe were recently proposed for listing as threatened species under the ESA. The USFWS also proposed a Section 4(d) rule to provide for their conservation. The potential range and habitats for these species intersect this project; therefore, USFWS recommends including an assessment of effects to these species within the DEIS. Section 7(a)(4) of the ESA requires federal agencies to confer with the USFWS on any action that is likely to jeopardize the continued existence of proposed species or result in the destruction or adverse modification of proposed critical habitat. The USFWS decided that critical habitat for the alligator snapping turtle is not determinable at this time. Critical habitat for the pyramid pigtoe will be determined within a year of listing. Currently, this means that an action agency has to determine if the action is likely to jeopardize a proposed species. Further updating of the assessments and conservation measures may be necessary through on-going coordination and consultation as new information on these two species becomes available and the Section 4(d) rules are implemented. Section 7(a)(2) of the ESA will be adhered to if a species is subsequently listed. If a federal action may affect a listed species or its critical habitat, the responsible federal agency must enter into consultation with the USFWS.

No critical habitats are present within the ROW of the action alternatives for any of the listed species; however, critical habitat for the rabbitsfoot is located approximately 7.35 miles downstream of Alternative 2 within the Black River. The location of the Black River is shown in **Figure 16**. **Table 1**

details the status and closest known occurrences of the federally-listed species that have a potential to be affected by the project.

3.3 Federally-protected Species and Suitable Habitats

This section provides information related to the federally-listed species, or those proposed for listing, identified by the USFWS as potentially occurring within or near the study area. More detail is provided on those species that have been determined to have suitable habitat within the AA and for which there may be effects. Species location information was initially evaluated as received from ANHC occurrence records. Further details regarding ANHC species tracking and state-listed species within the study area is discussed in Chapter 4 – State-listed Species of Concern.

A habitat assessment for the federally-listed species was conducted for all considered action alternatives, which included review of online governmental databases, coordination with the USFWS and ANHC, and limited field confirmation of potentially suitable habitats. The purpose of the habitat assessment is to identify suitable habitat for species that may be present in the study area (USFWS, 2019). The habitat assessment completed for this project helped to support the BA that provides a determination of whether the project would adversely affect federally-listed species and/or their suitable habitat. The draft BA prepared for the project is provided in **Attachment F**. Results of the habitat assessment are summarized in **Table 2**. Additional habitat considerations and descriptions are found in Chapter 2. This section focuses on habitat present within the study area specifically associated with federally-listed species or those additional species identified by USFWS as candidate or those proposed/evaluated for listing.

Site investigations of the study area for the action alternatives being evaluated in the EIS were conducted between March 2-3, 2021. These site investigations were limited to public access points along the study area.

Additionally, this habitat assessment included bat, mussel, and pondberry surveys; see **Attachment C, Attachment D,** and **Attachment E**, respectively, for details. No federally-listed bats species were captured during the bat survey. One federally-listed mussel species (rabbitsfoot) was collected during the mussel survey within the Black River near the Alternative 2 crossing. No pondberry was observed during the pondberry survey. No other official surveys for federally-listed species were conducted; however, known occurrences of T&E species have been coordinated with the USFWS and ANHC. The Official Species List indicates that critical habitat is located over seven miles downstream of the AA for the rabbitsfoot. Suitable habitat requirements, as noted in **Table 2** were compared to field observations within the action alternatives. Habitat for nine of the federally-protected species has been identified within the action alternatives.

Several biological studies have been performed in the vicinity of Alternatives 2 and 3 and on the Black River WMA. Previous Hwy. 67 corridor studies dating back to 1996, as well as ANHC data and other resources, documented that the pondberry was located within the AA and the pink mucket within the study area.

Table 1: Federally-protected Species, Status, and Closest Known Occurrences

Species (Status)	Closest Known Occurrence*				
	Alternative 2	Alternative 3	Alternative A	Alternative B	Alternative C
Gray bat (Endangered)	Not Identified	Not Identified	Not Identified	Not Identified	Not Identified
Indiana bat (Endangered)	2.15 mi. - Black River WMA	1.70 mi - Black River WMA	11.30 mi. - Black River WMA	11.30 mi. - Black River WMA	11.30 mi. - Black River WMA
Northern long-eared bat (Threatened)	2.15 mi. - Black River WMA	1.73 mi - Black River WMA	10.30 mi. - Black River WMA	10.30 mi. - Black River WMA	10.30 mi. - Black River WMA
Eastern black rail (Threatened)	Not Identified	Not Identified	Not Identified	Not Identified	Not Identified
Piping plover (Threatened)	Not Identified	Not Identified	Not Identified	Not Identified	Not Identified
Red knot (Threatened)	Not Identified	Not Identified	Not Identified	Not Identified	Not Identified
Curtis pearlymussel (Endangered)	Not Identified	Not Identified	Not Identified	Not Identified	Not Identified
Pink mucket (Endangered)	7.35 mi. downstream in Black River, Hwy. 67	1.16 mi. upstream in Black River – Black River WMA	4.00 mi. south in Black River WMA	4.00 mi. south in Black River WMA	4.00 mi. south in Black River WMA
Rabbitsfoot (Threatened)	7.35 mi. downstream in Black River, Hwy. 67	Black River, Hwy. 67	Black River, Hwy. 67	Black River, Hwy. 67	Black River, Hwy. 67
Scaleshell mussel (Endangered)	Not Identified	Not Identified	Not Identified	Not Identified	Not Identified
Pyramid pigtoe (Proposed Threatened)	Not Identified	Not Identified	Not Identified	Not Identified	Not Identified
Western fanshell (Proposed Threatened)	>45 mi. upstream in Black River,	4.26 mi. upstream in Black River,	Not Identified	Not Identified	Not Identified
Hine's emerald dragonfly (Endangered)	Not Identified	Not Identified	Not Identified	Not Identified	Not Identified
Monarch butterfly (Candidate)	Not Identified	Not Identified	Not Identified	Not Identified	Not Identified
Missouri bladderpod (Threatened)	Not Identified	Not Identified	Not Identified	Not Identified	Not Identified
Pondberry (Endangered)	2.31 mi. northwest on State Hwy. 328	**Inside ROW - 1.60 mi. south of O'Kean**	2.83 mi. west at Sand Pond Natural Area	2.83 mi. west at Sand Pond Natural Area	2.83 mi. west at Sand Pond Natural Area
Ozark hellbender (Endangered)	Not Identified	Not Identified	Not Identified	Not Identified	Not Identified
Alligator snapping turtle (Proposed Threatened)	Not Identified	Not Identified	Not Identified	Not Identified	Not Identified

*Closest known occurrences based on ANHC, AGFC, and USFWS coordination.

Table 2: Federally-protected Species' Suitable Habitats

Species (Status)	Habitat Requirements	Habitat Present within the AA
Gray bat (Endangered)	Primarily use caves throughout the year, although they move from one cave to another seasonally. Males and young of the year use different caves in summer than females. Smaller colonies also occasionally roost under bridge structures.	No caves were observed in or near the AA. Bridge* and other structures that provide potentially suitable summer roosting habitat are located within the AA. Forested areas are present that provide foraging habitat.
Indiana bat (Endangered)	Primarily use caves for hibernacula, although they are occasionally found in old mine portals. During summer, colonies are found behind slabs of exfoliating bark of dead trees, often in bottomland or floodplain habitats, but also in upland situations. Indiana bats may also occasionally roost under bridge structures.	The AA contain forested areas providing trees potentially suitable for roosting**. No caves or mine portals were observed in or near the AA. Bridge* and other structures are located within the AA that provide potentially suitable summer roosting habitat.
Northern long-eared bat (Threatened)	In winter, northern long-eared bats use caves, mine portals, abandoned tunnels, protected sites along cliff lines, and similar situations that afford protection from cold. Northern long-eared bats may also occasionally roost under bridge structures. During the summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags (dead trees). They are easily overlooked as they often wedge themselves back into wall cracks.	The AA contains trees potentially suitable for roosting. No caves or mine portals were observed in or near the AA. Bridge* and other structures are located within the AA that provide potentially suitable summer roosting habitat.
Eastern black rail (Threatened)	Eastern black rails occupy wetlands and marshes in areas of moist soil or shallow flooding. They require dense vegetative cover that allows movement underneath the canopy, such as rushes, sedges, and grasses. Shallow (0-3 cm) water level during breeding season is required as high water levels can flood nests and drown chicks. The species is likely a vagrant in Arkansas, passing through during migration.	The AA contains emergent wetlands and vast amounts of farm fields that occasionally flood. Potential habitat associated with these farm fields is confined to field edges.
Piping plover (Threatened)	Piping plovers are small, migratory shorebirds that inhabit beaches, shorelines, dry lakebeds, sandbars of major rivers, salt flats, and mudflats of reservoirs.	Most of the AA contains farm fields that are seasonally farmed leaving the large mud flats; however, no reservoirs are located within the AA. Several field levees act as impoundments and could serve as temporary stopover habitat. There are no exposed sandbars along the Black River within the AA.
Red knot (Threatened)	Red knots are usually found along mudflats associated with reservoirs.	Most of the AA contains farm fields that are seasonally farmed leaving the large mud flats; however, no reservoirs are located within the AA. Several field levees act as impoundments and could serve as temporary stopover habitat.

Species (Status)	Habitat Requirements	Habitat Present within the AA
Curtis pearlymussel (Endangered)	Curtis pearlymussels are found in large creeks to medium sized rivers with good water quality. They prefer riffles within transitional zones of clean streams and rivers that often occur between headwaters and meandering currents with sand or gravel substrates.	The Black River could provide suitable habitat for the Curtis pearlymussel. Approximately 408 linear feet (LF) of the Black River flows through Alternatives 2 and 421 LF flow through Alternative 3. No other large creeks or medium sized rivers with good water quality were located within the AA.
Pink mucket (Endangered)	Pink muckets are found in mud and sand and in shallow riffles and shoals swept free of silt in major rivers and tributaries. This mussel buries itself in sand or gravel, with only the edge of its shell and its feeding siphons exposed.	The Black River could provide suitable habitat for the pink mucket. Approximately 408 LF of the Black River flows through Alternatives 2 and 421 LF flows through Alternative 3. No other large streams or rivers are located within the AA.
Rabbitsfoot*** (Threatened)	Rabbitsfoot generally inhabit small to medium sized streams and some larger rivers. It occurs in shallow water areas along the bank and in shoals with reduced water velocity. Individuals have also been found in deep water runs (9-12 ft.). Bottom substrates generally include gravel and sand, but they have been found in riprap as well. In Arkansas, rabbitsfoot populations have been documented to occur in the Black River and Current River.	The Black River could provide suitable habitat for the rabbitsfoot. Approximately 408 LF of the Black River flows through Alternatives 2 and 421 LF flows through Alternative 3. No other large streams or rivers are located within the AA.
Scaleshell mussel (Endangered)	Scaleshell mussels are found in medium and large sized rivers with stable channels and good water quality.	Potential habitat for the scaleshell mussel exists in the Black River. Approximately 408 LF of the Black River flows through Alternatives 2 and 421 LF flows through Alternative 3. No other streams with stable channels and good water quality were identified within the AA.
Pyramid pigtoe (Proposed Threatened)	This mussel typically inhabits large rivers with gravel and rock substrates. It tends to occupy riffles or shoals in relatively shallow water and coarse-particle substrates, along sand bars, or in deep water (>4 m) with stable mud and muddy sand bottoms.	The Black River could provide suitable habitat for the pyramid pigtoe. Approximately 408 LF of the Black River flows through Alternatives 2 and 421 LF flows through Alternative 3. No other large streams or rivers are located within the AA.
Western fanshell (Proposed Threatened)	This mussel is found on rock, gravel, and soft mud bottoms in medium sized rivers in flowing water only. It is generally confined to shallow riffles and runs in predominantly clean, moderately compacted substrates.	The Black River could provide suitable habitat for the western fanshell. Approximately 408 LF of the Black River flows through Alternatives 2 and 421 LF flows through Alternative 3. No other medium sized rivers are located within the AA.
Hine's emerald dragonfly (Endangered)	This dragonfly species inhabits calcareous spring-fed marshes and sedge meadows overlying dolomite bedrock.	No calcareous spring-fed marshes or sedge meadows overlying dolomite bedrock were identified within the AA.

Species (Status)	Habitat Requirements	Habitat Present within the AA
Monarch butterfly (Candidate)	Presence of milkweed (*Asclepias* sp.), flowering or potentially flowering nectar plants (defined as forbs that can provide nectar for monarchs at some point in the growing season), and additional native habitat.	Few areas of herbaceous native habitat are present in the AA. Riparian habitat is predominantly large trees and scrub-shrub species and does not include milkweed or other flowering nectar plants. However, some habitat is present in the form of fallow fields and emergent wetlands that have the potential to contain milkweed and other flowering plants.
Missouri bladderpod (Threatened)	Primarily open limestone glades and dolomite glades, which are naturally dry treeless areas with shallow, loose soils and exposed rock. This species can also be found in open highway ROW and pastures where glades are present. It occasionally occupies open rocky woods.	No open limestone glades with exposed bedrock or open rocky woods were identified within the AA.
Pondberry (Endangered)	Pondberry is found within shaded areas and is associated primarily with bottomlands with hardwoods in their interior areas, margins of sinks, pond and sand pond edges, and depressions.	Forested wetland habitat exists within the AA and could provide suitable habitat.
Ozark hellbender (Endangered)	This salamander species needs cool, clear streams and rivers with many large flat rocks.	The Current River likely provides habitat for this species, but is not within the AA.
Alligator snapping turtle (Proposed Threatened)	Habitat consists of slow-moving, deep water of rivers, sloughs, oxbows, canals or lakes associated with rivers, swamps, and ponds near rivers.	Potential habitat exists in the Black River as well as within a few other perennial waterbodies. Alternative 2 has approximately 3.9 acres of suitable habitat and Alternative 3 has 3.8 acres.

* Bridge structures with gaps >0.5-inch are considered to provide suitable summer roosting habitat.

**USFWS defines suitable roosting habitat as forest patches with trees of 5-inches diameter at breast height (DBH) or larger that have exfoliating bark, cracks, crevices, and/or hollows.

***Critical Habitat for the rabbitsfoot is located in the Black River approximately seven river miles downstream of Alternative 2.

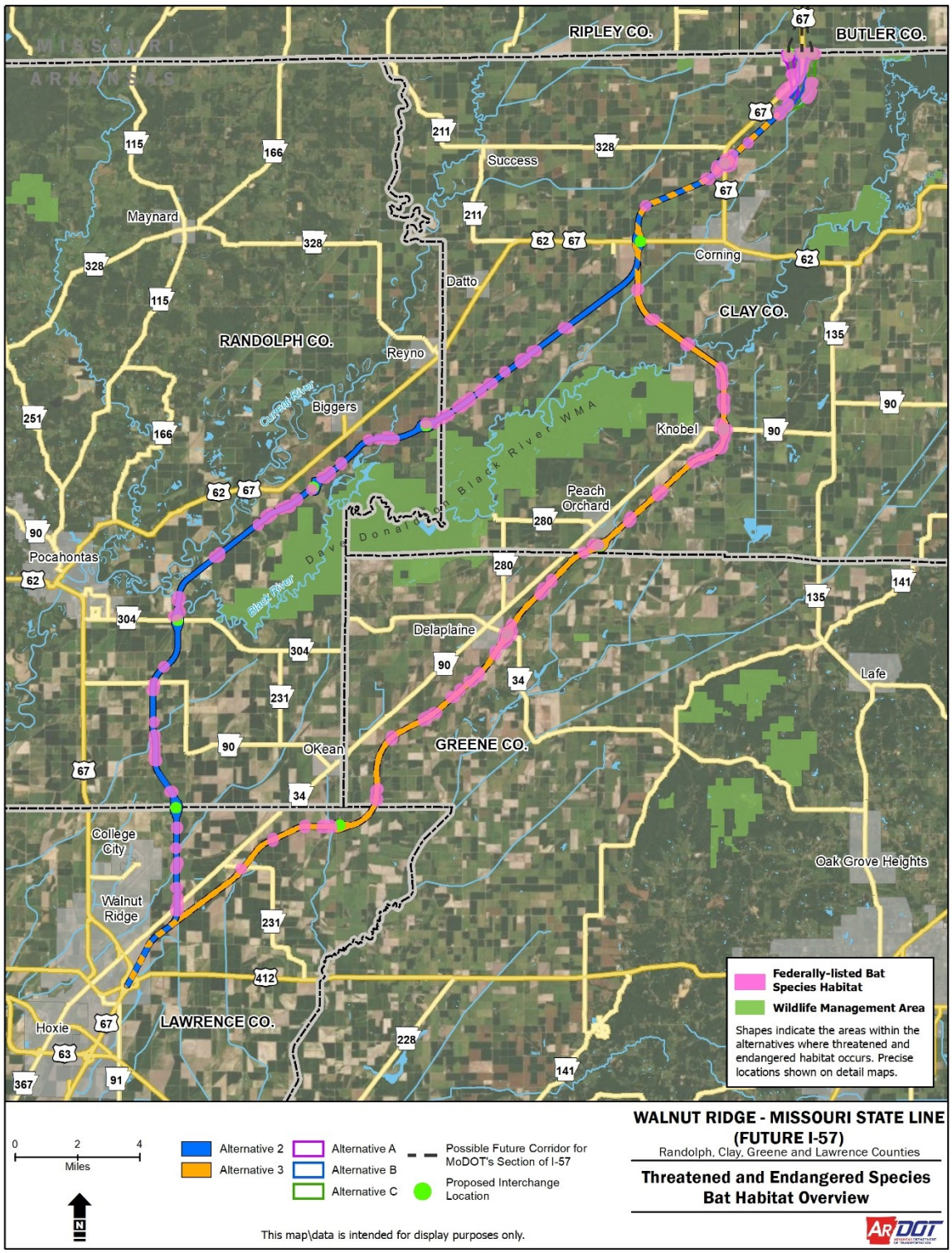
Federally-protected Bat Species and Suitable Habitats

To expand on the suitable habitat for the listed bat species, the following provides a description of summer roosting and foraging habitats that have been identified in the action alternatives for the Indiana bat, gray bat, and northern long-eared bat. Additionally, based on coordination with the USFWS, through a request for technical assistance and additional coordination, high probability suitable roosting habitat has been determined as those forested areas that are contiguous and connected to larger tracts of forested areas as well as forested riparian corridors along the Black River. As recommended in the Rangewide Indiana Bat Survey Guidelines (March 2020), the action alternatives were evaluated with respect to fragmented forest and riparian zones based on configuration and connectivity to other suitable habitat patches (USFWS, 2020a). Suitable roosting habitat within identified higher probability areas includes hollow trees, trees with peeling or loose bark, cavities, and/or cracks in dead or live trees of 5 inches in DBH. **Figure 22** provides an example of suitable bat summer roosting habitat. Per the Rangewide Indiana Bat Survey Guidelines, buildings, barns, and bridges were also considered potential summer habitat. However, buildings were only counted as suitable habitat if they appeared vacant.

Figure 22: Summer Roosting Habitat

Figure 23 shows the locations of suitable summer roosting habitat in relation to the action alternatives. Tree species composition within the action alternatives consisted of cherrybark oak, post oak (*Quercus stellata*), pecan (*Carya illinoinensis*), sweetgum, tupelo-gum (*Nyssa sylvatica*), bald cypress (*Taxodium distichum*), cottonwood, and hackberry (*Celtis occidentalis*). These types of summer roosting habitats provide higher probability or likelihood of bat use. However, farming practices in the Mississippi River delta region have resulted in highly fragmented forested areas leading to decreased suitable habitat within the general area. Forested corridors along intermittent and perennial streams also provide foraging areas for bats. These corridors are also considered higher probability areas.

Figure 23: Federally-listed Bat Species Habitat Overview



Although the existing bridge structures located at the interchange of Hwy. 67 and Hwy. 412 were evaluated for the presence of bat use (i.e., guano or oil staining), no evidence of bat use was observed during the March 2021 site reconnaissance. No other bridges are located within the study area; however, one large quadruple reinforced concrete box (RCB) culvert is located within the Alternative 3 ROW east of Knobel that provides suitable summer roosting habitat. Due to high water at the time of the site reconnaissance visit, internal inspection of the cells was not achievable. **Figure 24** provides an example of a bridge joint that would provide suitable bat summer roosting habitat.

Figure 24: Bridge Joint at Hwy. 412

Source – Project Team, 2021

The AA is also near the Black River WMA, which is a 25,510-acre AGFC-managed Wildlife Management Area and, as noted in Chapter 2, is one of the largest remaining tracts of mature bottomland hardwood forests in the Mississippi Alluvial Valley. The contiguous nature of these bottomland hard forests provides a greater degree of suitable bat habitat than fragmented forested areas common to the action alternatives, which is supported by occurrence records for the northern long-eared bat, Indiana bat, and Ozark big-eared bat (*Corynorhinus townsendii ingens)* species. Although the Ozark big-eared bat was not identified by the USFWS as occurring within the study area, it has been documented as occurring within the Black River WMA.

***Myotis grisescens* – Gray Bat**

The gray bat has a distinct unicolored fur on their back that differentiates them from other bat species; however, after molting in July or August, their fur transitions to chestnut brown or a russet color (USFWS, 1997). It is further distinguished from other *Myotis* species by its wing membrane connected to its ankle instead of a toe. Females give birth to single young in late May to June. Gray bats, with rare exceptions, inhabit caves year-round and forage on flying aquatic and terrestrial insects within riparian zones and over rivers and lakes. This bat species is found in northern Arkansas and occupies karst areas, where they are found in caves located along or near rivers in summer months. No such karst areas or caves have been identified within the action alternatives.

***Myotis sodalis* – Indiana Bat**

Indiana bats have been listed as endangered since 1966 and are found in most of the Eastern half of the United States. In 2016 (revised in 2018), the USFWS published the Section 4(d) rule of the ESA (50 Code of Federal Regulations [CFR] 17.40(o)) by the completion of a Programmatic Biological Opinion (BO) for projects located within the range of the Indiana bat and northern long-eared bat.

This bat species is small, has a wingspan of 9 to 11 inches and has dark brown to black fur. Indiana bats hibernate in caves in the winter and in the summer, they roost under peeling bark of dead and dying trees (USFWS, 2019). Foraging also occurs along rivers and lakes where they consume a variety of flying insects. In 2019, Arkansas was listed in the top five states with the most hibernacula of Indiana bats with 39 hibernacula identified within the state. Additionally, based on 2019 winter surveys, Arkansas was identified as reflecting the greatest increase in hibernacula in the USFWS Southeast Region from 2017 through 2019. The life cycle of the Indiana Bat consists of four phases that include winter hibernation (late October – April), spring migration (April), young rearing (June – July), and fall migration and swarming (September – November) (USFWS, 2019). The active season is considered to span from April through October. Summer roosting male Indiana bats roost individually or in small

groups, which can be located near or further away from winter hibernacula areas. Summer roosting reproductive females group together, forming large (100-300 individuals) maternity colonies that are often further away from winter hibernacula areas.

According to the USFWS, roost trees can be characterized as primary roost trees and alternate roost trees. Primary roost sites are larger sized trees or snags that provide for optimized roosting temperatures. According to the USFWS Midwest Region, primary roost trees are usually dead or dying, are greater than 9 inches in DBH, and have loose, peeling bark with high sun exposure. Alternate roost trees are smaller and used during seasonal temperature fluctuations. Males may utilize trees as small as 2.5 inches DBH. Shagbark Hickory (*Carya ovata*), maple (*Acer* spp.), hickory, ash (*Fraxinus* spp.), oak, elm (*Ulmus* spp.), pine (*Pinus* spp.), hemlock (*Tsuga canadensis*) and others have been considered to provide suitable habitat (Luensmann, 2005). Primary and alternate roost trees have been identified for use as maternity roost sites, both of which must be available to be considered suitable habitat.

Summer foraging Indiana bats feed on terrestrial and aquatic insects along stream corridors, edges of upland and bottomland forests, and forested edges of agricultural fields. According to the USFWS Midwest region, the use of herbicides near suitable habitat may directly and indirectly affect the species due to direct contact or ingestion, and reduction in foraging insects, respectively. Studies have shown that individual bats may forage within 2.5 miles of summer roosting sites and avoid vast open spaces, such as large agricultural fields, but utilize forested corridors connecting fragmented forest habitat.

***Myotis septentrionalis* – Northern Long-eared Bat**

Northern long-eared bats were listed as threatened in 2015 and are found in 37 states. As identified in the BO for the Indiana bat and northern long-eared bat, the Section 4(d) rule prohibits takes of the northern long-eared bat and indicates that incidental takes are in compliance with the Programmatic BO.

This bat species is considered a medium sized bat with dark brown fur on the back and pale brown fur on the underside. The longer ears than other *Myotis* species and conspicuous pointed tragus is a primary identifier of the species. During the winter, this bat species also hibernates in caves and mines, where they are often found in cracks and crevices (USFWS, 2020a). Northern Long-eared Bats may use the same hibernaculum site for multiple years and migrate 35-55 miles between winter hibernacula and summer roosting habitat. Summer roosting habitat is much the same as Indiana bats and also includes potential suitable roosting in barns, sheds, cabins, under eaves of buildings, and behind window shutters. They have been found in storm sewer entrances, hydro-electric dams, old aqueducts, and dry wells (USFWS, 2018). They prefer trees or snags that retain bark or provide cavities/crevices. Swarming season near the hibernacula begins in late summer or early fall. After swarming, impregnated females migrate to summer roosts where they nest in small colonies that are sexually segregated with females forming maternity colonies and males roosting individually or in small numbers (Bats of Missouri, 2009). Colony numbers tend to decrease in size between birth of pups, typically from late May to late July, and post-lactation.

Foraging habits of the northern long-eared bat are also similar to the Indiana bat in that they emerge at dusk to forage on flying terrestrial and aquatic insects within the understory of forested area (USFWS, 2015).

Federally-protected Bird Species and Suitable Habitats

***Laterallus jamaicensis ssp. jamaicensis* – Eastern Black Rail**

Alternatives 2, 3, and A contain emergent wetlands with potentially dense cover. Those areas of potentially suitable habitat are shown on **Figure 25**. Suitable habitat for the rail includes wet sedge meadows with dense cover (USFWS, 2020b). These wetlands could serve as potential Eastern Black Rail habitat; however, they are primarily confined to farm fields edges and transition zones between farm fields and forested fence or wind rows. Emergent wetlands with dense vegetation located within the action alternatives that do not appear to be maintained were considered suitable habitat. The potential wetland habitat in the farm field edges is likely maintained by mowing and/or use of herbicides to prevent crop infestations of undesirable plant species.

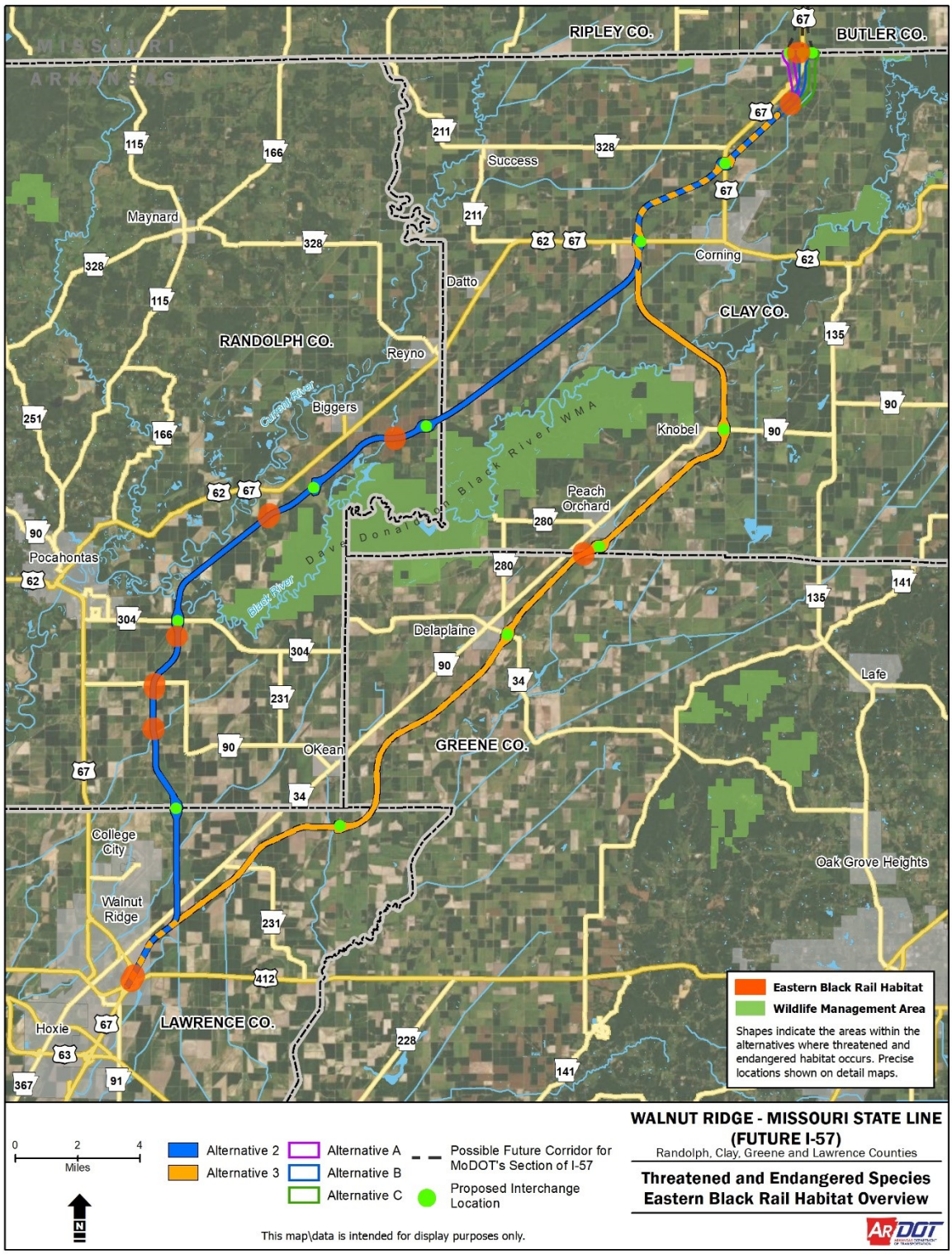
***Charadrius melodus* – Piping Plover**

The piping plover is a small shorebird that is pale brown above, lighter below with a black band across the forehead. It inhabits wide open, flat sandy beaches with little grass or vegetation and can be found nesting along small creeks and wetlands. They breed in northern United States and migrate to the Gulf of Mexico and other coastline locations in the southern United States. In the fall and spring, plovers utilize stopover habitat during migration. Plovers do not concentrate in large numbers at inland stopover sites; instead, they utilize stopover habitat for a few days before continuing migration. Stopover habitat may include farm ponds, rivers, marshes and wetlands, and natural lakes (USFWS, 2020b). In coordination with the USFWS, no stopover sites were identified. Additionally, ANHC does not have any occurrence records for the piping plover within the immediate area around any of the action alternatives.

***Calidris canutus rufa* – Red Knot**

The red knot is also a shorebird that is 9-11 inches in size with distinct red breeding plumage and dusky-gray plumage during the non-breeding season. These migratory birds migrate up to 19,000 miles annually, traveling from breeding grounds in the Arctic to wintering ground in the southern United States and other more southern countries. Although uncommon in Arkansas, the red knot can be found during migration. Known migration stopover habitat is found in Delaware Bay. The USFWS did not identify any known stopover sites in the study area of the action alternatives. The ANHC also does not have any occurrence records for the red knot within the immediate area around the action alternatives.

Figure 25: Federally-listed Eastern Black Rail Habitat Overview



Federally-protected Mussel Species and Suitable Habitats

The Black River is the dominant water body within the study area with potentially suitable habitat for the federally-listed mussel species. Proposed Alternatives 2 and 3 crossing locations of the Black River are shown on **Figure 26**. Effects determinations presented in the draft BA (**Attachment F**) are based on the current plan for the Black River to be completely spanned. However, there is no current funding for this project and if the plan to avoid in-channel work changes as the project moves to final design and construction, then consultation with USFWS would be re-initiated. A summary of the habitat the Black River provides, as well as the likelihood of mussel presence, is documented below and includes descriptions provided by John L. Harris's Black River Mussels (2021).

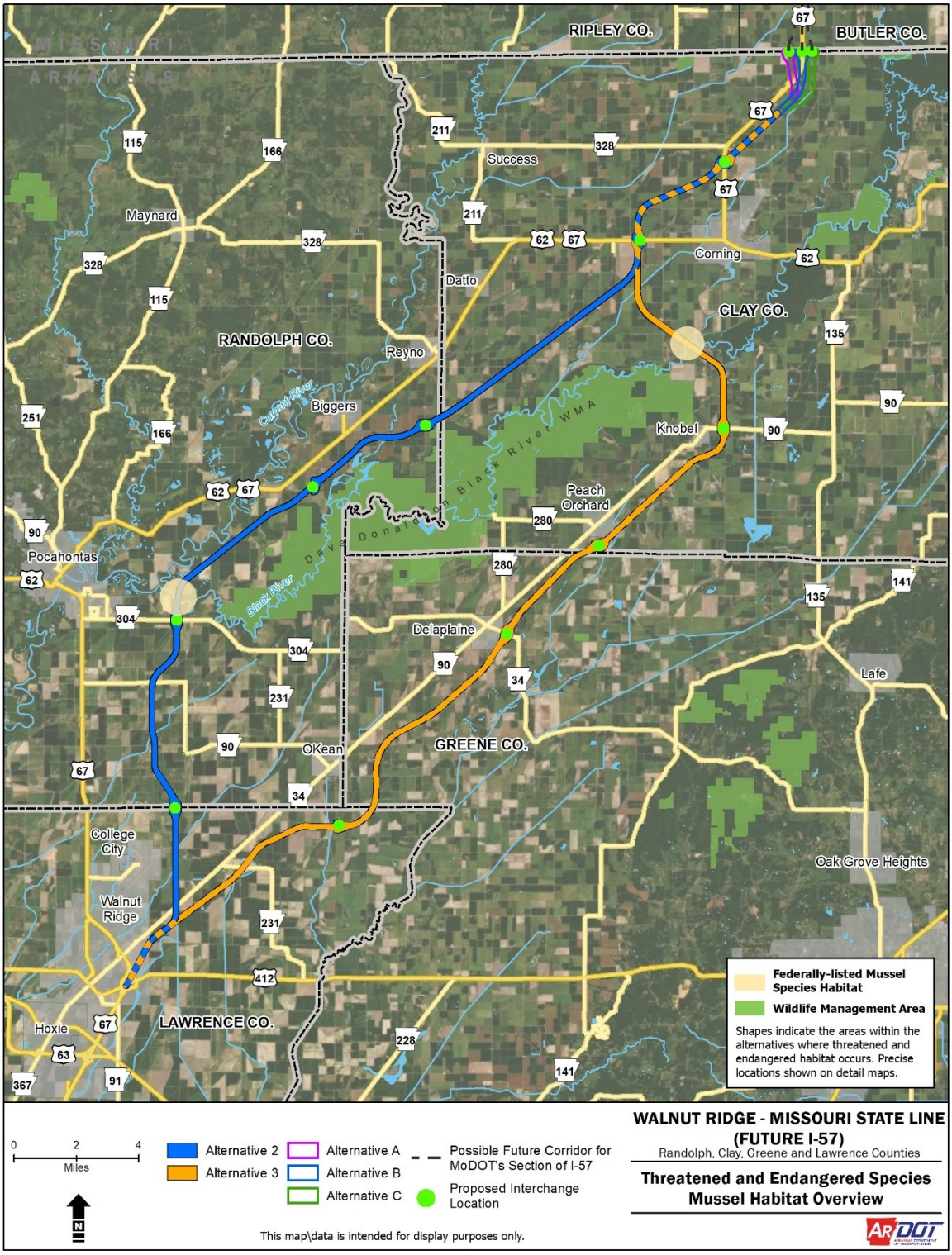
Overview (Harris et al., 2021)

The Black River watershed occupies 22,165 km^2 (8,560 mi^2) in southeastern Missouri and northeastern Arkansas. The Black River originates at the confluence of the East Fork and Middle Fork near Lesterville, Missouri, and flows 480 km (~298 river miles) through the Ozark Highlands and Mississippi Alluvial Plain ecoregions to its confluence with the White River near Newport, Arkansas. The upstream portion of the Black River in the Ozark Highlands, at about river mile 212 and upstream, is characterized by clear water, higher gradient, and shallow stream conditions with substrates dominated by gravel and sand (Chapman et al., 2002). The middle and downstream portions of the Black River on the Mississippi Alluvial Plain have lower water clarity, lower gradient, and deeper stream conditions with substrates dominated by sand and clay (Woods et al., 2004).

The Black River of Missouri and Arkansas, crosses physiographic and faunal boundaries and supports an important mussel resource (Harris, 1999; Neves, 1999). The upstream portion of the watershed lies in the uplands of the Ozark Highlands, and the mussel fauna is categorized within the Interior Highlands province. The downstream portion lies in the lowlands of the Mississippi Alluvial Plain, and the fauna is within the Mississippi Embayment province. A total of 53 mussel species are reported from the Black River, including 47 species from the Missouri portion and 42 species from the Arkansas portion (Hutson and Barnhart, 2004; McMurray, unpublished data; Harris, unpublished data; Christian et al., 2021).

Rust (1993) evaluated 224 sites in the Black River from the Arkansas–Missouri State line downstream to the confluence with the White River near Jacksonport, Arkansas. The primary purpose of Rust was to define the location and to map the areal extent of commercial quality mussel beds in the Black River, Arkansas. Rust (1993) defined the region upstream of the confluence of the Current River (Black River Mile [BRM] 96) as the "upper region" and stated it had primarily lowland alluvium soils with silt and organic matter as the major substrate components. He also said that hard packed clay (clinker), clay balls, and sand were present in most meanders (bends or bendways). Rust called downstream of the Current River confluence the "lower region" and stated the physical structure of the Black River changes dramatically. From Current River to the confluence with the White River at Mile 189, the Black River has mostly sand substrate, although hard packed clay is occasionally found in meanders. The meanders routinely have high clay banks of varying stability. Gradient increases below the Current River and the mean width of the Black River increases from about 40 meters (m) (130 feet) (upper) to about 70 m (230 feet) (lower). Rust located 31 Major Beds (<500 m^2 area with >10 mussels per m^2) and 17 Minor Beds (< 500 m^2 area and/or <10 mussels per m^2) from 224 sites.

Figure 26: Federally-listed Mussel Habitat Locations



Christian et al. (2021) evaluated the structure of Black River, Arkansas and Missouri mussel assemblages and defined three distinct groupings based on their BRM locations that were determined with navigation maps prepared by the U.S. Army Corps of Engineers in 1985. Nonmetric multidimensional scaling analysis revealed a geographic pattern of three clusters representing an upstream Ozark Highland assemblage from BRM 206.6 - BRM 256.5, a midstream Mississippi Alluvial Plain assemblage from BRM 123.3 – BRM 195.0, and a downstream Mississippi Alluvial Plain assemblage from BRM 50.6 - BRM 76.5. The midstream Mississippi Alluvial Plain grouping corresponds partially to Rust's (1993) upper region, and the downstream Mississippi Alluvial Plain grouping corresponds partially to Rust's (1993) downstream region.

Research indicates that the physical space used by mussels in large, sand-bed-material-dominated rivers represents areas of both flow and sediment refuge (Strayer, 1999; Christian et al., 2020). The physical space (or quality habitat) where mussel beds most often occur in larger rivers is the lateral scour pool (LSP) along the outside portion of a bendway. Within a larger river channel like the Black River, there are multiple forces interacting with each other to produce a variety of hydrological flow conditions which change with discharge levels (Bathhurst et al., 1979; Bathhurst, 1997). These interactions, known as the core flow concept, create vortices causing water to flow in a variety of directions. The primary flow, referred to as the core, shifts position within the channel as stage and discharge fluctuate and, generally, is associated with the highest velocities in the downstream direction. There are other secondary flow pathways which, within a river bend, push surface water to the outside bank and water found near the substrate is pulled toward the inside bank (i.e., point bar). This effectively forms a spiral flow condition around the core flow and produces an area of down-welling near the outside bank. Energy is dissipated on multiple axes as water moves vertically, laterally, and longitudinally along a river reach. The LSP of a river reach is highly turbulent, with areas of up- and down-welling, though velocities in the downstream direction are depressed. This produces enough flow to keep smaller, more mobile materials in suspension and move these particles toward the point bar or downstream along the outside bank. Burying by sediment load is a perceived threat to freshwater mussels; however, if these hydraulic conditions exist over most mussel bed habitats, burial may not occur frequently (except for bank failure or mass wasting events). Under physical conditions of appropriate depth and channel alignment (curvature), resulting velocities in the LSP over the mussel bed move fine sediments and food items over and away from the bed without reaching levels that entrain and transport mussels and associated substrate, creating the flow refuge. Changes in a river channel due to bank failure, tree fall, material placement are likely to modify the core flow vortices; therefore, modifying the size and composition of mussel beds that may be present.

Mussel Resources and Species of Concern (Harris, 2021)

Federally-protected endangered or threatened species that have been recorded from the Black River include *Epioblasma curtisii* (Frierson and Utterback, 1916) (Endangered), *Epioblasma triquetra* (Rafinesque, 1820) (Endangered), *Lampsilis abrupta* (Say, 1831) (Endangered), *Potamilus leptodon* (Rafinesque, 1820) (Endangered) (formerly *Leptodea leptodon*), and *Theliderma cylindrica* (Say, 1817) (Threatened). Mussel species currently in the USFWS National Domestic Listing Workplan (USFWS, 2021) that have been recorded from the Black River include *Cyprogenia aberti* (Conrad, 1850), *Pleurobema rubrum* (Rafinesque, 1820), and *Simpsonaias ambigua* (Say, 1825) (Harris et al., 2010). Nomenclature follows Williams et al. (2017) as modified by the Freshwater Mollusks Conservation Society 2021.

Endangered and Threatened Mussel Species

***Epioblasma curtisii* – Curtis Pearlymussel**

The Curtis pearlymussel is a small mussel species that is found in riffles within large creeks to medium sized rivers with good water quality in Arkansas and Missouri. Females lure fish hosts then expels

glochidia directly onto the fish before releasing the fish. The Black River provides suitable habitat for this species, as it is over 100 feet in width and frequently floods. The Black River at the proposed crossing locations for Alternatives 2 and 3 may be relatively stable, have good water quality, and could contain riffles in certain areas during low flow conditions that may support suitable habitat for this species. No other suitable habitat is located within the action alternatives.

Epioblasma curtisii was reported from the "Black River at the mouth of the Spring River", Lawrence-Randolph County with specimens collected and illustrated by J. M. Bates and S. D. Dennis (Ecological Consultants, Inc., 1983, 1984). Attempts to locate these specimens have been unsuccessful, and there is concern as to whether this site represents a valid record of *Epioblasma curtisii*. The Recovery Plan for *E. curtisii* (USFWS, 1986, p. 5) alludes to the fact that these Black River specimens are not *E. curtisii*. M. E. Gordon (personal communication) believes these specimens to represent *E. capsaeformis*, a species restricted to the Tennessee River system, and the reported Black River location the result of accidental label switching for the field collection data (Harris et al., 2007, 2010). Since *E. curtisii* may well be extirpated from Arkansas and possibly extinct throughout its former range, there is little chance of the proposed project adversely affecting the species (Harris, 2021). This species was not found during the mussel survey conducted within the Black River for the project (**Attachment D**).

***Lampsilis abrupta* – Pink Mucket**

The pink mucket buries itself in mud, sand, or gravel in shallow riffles that are free of silt in large rivers and tributaries. ANCH has occurrence records in the Black River downstream of the Alternative 2 and 3 proposed crossings. This species requires stable habitat with sufficient fish hosts. Suitable habitat for the pink mucket is found within the Black River, which has stable reaches and deep water runs with sand, gravel, and/or mud substrates. No other suitable habitat is located within Alternatives 2 and 3.

Lampsilis abrupta was widely distributed in the Black River and found from BRM 50.6 (near Minturn, AR) upstream to BRM 163.4 (upstream of Hwy. 62 near Corning, Arkansas). Rust (1993) sampled *L. abrupta* from 11 major beds and 5 minor beds, and it was relatively uncommon in each, representing less than 0.2-1.8% of any population sample (with ≥5 m^2 samples). There is the potential for *Lampsilis abrupta* to occur at both the Alternative 2 and Alternative 3 proposed crossings of the Black River. Its occurrence at either would depend on the habitat quality and could be determined only through dive surveys of the proposed alternative crossings (Harris, 2021). This species was not found during the mussel survey conducted within the Black River for this project (**Attachment D**).

***Potamilus leptodon* – Scaleshell Mussel**

The scaleshell mussel is a small mussel with a fragile shell and faint green rays. This mussel species inhabits medium and large sized rivers with stable channels and good water quality (USFWS, 2020b). Sand and gravel substrates are preferred habitat where individuals bury themselves in the substrate and siphon food out of the water.

The USFWS (2010) described *Potamilus leptodon* habitat as medium to large rivers with low to medium gradients, primarily inhabiting stable riffles and runs with gravel or mud substrate and moderate current velocity. The scaleshell mussel requires good water quality and is usually found where other mussel species are concentrated. McMurray et al. (2012) also noted that *P. leptodon* occurs in mud substrates as well. Rust (1993) did not find *Potamilus leptodon* in his Black River survey. Results of a museum holdings survey suggest that the distributional centers and largest populations of *Potamilus leptodon* in Arkansas have historically occurred in the Ouachita and Saline Rivers of the Ouachita River basin and the Black and Spring Rivers of the White River basin (Bouldin et al., 2013). Despite relatively recent and extensive survey efforts in each of these rivers (as summarized in Harris et al., 2010), live *Potamilus leptodon* have been found only in the Strawberry River (Sanchez-Gonzalez, 2018) and Black

River at Black Rock (in 2012, J. Seagraves, ARDOT, personal communication) since 1983 (Bouldin et al., 2013). There is the potential for *Potamilus leptodon* to occur at both the Alternative 2 and Alternative 3 proposed crossings of the Black River. Its occurrence at either would depend on the habitat quality and could be determined only through dive surveys of the proposed alternative crossings (Harris, 2021). This species was not found during the mussel survey conducted for this project (**Attachment D**).

***Theliderma cylindrica* - Rabbitsfoot**

The rabbitstoot mussel is a medium to large mussel that inhabits small to medium sized streams and some larger rivers where it occurs near the banks in shallow water areas. Adults are filter feeders and ingest food and oxygen from the water column, while juveniles are considered pedal feeders that collect foot for bringing into the shell (USFWS, ECOS Species Profile). Individuals are mostly sedentary until brooding season (May to late August) where it moves towards shallow water. Suitable habitat for the rabbitsfoot is found within the Black River within the AA, downstream of the two proposed crossings of Alternatives 2 and 3. Designated critical habitat for the rabbitsfoot is located within and downstream of the AA, which begins at the existing crossing of Hwy. 67 of the Black River and extends downstream. The proposed crossing locations for Alternatives 2 and 3 may have relatively clean water, are stable, and contain deep water runs with sand, gravel, and/or mud substrates. No other suitable habitat is located within the action alternatives.

Rust (1993) found *Theliderma cylindrica* in four major mussel beds between BRM 65.1 and BRM 76.5, which is in the vicinity of Black Rock, Arkansas near the confluence of the Spring River, approximately 9.4 miles west of Alternatives 2 and 3. *Theliderma cylindrica* represented between 0.3% and 5.1% of the mussels sampled from these beds. Harris (2014a and 2014b) found moderate numbers of *Theliderma cylindrica* in two small mussel beds at approximately river mile 86.0 and river mile 85.5 downstream from Pocahontas, Arkansas. The Black River between Pocahontas and Black Rock closely abuts the Ozark Highlands Central Plateau (Woods et al., 2004), and substrates in this 20+ mile reach are composed of more gravel and rock than portions of the river upstream and downstream within Arkansas. There is the potential for *Theliderma cylindrica* to occur at both the Alternative 2 and Alternative 3 proposed crossings of the Black River. Its occurrence at either would depend on the habitat quality and could be determined only through dive surveys of the proposed alternative crossings (Harris, 2021). Two individuals of this species were collected at Alternative 2 during the mussel survey conducted for this project (**Attachment D**). No individuals were collected at Alternative 3.

Critical habitat for the rabbitsfoot was designated in April 2015 as documented in the Federal Register (FR) under 50 CFR Part 17 (80 FR 24692 24774). Designated critical habitat extends downstream from the existing Hwy. 67 bridge over the Black River in Pocahontas to its confluence with Flat Creek in Lawrence County. Critical habitat for the rabbitsfoot is located over seven river miles downstream of Alternative 2.

Mussel Species Proposed Threatened or Evaluated for Listing

***Pleurobema rubrum* – Pyramid Pigtoe**

This species is proposed threatened by the USFWS. Like many *Pleurobema* species, *Pleurobema rubrum* identification with certainty is difficult given the paucity of conchological identifying characters and the proclivity for environment driven morphological variation. Various museum specimens from Black River localities have been tentatively identified as *P. rubrum* (e.g., Ohio State University Museum of Zoology (OSUM) 47681, OSUM 47941, OSUM 79505; Arkansas State University Museum of Zoology (ASUMZ) Lot 587, ASUMZ Lot 1067, and ASUMZ Lot 1117). Rust (1993) did not identify any specimens from the Black River as *P. rubrum*; however, he found *P. sintoxia* (as *P. coccineum*) to be widespread

but not abundant within his study area (19 major beds, 4 minor beds; relative abundance 0.2%-4.6% within mussel beds). This species was not found during the mussel survey conducted within the Black River for this project (**Attachment D**).

***Cyprogenia aberti* (Conrad, 1850) – Western Fanshell (Ouachita Fanshell)**
This species is proposed for listing by the USFWS as threatened. Harris et al. (2010) chose to recognize specimens from the Black and St. Francis Rivers in Arkansas as *Cyprogenia stegaria* (Rafinesque, 1820) which was subsequently proven incorrect by Chong et al. (2016). Based on Roe and Chong (2014), Arkansas populations of *C. aberti* are considered to represent two taxa (K. J. Roe, Iowa State University, personal communication). *Cyprogenia aberti sensu stricto* occurs (or previously occurred) in the Arkansas, St. Francis, and White River drainages. *Cyprogenia sp. cf aberti* is restricted to the Ouachita River drainage. To determine their conservation status, Harris and Posey (2015) evaluated the two taxa envisioned by Roe and Chong as *Cyprogenia aberti* (Arkansas, St. Francis, White) and *Cyprogenia sp. cf aberti* (Ouachita). The form that occurs in the Black River received a statewide conservation rank of S3, Vulnerable - At moderate risk of extirpation due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors. Rust (1993) data found *C. aberti* with a similar distribution to *Theliderma cylindrica* in that it occurred primarily over approximately 20 river miles between Black Rock and Pocahontas in the portion of the Black River that closely abuts the Ozark Highlands Central Plateau (Woods et al., 2004), and in habitat composed of more gravel and rock substrates. One individual of this species was collected at Alternative 2 during the mussel survey conducted for this project (**Attachment D**). No individuals were collected at Alternative 3.

High Density Mussel Assemblages (Mussel Beds)

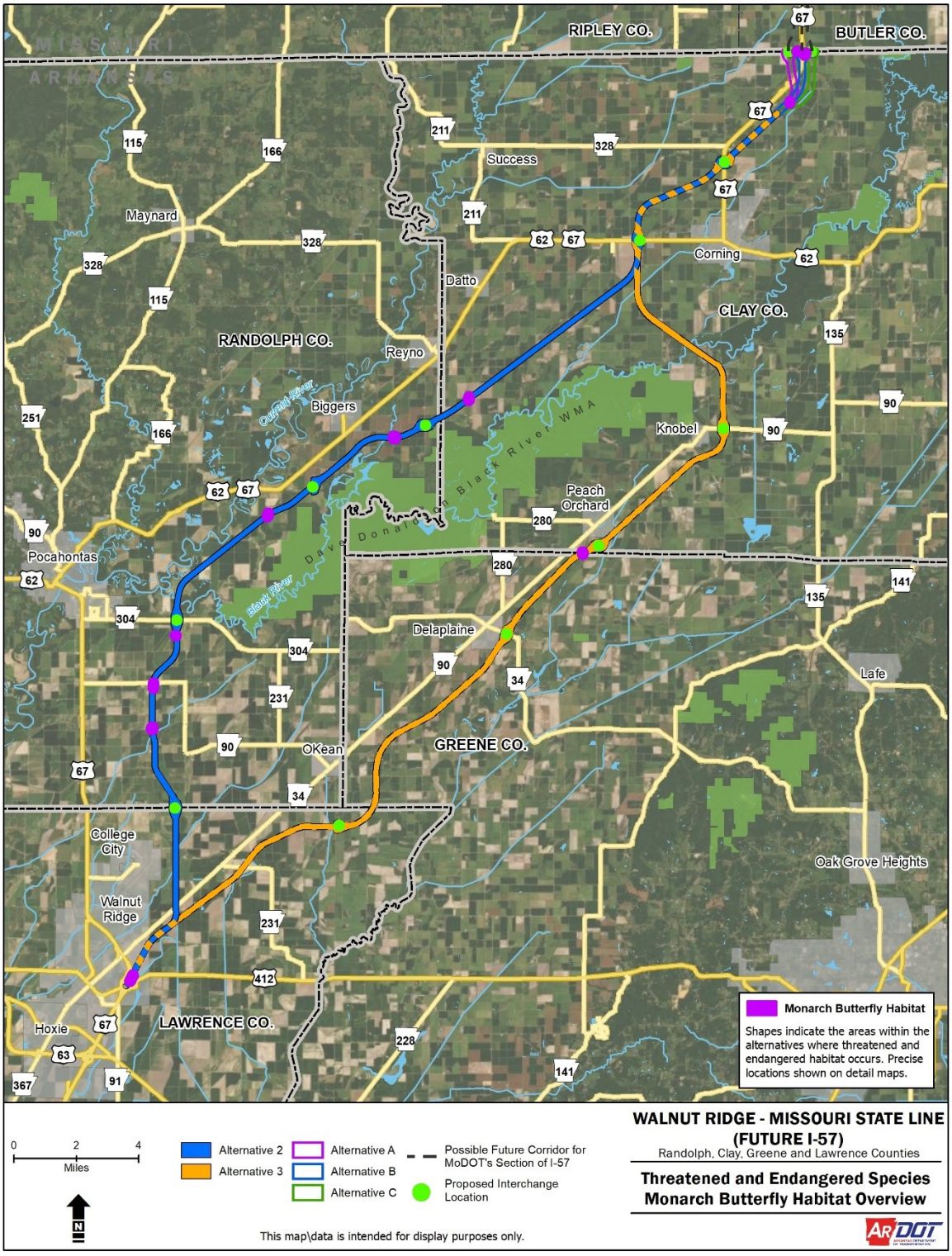
Rust (1993) did not locate substantial commercial mussel beds near the Alternative 2 (ca. BRM 97.3) or Alternative 3 (ca. BRM 143.0) proposed crossings of the Black River. The nearest commercial quality mussel bed to either proposed crossing was at ca. BRM 142.2, which is >0.5 river mile downstream of proposed Alternative 3. The BRM 142.2 bed was estimated to encompass 400 m^2 with density of 7.9 mussels/m^2, and nine species were encountered. Both the proposed Alternative 2 and Alternative 3 Black River crossings have moderate potential for mussel concentrations. Dive surveys, results of which are provided in **Attachment D**, were conducted for the proposed project to determine the presence of mussel resources and habitat quality at both proposed crossings (Harris, 2022).

Federally-protected Insect Species and Suitable Habitats

***Somatochlora hineana* – Hine's Emerald Dragonfly**
Glade habitat includes open limestone, dolomite, and shale areas that are dry, treeless areas with shallow, loose soil and exposed bedrock. This habitat is required for suitable habitat to be present for the Hine's emerald dragonfly. Upon review of glade habitats of the area provided by ANHC, no suitable habitat was identified within any of the action alternatives.

***Danaus plexippus* – Monarch Butterfly**
The monarch is listed by the USFWS as a candidate species. The monarch butterfly inhabits fields, meadows, marshes, and roadside ditches (Lotts and Naberhaus, 2021). Some of the action alternatives have fallow fields and emergent wetlands that would be considered suitable habitat as these areas have the potential to contain milkweed and other flowering plants the species needs to service and reproduce. These locations are shown on **Figure 27**.

Figure 27: Potentially Suitable Monarch Butterfly Habitat Locations



Federally-protected Plant Species and Suitable Habitats

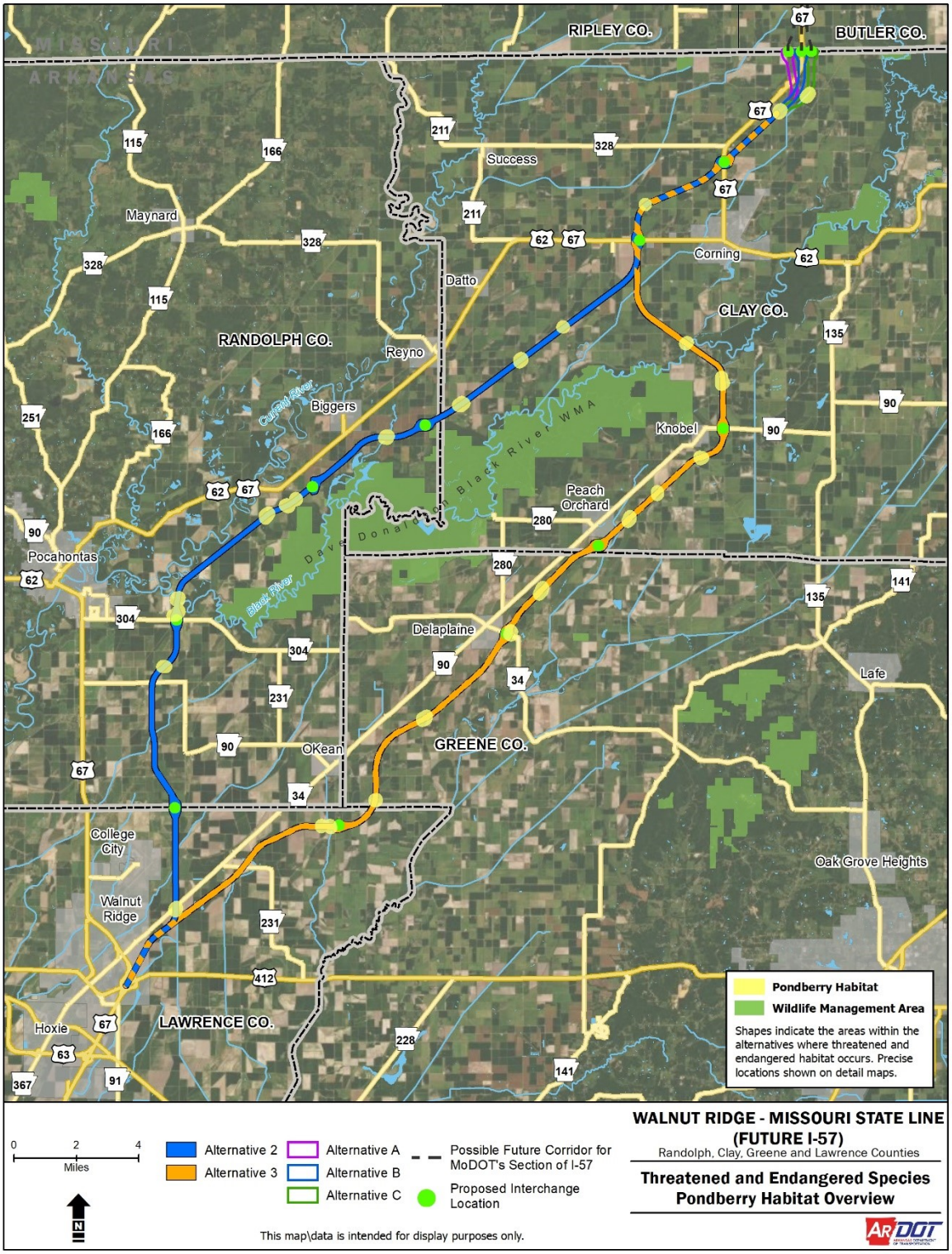
***Physaria filiformis* – Missouri Bladderpod**

Glade habitat includes open limestone, dolomite, and shale areas that are dry, treeless areas with shallow, loose soil and exposed bedrock. This habitat is required for suitable habitat to be present for the Missouri bladderpod. Upon review of glade habitats of the area provided by ANHC, no suitable habitat was identified within any of the action alternatives.

***Lindera melissifolia* – Pondberry**

Pondberry is a member of the Lauraceae family and is also referred to as the southern spicebush. It is a rhizomatous deciduous shrub that grows up to six feet in height with sparsely spaced branches and often forms clonal colonies (USFWS, 2021a). Pondberry habitat as identified in **Table 2** has also been documented as being located within the vicinity of Alternative 2 and within Alternative 3 by ANHC. Habitat preferences for the pondberry within the study area include forested depressional wetland habitats that are seasonally flooded and that provide shade. These locations are shown on **Figure 28**. They are usually found in standing water in the spring, although the same areas are typically dry by April or May (USFWS, 1993). Suitable habitat for the pondberry includes predominantly the interior portions of wetland habitats within bottomland and hardwood forests, sinkhole margins, ponds, and depressions. This species can be found mostly in shaded areas but can also be found in full sun. As documented in Chapter 2, edges of sand ponds provide suitable habitat; however, no sand ponds with forested areas have been identified within any of the action alternatives. Known populations occur within Alternative 3 and in the Sand Ponds Natural Area along the Missouri state line west of Alternative A. The location of the Sand Ponds Natural Area is shown in **Figure 16**.

Figure 28: Federally-listed Pondberry Habitat Locations



Federally-protected Salamander and Turtle Species and Suitable Habitats

***Cryptobranchus alleganiensis bishopi* – Ozark Hellbender**

The Ozark hellbender is a large aquatic salamander species with small eyes, a keeled tail, and a flattened body for moving in fast moving water (Nickerson and Mays, 1973). This species inhabits fast flowing streams and rivers with cool, clear water and many large, flat rocks. Consistent dissolved oxygen levels, temperature, and flow are required for suitable habitat (Williams et al., 1981). Breeding occurs in October with eggs hatching two to three months later. The Current River in Missouri has documented occurrences of the Ozark hellbender. Additionally, the historic range of the species could have included the Black River (Trauth et al., 1992). The closest location of all the action alternatives to the Current River, containing the closest known suitable habitat, is approximately 600 feet west of Alternative 2 and northeast of Pocahontas.

***Macroclemys temmincki* – Alligator Snapping Turtle**

The alligator snapping turtle is proposed threatened by the USFWS. This species is a large, aquatic turtle and is found in deep water habitats of deep rivers, swamps, and lakes (Fuller and Somma, 2021). This is the largest freshwater turtle in the United States and reaches lengths of 31.5 feet and 251 pounds (Pritchard, 1989; Conant and Collins, 1998). The Black River is the predominant hydrology feature providing suitable habitat for this species within Alternatives 2 and 3, although additional perennial watercourses may also have suitable habitat to support the species.

3.4 Environmental Consequences

Acreages and linear feet (LF) of suitable habitat for each federally-listed species are quantified in **Table 3**. Preliminary habitat impacts are based on a consistent 400-foot-wide proposed ROW for all the action alternatives, with the exception of larger areas at proposed interchanges, and assume all habitat within the proposed ROW would be directly affected by construction activities. However, effects determinations presented in the draft BA (**Attachment F**) and impacts summarized below are based on the current plan for the Black River to be completely spanned. Yet, there is no current funding for this project and if the plan to avoid in-channel work changes as the project moves to final design and construction, then consultation with USFWS would be re-initiated. Potential impacts to each federally-listed species' habitats for the action alternatives are summarized below and in the BA.

No Action Alternative

The No Action Alternative would have no effect on federally-protected species beyond what would be proposed for improvements deemed necessary by governing officials.

Alternative 2

Alternative 2 would impact through removal an estimated 65.2 acres of forested areas determined by USFWS to provide suitable summer roosting habitat for the Indiana bat, gray bat, and northern long-eared bat species. An estimated 19 structures (barns, sheds, abandoned buildings, or silos), and four existing bridges, are located within Alternative 2 and provide suitable summer roosting habitat for the federally-listed bat species. For the three existing bridges at the Hwy. 67/Hwy. 412 interchange that are to remain during construction, temporary and indirect impacts to these potentially suitable summer roosting habitats could occur as a result of construction activities, although evidence of bats was not observed during field investigations. All other structures would be removed by the project. Based on coordination with USFWS and ANHC, and review of the Northern Long-eared Bat Consultation Area map and Final 4(D) Rule Guidance document, no known occupied bat maternity roost trees were identified within 150 feet of the action alternative; however, potential roost trees are present within Alternative 2. Suitable structures and forested habitat would be directly impacted by

the project as a result of grading, clearing, and grubbing for roadway embankment and ROW construction activities. Indirect impacts would include construction noise and potential sedimentation because of ground disturbing activities. Sedimentation can affect aquatic and emerging insects on which bats feed. Closest known northern long-eared bat and Indiana bat locations (based on ANHC record data) are over 2 miles northeast of this alternative. Indirect disturbance impacts to suitable summer roosting habitat on the three bridges located at the interchange of Hwy. 67 and Hwy. 412 could occur as a result of construction activities such as night work, sign mounting, vibration from construction equipment, and demolition required for expanding the facilities. Results from the bat survey indicated that no federally-listed bat species were captured in the mist nets.

Table 3: Federally-protected Species Preliminary Habitat Impacts

Species/Status	Suitable Habitat	Action Alternatives*				
		2	3	A	B	C
Northern long-eared bat Threatened	Forested acreage	65.2	63.2	3.8	16.0	8.3
	Roosting structures	23	27	13	26	15
Gray bat Endangered	Forested acreage	65.2	63.2	3.5	16.0	8.0
	Roosting structures	23	27	13	26	15
Indiana bat Endangered	Forested acreage	65.2	63.2	3.5	16.0	8.0
	Roosting structures	23	27	13	26	15
Eastern black rail Threatened	Emergent wetland acreage	4.5	2.0	0.6	0.3	0
Curtis pearlymussel Endangered	LF of Black River	Indirect Only**	Indirect Only**	0	0	0
Pink mucket Endangered	LF of Black River	Indirect Only**	Indirect Only**	0	0	0
Rabbitsfoot* ** Threatened	LF of Black River	Indirect Only**	Indirect Only**	0	0	0
Scaleshell mussel Endangered	LF of Black River	Indirect Only**	Indirect Only**	0	0	0
Pyramid pigtoe Proposed Threatened	LF of Black River	Indirect Only**	Indirect Only**	0	0	0
Western fanshell Proposed Threatened	LF of Black River	Indirect Only**	Indirect Only**	0	0	0
Monarch butterfly Candidate	Acres of fallow fields and emergent wetlands	9.4	2.0	0.6	2.1	0
Pondberry Endangered	Acres of forested wetland habitat	33.2	19.7	2.8	10.0	4.5
Alligator snapping turtle Proposed Threatened	Acres of river and large waterbody habitat	2.5	2.2	0	0	0

*Habitat impacts are based on a 400-foot-wide proposed ROW for each action alternative. **The current plan is to completely span the Black River and avoid direct impacts. ***There is designated Critical Habitat for the rabbitsfoot, as listed in 50 CFR part 17, located in the Black River approximately seven river miles downstream of the AA.

Suitable habitat associated with the Curtis pearlymussel, pink mucket, rabbitsfoot, scaleshell mussel, pyramid pigtoe, and western fanshell is located within the Black River. As documented in ANHC records, the rabbitsfoot and pink mucket are known to occur within the Black River near the existing Hwy. 67 crossing of the river, which is approximately 7.35 river miles downstream of the proposed Alternative 2 crossing location. This is the same location that designated Critical Habitat begins for the rabbitsfoot. Occurrence records for the scaleshell and Curtis pearlymussel have also been identified in

the Black River near the mouth of the Spring River (Ecological Consultants, Inc., 1983, 1984). As the Black River would be spanned, no direct impacts to mussel species or suitable habitat would occur. Temporary and indirect impacts to potentially suitable habitat include downstream sedimentation occurring during construction within the banks of the river and water quality effects from post-construction stormwater runoff. Goldsmith et al. (2020) found that increases in suspended solids could impact mussels by decreasing food availability, physically interfering with filter feeding and respiration, and impeding various aspects of the mussel-host relationship.

Results of the mussel survey indicated that 609 live mussels representing 23 taxa were encountered along Alternative 2. The federally-protected rabbitsfoot, listed as a threatened species, was represented at Alternative 2 by two live specimens that accounted for 0.3% of the live mussels collected. Additionally, one live specimen of the western fanshell, which is proposed threatened, was collected. As described in the survey report provided in **Attachment D**, Alternative 2 and Alternative 3 occur in relatively different riverine habitats for mussels. Alternative 2 provides more physical habitat diversity potentially accounting for its greater species richness. Alternative 3 provides less habitat diversity and is almost lentic in its physical characteristics.

There would be no direct impacts to Critical Habitat for the rabbitsfoot. Indirect effects to Critical Habitat are unlikely provided the long distance (7.35 river miles) between the proposed crossing of the Black River and the location of Critical Habitat.

Potentially suitable habitat in the form of emergent wetlands is present for the eastern black rail. Alternative 2 would impact an estimated 4.5 acres of emergent wetlands containing possible dense vegetation cover in the summer. However, the use of herbicides to maintain cropland edge habitats reduces the likelihood of emergent wetland vegetation from becoming dense or overgrown. Direct impacts of filling of the wetlands and indirect impacts of downstream sedimentation could occur. These direct and indirect wetland impacts would impair emergent wetland habitat required by the rail and may also affect the species foraging abilities. Erosion and sediment control best management practices (BMPs) to control off-site sedimentation would be implemented to ensure off-site wetlands would not be impacted.

Potentially suitable habitat, in the form of fallow fields and emergent wetlands that have the potential to contain milkweed and other flowering plants, was observed for the monarch butterfly within Alternative 2. It is anticipated this alternative would directly impact 9.4 acres of potentially suitable habitat by clearing during construction. However, a portion of these impacts are anticipated to be temporary as areas within the proposed ROW would return to herbaceous habitat and be planted with a wildflower seed mix.

Alternative 2 would impact approximately 33.2 acres of suitable habitat identified in association with the pondberry. No known populations have been identified by ANHC within Alternative 2.

Approximately 3.9 acres of potentially suitable habitat within the Black River and Murray Creek was observed for the alligator snapping turtle. As the Black River would be spanned, no direct impacts to alligator snapping turtles or suitable habitat would occur within the Black River. For the approximately 2.5 acres of Murray Creek, which is low quality habitat, it is anticipated that Alternative 2 would directly impact this area by removal due to fill. Indirect impacts resulting from off-site sediment migration also could occur as sedimentation may reduce visibility of the turtles' prey.

Alternative 3

Alternative 3 would impact slightly less Indiana bat, gray bat, and northern long-eared bat suitable summer roosting habitat with an estimated 63.2 acres of forested areas removed. An estimated 22 structures (barns, sheds, abandoned buildings, or silos), and five existing bridges, are located within Alternative 3 and provide suitable summer roosting habitat for the federally-listed bat species. All building structures would be removed by the project; bridge structures would incur disturbance and/or impacts due to expansion (as descripted for Alternative 2). As identified for Alternative 2, the same temporary disturbances during construction of Alternative 3 could be expected at the three existing bridges at the Hwy. 67/Hwy. 412 interchange. Similar to Alternative 2, coordination with USFWS and ANHC, Northern Long-eared Bat Consultation Area map, and Final 4(D) Rule Guidance document, indicates no known occupied bat maternity roost trees within 150 feet of Alternative 3. However, potential roost trees are present within the ROW footprint and direct impacts would include tree clearing and grubbing. Indirect impacts would include construction noise and potential sedimentation as a result of ground disturbing activities. Sedimentation can affect aquatic and emerging insects on which bats feed. Northern long-eared bat and Indiana bat occurrence records provided by ANHC indicate these species have been found approximately 1.7 miles northwest of this alternative. Results from the bat survey indicated that no federally-listed bat species were captured in the mist nets.

As identified for Alternative 2, suitable habitat associated with the Curtis pearlymussel, pink mucket, rabbitsfoot, scaleshell mussel, pyramid pigtoe, and western fanshell is located within the Black River. ANHC records indicate the rabbitsfoot has been found at the existing crossing of the Black River and Hwy. 67. Pink muckets are known to occur within the Black River approximately 1.2 river miles upstream of Alternative 3. Alternative 3 is over 40 river miles upstream from known occurrences within the Black River of the rabbitsfoot and pink mucket. The western fanshell is known to occur within the Black River approximately 4.26 river miles upstream of the proposed Alternative 3 crossing location. As the Black River would be spanned, no direct impacts to mussel species or suitable habitat would occur. Indirect impacts to downstream suitable habitat within the Black River would occur as a result of sediment migration during construction and to water quality as a result of post-construction stormwater runoff. As described for Alternative 2, sedimentation may impact mussels by decreasing food availability, physically interfering with filter feeding and respiration, and impeding various aspects of the mussel-host relationship (Goldsmith et al., 2020).

Results from the mussel survey indicated that a total of 563 live mussels representing 16 taxa were found at the Alternative 3 crossing. No threatened or endangered mussels were identified along Alternative 3 by the survey. The mussel survey report is provided in **Attachment D**.

There would be no direct or indirect impacts to Critical Habitat for the rabbitsfoot given the long distance between the proposed crossing of the Black River and the location of Critical Habitat, which is estimated to be over 50 river miles downstream of the proposed Alternative 3 crossing.

Potentially suitable emergent wetland habitat was identified for the eastern black rail. This alternative would remove approximately 2.0 acres of emergent wetlands containing possible summer dense vegetation cover. As documented in the description of Alternative 2, the use of herbicides within croplands reduces the likelihood of emergent wetland vegetation becoming dense or overgrown. Direct impacts to wetland habitat would occur from embankment and base fill required for the proposed highway. Indirect impacts of off-site sedimentation could occur; however, BMPs to control off-site sedimentation would be implemented to ensure off-site wetlands would not be impacted.

Potentially suitable habitat, in the form of fallow fields and emergent wetlands that have the potential to contain milkweed and other flowering plants, was observed for the monarch butterfly within Alternative 3. It is anticipated this alternative would directly impact 2.0 acres of potentially suitable habitat by clearing during construction. However, a portion of these impacts are anticipated to be temporary as areas within the proposed ROW would return to herbaceous habitat and be planted with a wildflower seed mix.

Alternative 3 would impact approximately 19.7 acres of suitable habitat identified in association with the pondberry. Known populations have been identified by ANHC within a forested area in Alternative 3 that is located approximately 1.6 mile south of the town of O'Kean and 0.17 mile west of Lawrence County Road 603 (Main Street).

Approximately 3.8 acres of potentially suitable habitat within the Black River as well as within a few other perennial waterbodies was observed for the alligator snapping turtle. As the Black River would be spanned, no direct impacts to alligator snapping turtles or suitable habitat would occur within the 1.6 acres of the Black River. However, it is anticipated that Alternative 3 would directly impact by removal due to fill approximately 2.2 acres of suitable habitat found within other perennial waterbodies. Indirect impacts resulting from off-site sediment migration also could occur as sedimentation may reduce visibility of the turtles' prey.

Alternative A

A very limited amount of forested habitat exists along one field ditch and portions of a contiguous forested area. In total, approximately 3.8 acres of wooded areas that could offer summer roosting bat habitat within Alternative A would be removed. An estimated 13 suitable summer roosting structures are located within this alternative's proposed ROW and would be removed by the project.

Potentially suitable habitat, in the form of emergent wetlands, was observed for the eastern black rail. Although the use of herbicides to maintain cropland edge habitats reduces the likelihood of emergent wetland vegetation from becoming dense or overgrown, it is anticipated this alternative would impact an estimated 0.6 acre of emergent wetlands containing possible summer dense vegetation cover. Alternative A would directly impact these wetlands by removal due to fill. Indirect impacts resulting from off-site sediment migration also could occur. These direct and indirect wetland impacts would impair emergent wetland habitat required by the eastern black rail and may also affect the species foraging abilities.

Potentially suitable habitat, in the form of emergent wetlands that have the potential to contain milkweed and other flowering plants, was observed for the monarch butterfly within Alternative A. It is anticipated this alternative would directly impact 0.6 acres of potentially suitable habitat by clearing during construction. However, a portion of these impacts are anticipated to be temporary as areas within the proposed ROW would return to herbaceous habitat and be planted with a wildflower seed mix.

Alternative A would impact an estimated 2.8 acres of depressional, forested wetland habitat that may be suitable for the pondberry. Direct impacts to suitable habitat would include clearing, grubbing, and filling for both roadway embankment and ROW.

Alternative B

A limited amount of forested habitat exists, primarily within a single large, forested patch. In total, approximately 16.0 acres of potentially suitable summer roosting bat habitat would be impacted by

Alternative B. Direct impacts to suitable summer roosting bat habitat include removal of 26 structures and forested areas as a result of clearing activities.

Potentially suitable habitat, in the form of emergent wetlands, was observed for the eastern black rail. Although the use of herbicides reduces the likelihood of emergent wetland vegetation from becoming dense or overgrown, it is anticipated this alternative would impact an estimated 0.3 acre of emergent wetlands containing possible summer dense vegetation cover. Alternative B would directly impact these wetlands by removal due to fill. Indirect impacts resulting from off-site sediment migration also could occur. These direct and indirect wetland impacts would impair emergent wetland habitat required by the eastern black rail and may also affect the species foraging abilities.

Potentially suitable habitat, in the form of fallow fields and emergent wetlands that have the potential to contain milkweed and other flowering plants, was observed for the monarch butterfly within Alternative B. It is anticipated this alternative would directly impact 2.1 acres of potentially suitable habitat by clearing during construction. However, a portion of these impacts are anticipated to be temporary as areas within the proposed ROW would return to herbaceous habitat and be planted with a wildflower seed mix.

Alternative B would impact an estimated 10.0 acres of depressional, forested wetland habitat that may be suitable for the pondberry. Direct impacts to suitable habitat would include clearing, grubbing, and filling for both roadway embankment and ROW.

Alternative C

Alternative C contains very fragmented forested areas that are primarily associated with isolated residences located along County Roads 154 and 278, and within two smaller forested areas comprising approximately 8.3 acres. An estimated 15 structures suitable for providing summer roosting habitat are located within this alternative connector and includes grain silos and barns. Direct impacts to suitable summer roosting bat habitat include removal of these structures and suitable forested areas as a result of clearing activities.

Alternative C would impact an estimated 4.5 acres of depressional, forested wetland habitat that may be suitable for the pondberry. Direct impacts to suitable habitat would include clearing, grubbing, and filling for both roadway embankment and ROW.

3.5 Agency Consultation Status

Section 7(a)(2) of the ESA requires that, through consultation with the USFWS, federal agencies insure their actions are not likely to jeopardize the continued existence of any listed species or results in the destruction or adverse modification of Critical Habitat. Consultation with USFWS began early and has been ongoing throughout the NEPA process. A request for technical assistance was submitted to USFWS in mid-November 2020 with initial consultation calls occurring in January and February 2021. Continuing coordination with USFWS indicated that presence/absence surveys would be required for the federally-listed pondberry, and for federally-listed bat and mussel species to comply with Section 7. As a result, suitable summer roosting forested habitat survey locations for the listed bat species were identified and presented to the USFWS. In March 2021, the USFWS responded with recommendations for bat mist netting survey locations. The USFWS also indicated that the Black River is the only natural watercourse within the study area that would provide suitable mussel habitat and confirmed that a presence/absence survey should be conducted at proposed crossings. Below is a summary of notable impacts discussed in agency coordination.

- Alternatives 2 and 3 would impact suitable summer roosting (forested and structure habitat) and foraging bat habitat.
- The ANHC has occurrence records for the pondberry located within the Alternative 3 proposed ROW.
- Alternatives 2 and 3 would indirectly impact similar LF of suitable mussel habitat within the Black River.
- Critical habitat for the rabbitsfoot is located over seven miles away; however, the closest alternative, (Alternatives 2) is almost seven times closer than Alternative 3. None of the action alternatives are located within or near Critical Habitat.

As required by USFWS, presence/absence surveys were conducted for federally-listed bat species for 12 nights (August 1-12, 2021) at 25 locations along Alternative 2 and Alternative 3 (Redman, 2021). Additionally, a mussel survey was performed at the Black River crossings of Alternatives 2 and 3 to determine if federally protected mussel species exist within either of the proposed 400-foot-wide corridors (Harris, 2022). The Alternative 2 corridor was surveyed on October 16-17 and November 6, 2021. The Alternative 3 corridor was surveyed on October 30-31, 2021. The presence/absence survey of the Preferred Alternative (Alternatives 2 and C) was conducted for pondberry on April 19, 2022 within suitable habitat. No pondberry was found during the survey.

Effects determinations presented in the draft BA (**Attachment F**) are based on the current plan for the Black River to be completely spanned. However, there is no current funding for this project and if the plan to avoid in-channel work changes as the project moves to final design and construction, then consultation with USFWS would be re-initiated.

3.6 Avoidance, Minimization, and Mitigation

Initial avoidance and minimization of federally-listed species habitat the in early stages of project planning included desktop review of potentially suitable habitat locations and refining wide corridors to 400-foot-wide ROW footprints. Development of the 400-foot-wide ROW for the action alternatives considered construction limitations and other environmental constraints such as forested wetlands, conservation areas, and major gas pipelines. Locations of other resources within and near the action alternatives were also considered, such as floodplains and the ability to achieve near perpendicular crossings of the Black River. Black River crossings were selected based on both crossing orientation and avoidance of impacts to forested riparian zones.

As mentioned at the beginning of this Chapter, the monarch butterfly is a candidate species and as such, is not federally protected under the ESA. However, the USFWS recommends agencies implement conservation measures for candidate species in action areas, as these are species, by definition, that may warrant future protection under the ESA. Thus, for the monarch butterfly, a wildflower seed mix will be included in the permanent seeding for the project with the intent of establishing habitat that would benefit the monarch and other pollinator species. Additional assessment and conservation/mitigation measures regarding the monarch butterfly would be considered in the design phase of the project.

Upon selection of a Preferred Alternative, further avoidance, minimization, and mitigation measures would be evaluated and implemented into the project. Avoidance and minimization measures (AMM) would be implemented through ARDOT SPs for Water Pollution Control, Storm Water Pollution Prevention Plan, and Vegetated Buffer Zone to help limit sediment from entering waterbodies during construction. Other AMMs may include additional presence/absence surveys for listed bat and mussel species (as discussed in previous section), providing mitigation for impacted bat habitat where

presence is assumed, implementing BMPs such as turbidity curtains and silt fence, water quality monitoring during construction, and mussel relocations.

3.7 Commitments

Additional presence/absence surveys will be conducted for federally listed bat and mussel species prior to project construction. Additional commitments will be considered during the design phase of the project.

For the monarch butterfly, a wildflower seed mix will be included in the permanent seeding for the project.

As there is a "likely to adversely affect" determination for some of these federally-listed species, a BA has been prepared for the project, which evaluates potential impacts, provides impact determinations, and includes results of all surveys completed for the listed species. This draft BA is provided in **Attachment F** and has been informally reviewed by USFWS. Prior to the Final EIS, the final BA would be provided to the USFWS for review and concurrence along with a request for formal consultation. The USFWS would issue a BO after review of the BA that would document their decision of the impacts on federally-listed species. Section 7 consultation would continue upon selection of the Preferred Alternative. Avoidance and mitigation measures would be determined upon completion of Section 7 consultation.

Effects determinations presented in the draft BA (**Attachment F**) are based on the current plan for the Black River to be completely spanned. However, there is no current funding for this project and if the plan to avoid in-channel work changes as the project moves to final design and construction, then consultation with USFWS would be re-initiated.

Chapter 4 – State-listed Species of Concern

4.1 Regulatory Context, Methodology, and Data

Federally-listed T&E species are covered in Chapter 3 and general wildlife and terrestrial habitats are covered in Chapter 2. This chapter covers the analysis of the following resources:

- ANHC State-listed Elements of Special Concern
- AGFC Arkansas Endangered, Threatened, Regulated, and Species of Greatest Conservation Need (published in 2016)

There are currently no state laws protecting state-listed species in Arkansas; however, the state-listed species identified by ANHC and AGFC are those that are considered to be rare in Arkansas. Animal species identified as State Endangered (SE) according to the ANHC are afforded protection under AGFC regulation *P1.01 Endangered Species List – Animals*, as adopted under Amendment 35 of the Constitution of the State of Arkansas. The ANHC is an agency within the Department of Arkansas Heritage and holds fee title or restrictive conservation easements on lands within the state, which are referred to as natural areas. These natural areas have been identified as important to the state's natural diversity and frequently provide habitat to rare, endangered or threatened species, or represent examples of high-quality natural community types (ANHC, 2019). These areas are protected in perpetuity. ANHC tracks known locations of these species and natural community types as occurrence data within their Natural Diversity Database. The ANHC was consulted regarding known records for state-listed species within their Natural Diversity Database, which includes endangered, threatened, rare, peripheral or status undetermined species within the AA.

Habitat assessments were conducted, and impacts quantified, within the anticipated ROW footprint of each action alternative. In this chapter, these areas are referred to as the study area of each alternative and are shown in **Attachment A.** The study area of each action alternative is defined as a consistent 400-foot-wide ROW with larger areas at the proposed interchanges. The proposed interchanges can be seen in **Figure 1**. Unless otherwise noted, it is assumed that all areas within the ROW footprint would be directly affected by construction activities. The current plan is for the Black River to be completely spanned; therefore, no direct habitat impacts are anticipated within this waterbody.

4.2 State-listed Species

ANHC Natural Diversity Database records identified a total of 39 species that have been confirmed on the occurrence level and/or observation level. Many of the state-listed species have a status of "inventory element" meaning ANHC is currently conducting active inventory work on those species. Seven of the 39 state-listed species are considered State Threatened (ST) or SE. The ANHC Elements of Special Concern list can be found in **Table 4** and **Attachment G**.

The AGFC was also consulted regarding species of greatest concern as identified in their 2016 published list, in which 255 species of plants and animals were identified. This list of species can be found in **Attachment H**. Occurrence records for these species was not provided.

Table 4: ANHC State-listed Species, Preferred Habitat, and Preliminary Habitat Impacts

ANHC Species and State Status	Preferred Habitat	Action Alternatives*				
		2	3	A	B	C
Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), INV	Caves, mines and hollows of trees in bottomland forests and old buildings	65.2 AC 23 STR	63.2 AC 27 STR	3.8 AC 13 STR	16.0 AC 26 STR	8.3 AC 15 STR
Southeastern bat (*Myotis austroriparius*), INV	Caves and tree hollows in bottomland hardwoods, abandoned buildings	65.2 AC 23 STR	63.2 AC 27 STR	3.8 AC 13 STR	16.0 AC 26 STR	8.3 AC 15 STR
Little brown bat (*Myotis lucifugus*), INV	Caves, barns, buildings, bridges and trees with hollows or peeling bark	65.2 AC 23 STR	63.2 AC 27 STR	3.8 AC 13 STR	16.0 AC 26 STR	8.3 AC 15 STR
Northern long-eared bat (Myotis septrionalis), SE**	Identified in Chapter 3	65.2 AC 23 STR	63.2 AC 27 STR	3.8 AC 13 STR	16.0 AC 26 STR	8.3 AC 15 STR
Indiana bat (*Myotis sodalis*), SE**	Identified in Chapter 3	65.2 AC 23 STR	63.2 AC 27 STR	3.8 AC 13 STR	16.0 AC 26 STR	8.3 AC 15 STR
Ozark fanshell (*Cyprogenia aberti*), INV	Creeks and large rivers with rock, gravel and mud substrate	0 LF**	0 LF**	NP	NP	NP
Pink mucket (*Lampsilis abrupta*), SE**	Identified in Chapter 3	0 LF**	0 LF**	NP	NP	NP
Round pigtoe (*Pleurobema sintoxia*), INV	Small to large rivers with mud, sand and gravel substrate	0 LF**	0 LF**	NP	NP	NP
Rabbitsfoot (*Theliderma cylindrica*), SE**	Identified in Chapter 3	0 LF**	0 LF**	NP	NP	NP
Little spectaclecase (*Villosa lienosa*), INV	Small to medium sized streams with sand or gravel substrate	0 LF**	0 LF**	NP	NP	NP
Western sand darter (*Ammocrypta clara*), INV	Medium to large streams with moderate current and sand substrate	0 LF**	0 LF**	NP	NP	NP
Current darter (*Etheostoma uniporum*), INV	Large rivers and tributaries	0 LF**	0 LF**	NP	NP	NP
Slenderhead darter (*Percina phoxocephala*), INV	Medium sized rivers and large creeks with gravel and rocky riffles	0 LF**	0 LF**	NP	NP	NP
Stargazing darter (*Percina uranidea*), INV	Medium sized rivers with gravel substrates and deep riffles	0 LF**	0 LF**	NP	NP	NP
Saddleback darter (*Percina vigil*), INV	Medium sized rivers with fine gravel or sand substates	0 LF**	0 LF**	NP	NP	NP
Gilt darter (*Percina evides*), INV	Large creeks, small to medium rivers with clean, clear water and deep riffles	NP	NP	NP	NP	NP
Blue sucker (*Cycleptus elongatus*), INV	Large riverine systems with deep fast-moving rivers and deep lakes	0 LF**	0 LF**	NP	NP	NP
Highfin carpsucker (*Carpoides velifer*), INV	Clear streams and rivers with firm substrates	0 LF**	0 LF**	NP	NP	NP
Goldeye (*Hiodon alosoides*), INV	Medium to large rivers with moderate to swift currents and firm sand	0 LF**	0 LF**	NP	NP	NP
Mooneye (*Hiodon tergisus*), INV	Large, clear streams river and lakes with firm	0 LF**	0 LF**	NP	NP	NP
Shoal chub (*Macrhybopsis hyostoma*), INV	Large streams with shifting sand and shallow riffles	0 LF**	0 LF**	NP	NP	NP
Silver redhorse (*Moxostoma anisurum*), INV	Medium to large rivers with deep sluggish pools over rock or gravel	0 LF**	0 LF**	NP	NP	NP
Pealip redhorse (*Moxostoma pisolabrum*), INV	Medium to large rivers with clear sediment-free water	0 LF**	0 LF**	NP	NP	NP
Blackspot shiner (*Notropis atrocaudalis*), INV	Small, clear streams	NP	NP	NP	NP	NP

ANHC Species and State Status	Preferred Habitat	Action Alternatives*				
		2	3	A	B	C
Sabine shiner (*Notropis sabinae*), INV	Streams and rivers with fine, silt-free, sand substrates	0 LF**	0 LF**	NP	NP	NP
Channel shiner (*Notropis wickliffi*), INV	Large rivers and mouths of tributaries with silt, sand or gravel substrates	0 LF**	0 LF**	NP	NP	NP
Smith's longspur (*Calcarius pictus*), INV	Prairies, fields, shortgrass plains, pastures and airport fields	6.5 AC	1.8 AC	NP	1.8 AC	NP
Bald eagle (*Haliaeetus leucocephalus*), INV	Near rivers, lakes, reservoirs and marshes, super canopy trees	5 AC	1.3 AC	NP	NP	NP
Hairy wood mint (*Blephilia hirsute*), INV	Floodplains, forests, meadows, and fields	P		P		
False hop sedge (*Carex lupuliformis*), INV	Marshes, shores of rivers or lakes and swamps	P	P +	NP		
Opaque prairie sedge (*Carex opaca*), SE	Low areas of prairies, roadside ditches, and poorly drained sites	P		P		
Woolly sedge (*Carex pellita*), INV	Roadside ditches and other early successional habitats	P		P		
Wolf's spike-rush (*Eleocharis wolfii*), INV	Ephemeral pools in open grasslands, oak forests, and river terraces	P		P		
Corkwood (*Leitneria floridana*), INV	Forested or open swamps, wet thickets and roadside ditches	P	P +	P		
Pondberry (*Lindera melissifolia*), SE**	Identified in Chapter 3	33.2 AC	19.7 AC	2.8 AC	10.0 AC	4.5 AC
Brand's scorpion-weed (*Phacelia gilioides*), INV	Bottomland hardwood forests, streambanks, roadsides, glades	P		P		
Purple fringeless orchid (*Platanther peramoena*), ST	Bottomland forests along streams and lakes, mucky or rocky soil	P	P +	NP		
Big mock Bishop's-weed (*Ptilimnium costatum*), INV	Swamps, sloughs, streambanks and ditches	P	P +	P		
Virginia spiderwort (*Tradescantia virginiana*), INV	Mesic to dry upland forests, open rocky woods, railroads	P		P		

INV - Inventory Element that the ANHC is currently conducting active inventory work on this species. SE - State Endangered. ST - State Threatened.

* Habitat based on a 400-foot-wide proposed ROW. **The current plan is to completely span the Black River and avoid direct impacts; only indirect impacts are anticipated. AC - Acres; STR - Potentially suitable existing bridge structures or building structures (barns, sheds, abandoned buildings, or silos); LF - Linear Feet, calculated by nautical miles; NP - No potentially suitable habitat is present within the action alternatives; P - Potentially suitable habitat is present within the action alternatives; P+ - Potentially suitable habitat is present within the action alternatives and there is an ANHC-known occurrences within the action alternatives. The closest known occurrence of these species relative to Alternatives A, B and C is approximately 1.8 miles to the west.

4.3 Existing Conditions and Habitat Assessment – State-listed Species

A habitat assessment for the state-listed species identified by ANHC is summarized for the action alternatives in this section. This assessment included limited site investigations of suitable habitat that was conducted March 2-3, 2021 and was limited to public access points along the study area. Additional habitat considerations and descriptions are found in Chapter 2.

Suitable habitat requirements of the state-listed species, which are described in **Table 4,** were compared to field observations and aerial photography associated with the study area (see **Attachment A**). Based on limited site investigations, suitable habitat for all ANHC state-listed species were identified within proposed ROW of at least one of the action alternatives. One potentially positive identification of corkwood was documented at the intersection of Alternative 2 with Hwy. 90 (Main Street) located northeast of the town of Knobel (**Figure 29**).

Figure 29: Potential Corkwood species

Bat Species

Forested areas providing suitable habitat for the state-listed Rafinesque's big-eared bat, southeastern bat, and little brown bat are also located within all the action alternatives. Suitable roosting habitat within these forested areas exist in the form of live and dead or dying trees with peeling bark, hollows, and crevices. As documented in Chapter 3, these forested areas are located along field edges, within riparian zones of the creeks and the Black River, and agricultural ditches. Occurrence records for all three state-listed bat species have been identified predominantly within the Black River WMA with one occurrence of the Rafinesque's big-eared bat documented outside of the Black River WMA within a forested tract of land located within Alternative 3.

Aquatic Species

Medium to large sized waterbodies within the alternative footprints include Big Running Water Creek, Murray Creek Ditch, Oak Creek Ditch, Petersburg Ditch, Lateral Number 1, Post Oak Ditch, Conley Ditch, White Oak Slough, Village Creek, and the Black River. The water quality within these creeks and ditches within the alternative footprints was observed to be sediment laden and of poor water quality, which would likely preclude them from providing suitable habitat for the species identified in **Table 4** requiring clear water. Additionally, these creeks and ditches within the study area did not contain riffles at the time of the site investigation. All of these creeks and ditches within the action alternatives have been channelized and/or straightened in the past and not representative of natural, undisturbed conditions. The Black River provides clear and good water quality and provides suitable habitat for all of the state-listed mussel and fish species. Approximately 408 LF and 421 LF of the Black River flows through Alternatives 2 and 3, respectively. Medium to large sized waterbodies within the action alternatives include the Big Running Water Creek, Murray Creek Ditch, Oak Creek Ditch, Petersburg Ditch, Lateral Number 1, Post Oak Ditch, Conley Ditch, White Oak Slough, and Village Creek. Within the action alternatives, all of these waterbodies have been channelized and/or straightened in the past and are not representative of natural, undisturbed conditions. The water quality within these creeks and ditches within the alternative footprints was observed to be sediment laden and of poor water quality. These waterbodies do not provide suitable habitat for any of the state-listed mussel and fish species.

Bird Species

Two bird species have been listed by ANHC and include Smith's longspur and the bald eagle. Suitable habitat associated with Smith's longspur was observed within Alternatives 2, 3, and B and includes fields and pastures. However, there is a limited amount of suitable habitat within the action alternatives simply due to the amount of active farming. Suitable habitat is therefore confined to field and stream edges where forested transitions are absent and where farming practices have left a planting buffer between crops or along agricultural ditches. Bald eagle foraging habitat includes rivers, lakes, and reservoirs as well as marshes. According to ANHC, a bald eagle occurrence was documented

between Alternatives 2 and 3 within Lake Ashbaugh. Although there are no reservoirs located within or adjacent to Alternatives 2 and 3, some farming practices do include flooding fields for short periods of time, creating temporary "lakes" that could provide stopover habitat for foraging during migration. Additionally, William H. Donham State Fish Hatchery is located adjacent to Alternatives 2 and 3 just west of Corning. Hatcheries are known to be used by eagles as foraging habitat.

Plant Species

Many of the state-listed plant species can be found in a variety of habitats, all of which are found within Alternatives 2 and 3, which contains vast floodplains, upland and bottomland forests, streambanks, and roadside ditches. As described below, habitats for some state-listed plant species are located within Alternatives A, B, and C. Open rocky woods, glade and prairie habitats were habitat types not identified within the action alternatives.

Species Locations

ANHC provided documentation on the occurrence records of both state and federally-listed species. These records included occurrences for the pondberry, corkwood, false hop sedge, purple fringeless orchid, and big mock Bishop's weed as occurring within Alternative 3. Seven of the 39 state-listed species are considered state-threatened (ST) or state-endangered (SE). State-threatened designations apply to both animal and plant species identified by ANHC as "being or likely to become endangered in Arkansas in the foreseeable future, based on current inventory information" (ANHC, 2019). State-endangered designated wildlife species are afforded protection under the AGFC regulations and apply to "wildlife species or subspecies endangered or threatened with extinction, listed or proposed as a candidate for listing by the U.S. Fish and Wildlife Service or any native species or subspecies listed as endangered by the Commission. State-endangered plant species are not afforded the same protections as wildlife species and applies to those plant species "as being in danger of being extirpated from the state" (ANCH, 2019. The seven state-listed species identified as ST or SE by ANCH include: the pink mucket (SE), rabbitsfoot (SE), northern long-eared bat (SE), Indiana bat (SE), opaque prairie sedge (SE), pondberry (SE), and purple fringeless orchid (ST). The ANHC Elements of Special Concern list and preferred habitat within the action alternatives of the listed species can be found in **Table 4**. The AGFC was also consulted regarding species of greatest concern as identified on the 2016 list in which 255 species of plants and animals have been identified.

4.4 Environmental Consequences

Potential acreage and LF of impacts to suitable habitat for each ANHC state-listed species are qualitatively summarized for each alternative. Preliminary habitat impacts are based on a consistent 400-foot-wide proposed ROW for action alternatives, with the exception of larger areas at proposed interchanges, and assume all habitat within these action alternatives would be directly affected by construction activities. However, effects determinations presented in the draft BA (**Attachment F**) and impacts summarized below are based on the current plan for the Black River to be completely spanned. Yet, there is no current funding for this project and if the plan to avoid in-channel work changes as the project moves to final design and construction, then consultation with USFWS would be re-initiated.

No Action Alternative

The No Action Alternative would have no effect on ANHC or state-listed species beyond what would be proposed for improvements deemed necessary by governing officials.

Alternative 2

There are approximately 65.2 acres of total forested habitat and 23 structures within Alternative 2 that would be impacted. An estimated 19 building, barn, or silo structures, and four existing bridges, are located within the Alternative 2 footprint and could provide suitable summer roosting habitat for the Rafinesque's big-eared bat, southeastern bat, little brown bat, Indiana bat and northern long-eared bat (habitat impacts determined for the Indiana bat and northern long-eared bat are discussed in Chapter 3). These structures would be directly impacted by the project by complete removal. Direct impacts would include tree clearing and grubbing. Indirect impacts would include construction noise and potential sedimentation as a result of ground disturbing activities. Sedimentation can affect aquatic and emerging insects on which bats feed. The closest known occurrences for these state-listed bat species places them within the Black River WMA. Indirect disturbance impacts to suitable summer roosting habitat on the three bridges located at the interchange of Hwy. 67 and Hwy. 412 could occur as a result of construction activities such as night work, sign mounting, vibration from construction equipment and demolition required for expanding the facilities.

Suitable habitat associated with the Ozark fanshell, round pigtoe, and little spectaclecase is located within the Black River. ANHC has known occurrence records for the little spectaclecase in the Black River approximately 0.5 mile downstream from the proposed crossing of Alternative 2. Known occurrence records for the Ozark fanshell and round pigtoe place them approximately 3.4 to 3.6 miles downstream from the Alternative 2 proposed ROW. As the Black River would be spanned, no direct impacts to mussel species or suitable habitat would occur. Indirect impacts to downstream suitable habitat within the Black River would occur as a result of sediment migration during construction and to water quality as a result of post-construction stormwater runoff. Sedimentation may impact mussels by decreasing food availability, physically interfering with filter feeding and respiration, and impeding various aspects of the mussel-host relationship (Goldsmith et al., 2020).

The Black River could provide suitable habitat for the darter species, blue sucker, highfin carpsucker, goldeye, mooneye, shoal chub, silver redhorse, pealip redhorse, and channel shiner. As the Black River would be spanned, no direct impacts to mussel species or suitable habitat would occur. Indirect impacts to downstream suitable habitat within the Black River would occur as a result of sediment migration during construction and to water quality as a result of post-construction stormwater runoff. No suitable habitat for the gilt darter and blackspot shiner were identified within Alternative 2.

As documented in Chapter 2 approximately 92.9% of the Alternative 2 proposed ROW is actively cultivated crop fields, which severely limits the potential for suitable habitat for the Smith's longspur. Field edges and planting buffer strips along ditches and creeks offer the only non-cultivated grassed areas and are highly fragmented and narrow (commonly 20-40 feet wide). This alternative would impact an estimated 6.5 acres of herbaceous, non-wetland vegetation cover; however, the use of herbicides to maintain cropland edge habitats reduces the likelihood of suitable habitat being present. Direct impacts from clearing these field edges and indirect impacts of off-site sedimentation would occur. The ANHC identified occurrence of the bald eagle is located well outside of Alternative 2. Potential foraging habitat for the bald eagle includes temporarily flooded farm fields. The potential for super canopy trees to supply suitable nesting habitat could exist along the Black River within the riparian zone, of which approximately 5 acres would be cleared within the ROW.

No occurrence records for any of the 11 ANHC state-listed plant species identified in **Table 4** were identified within Alternative 2. However, suitable habitat located within the proposed ROW includes floodplains, bottomland and upland forests, sloughs, streambanks, and roadside ditches. These habitat types provide suitable habitats for all listed plant species identified by ANHC.

Alternative 3

There are approximately 63.2 acres of forested habitat within Alternative 3 that would be impacted by this alternative. An estimated 22 suitable building, barn, or shed structures plus five existing bridges, are located within the Alternative 3 footprint. These structures provide suitable habitat for the same bat species identified for Alternative 2. The closest known occurrences for the southeastern bat, little brown bat, Indiana bat, and northern long-eared bat places them within the Black River WMA. The closest known occurrence for the Rafinesque's big-eared bat is approximately 0.6 miles west of Alternative 3 near the town of O'Kean. Direct impacts by the project on suitable summer roosting habitat includes complete removal of structures and trees from clearing and grubbing. Indirect impacts would include construction noise and potential sedimentation as a result of ground disturbing activities. Indirect impacts to suitable summer roosting habitat on the three bridges located at the interchange of Hwy. 67 and Hwy. 412 could occur as identified for Alternative 2.

As identified in Alterative 2, suitable habitat associated with the Ozark fanshell, round pigtoe, and little spectaclecase is located within the Black River. Occurrence records for the round pigtoe have been documented approximately 0.75 mile upstream within the Black River. Ozark fanshell and little spectaclecase occurrence records have placed individuals approximately 4 miles upstream. The rabbitsfoot and pink mucket known occurrences are described in Chapter 3. As the Black River would be spanned, no direct impacts to mussel species or suitable habitat would occur. Indirect impacts to downstream suitable habitat within the Black River would occur as a result of sediment migration during construction and to water quality as a result of post-construction stormwater runoff. Sedimentation may impact mussels by decreasing food availability, physically interfering with filter feeding and respiration, and impeding various aspects of the mussel-host relationship (Goldsmith et al., 2020).

The Black River could provide suitable habitat for the darter species, blue sucker, highfin carpsucker, goldeye, mooneye, shoal chub, silver redhorse, pealip redhorse, and channel shiner. As the Black River would be spanned, no direct impacts to mussel species or suitable habitat would occur. Indirect impacts to downstream suitable habitat within the Black River would occur as a result of sediment migration during construction and to water quality as a result of post-construction stormwater runoff. No suitable habitat for the gilt darter and blackspot shiner were identified within Alternative 3.

Approximately 93.7% of the Alternative 3 proposed ROW is actively cultivated crop fields, which limits the potential for suitable habitat for the Smith's longspur to occur. As mentioned for Alternative 2, field edges and planting buffer strips along ditches and creeks offer the only non-cultivated grassed areas. This alternative would impact an estimated 1.8 acres of herbaceous, non-wetland vegetation cover. Direct impacts are the same as identified for Alternative 2. The ANHC identified occurrence of the bald eagle is also located well outside of Alternative 3 (over 3 miles to the northwest). Potential foraging habitat impacts for the bald eagle includes temporarily flooded farm fields and the Black River within the Alternative 3 proposed ROW. Potential super canopy trees available for nesting eagles could be located along the Black River and approximately 1.3 acres of riparian zone of the river would be directly impacted by tree clearing.

Alternative 3 would impact approximately 19.7 acres of suitable habitat identified in association with the pondberry, purple fringeless orchid, and big mock Bishop's-weed. Known populations of these species have been identified by ANHC within a forested area located approximately 1.8 miles south of O'Kean and 0.17 mile west of Lawrence County Road 603 (Main Street). Approximately 6.7 acres of this forested area would be directly impacted as a result of clearing, grubbing, and/or direct fill. As a result of the pondberry occurrence records within this site near O'Kean, additional coordination with the USFWS and ANHC for specific locations is on-going. Additionally, Alternative 3 would impact

approximately 20.0 acres of suitable habitat associated with the corkwood within two sites previously identified in ANHC occurrence records, the first site being located south of Peach Orchard and the second site located just east of Knobel. Additionally, Alternative 3 would impact approximately 0.29 acre of suitable habitat associated with the false hop sedge at one site previously identified in ANHC occurrence data located northeast of Knobel. Suitable habitat, as identified in **Table 4**, for all of the state-listed plant species is located within the Alternative 3 proposed ROW.

Alternative A

Approximately 3.8 acres of potentially suitable summer bat roosting habitat exists within Alternative A as forested habitat. Additionally, 13 suitable roosting structures are located within this alternative's proposed ROW. Direct impacts to summer roosting habitat for the Rafinesque's big-eared bat, southeastern bat, and little brown bat would occur due to structure and woodland removal for ROW or road construction. Indirect effects to potential summer roosting structures include construction noise and vibrations and could affect adjacent structures close to the alternative's proposed ROW.

No suitable habitat for the state-listed mussel, fish, or bird species is located within Alternative A.

Suitable habitat for the opaque prairie sedge, woolly sedge, corkwood, Brand's scorpion-weed, and big mock Bishop's-weed are found within Alternative A. No other suitable habitat for the remaining state-listed plant species was identified within Alternative A proposed ROW.

Alternative B

Approximately 16.0 acres of potentially suitable summer tree bat roosting habitat exists within the Alternative B proposed ROW. An estimated 26 suitable roosting structures are located within this alternative's proposed ROW. Direct impacts to summer roosting habitat for the Rafinesque's big-eared bat, southeastern bat, and little brown bat would occur due to structure removal for ROW or road construction. Indirect effects to potential summer roosting structures include construction noise and vibrations and could affect adjacent structures close to the proposed ROW.

No suitable habitat for the state-listed mussel or fish species is located within Alternative B.

Approximately 1.8 acres of suitable pasture habitat for the Smith's longspur would be directly impacted by clearing and grubbing activities related to construction of the proposed interchange.

Suitable habitat for the opaque prairie sedge, woolly sedge, corkwood, Brand's scorpion-weed, and big mock Bishop's-weed are found within Alternative B. No other suitable habitat for the remaining state-listed plant species was identified within Alternative B proposed ROW.

Alternative C

Approximately 8.3 acres of potentially suitable summer tree bat roosting habitat and 15 suitable structures are located within this alternative's proposed ROW. Direct impacts to summer roosting habitat for the Rafinesque's big-eared bat, southeastern bat, and little brown bat would occur due to structure removal for ROW or road construction. Indirect effects to potential summer roosting structures include construction noise and vibrations and could affect adjacent structures close to the proposed ROW.

No suitable habitat for the state-listed mussel, fish, or bird species is located within Alternative C.

Suitable habitat for the opaque prairie sedge, woolly sedge, corkwood, Brand's scorpion-weed, and big mock Bishop's-weed are found within Alternative C. No other suitable habitat for the remaining state-listed plant species was identified within the Alternative C proposed ROW.

No Action Alternative

The No Action Alternative would have no effect on federally-protected species beyond what would be proposed for improvements deemed necessary by governing officials.

4.5 Avoidance, Minimization, and Mitigation

As mentioned in Chapter 3, the larger conceptual level alternative corridors were refined to 400 feet in width and evaluated as proposed ROW. The proposed ROW of the action alternatives were identified to minimize or avoid impacts to forested wetlands, T&E species habitat, conservation areas, and major gas pipelines. Locations of other resources within and near the action alternatives' proposed ROWs were also considered, such as floodplains and the ability to achieve perpendicular crossings of the Black River. Avoidance and mitigation of state-listed species habitat includes the same as those identified for the federally-listed species. BMPs to control off-site sedimentation would be implemented to ensure off-site areas would not be impacted.

Chapter 5 – National Domestic Listing Workplan Species

5.1 Regulatory Context, Methodology, and Data

The National Domestic Listing Workplan (Workplan) is a Workplan developed by the USFWS for species needing conservation and for addressing ESA listing and critical habitat that is updated every five years (USFWS, 2021b). This section provides information related to the Workplan-listed species identified by the USFWS with more detail provided on those species that have been determined to have suitable habitat within the AA and for which there may be effects. Species location information was evaluated as received from ANHC occurrence records. Further details regarding ANHC species tracking and state-listed species within the AA is discussed in previous chapters.

A cursory habitat assessment for the Workplan-listed species was conducted at the same time and included the same evaluation methods utilized for the federal and state-listed species. Results of the habitat assessment are summarized in **Table 5**. Additional habitat considerations and descriptions are found in Chapter 2. This section focuses on habitat present within the study area specifically associated with federally-listed species.

5.2 National Domestic Listing Workplan Species and Suitable Habitats

There are 30 species identified in the fiscal year 2021-2025 Workplan that occur in Arkansas (**Attachment I**). These species are identified in **Table 5** along with a brief description of their preferred habitat. Detailed accounts of the species on the Workplan that could potentially be located within the action alternatives are discussed in this section.

Table 5: Workplan Species and Preferred Habitat

Common Name	Scientific Name	Preferred Habitat
Western fanshell	***Cyprogenia aberti***	**Rivers with gravel and rock substrates**
Ouachita fanshell	***Cyprogenia cf. aberti***	**Rivers with gravel and rock substrates**
Pink (Pyramid) pigtoe*	***Pleurobema rubrum***	**Rivers with gravel and rock substrates**
Salamander mussel	***Simpsonaias ambigua***	**Rivers, under large, flat rocks, fine mud**
Snuffbox*	***Epioblasma triquetra***	**Small to medium sized creeks, swift current**
Spectaclecase*	***Cumberlandia monodonta***	**Large rivers, firm mud, under rock slabs and roots**
Mammoth Spring crayfish	*Orconectes marchandi*	Medium, clear streams with well-defined riffles
Streamside salamander	***Ambystoma barbouri***	**Upland forests close to streams**
Longnose darter	***Percina nasuta***	**Large streams or small rivers with cobble/gravel**
Paleback darter	*Etheostoma pallididorsum*	Shallow pools, gravel bottoms, spring-fed streams
Caddo madtom	*Noturus taylori*	Shallow, gravel bottom pools, clear upland streams
Colorless shiner	*Notropis perpallidus*	Deep pools in moderate, warm clear rivers
Ozark shiner	***Notropis ozarcanus***	**High-gradient stream sections below riffles**
Rocky shiner	*Notropis suttkusi*	Moderate-high gradient, clear rivers/streams
Little brown bat	***Myotis lucifugus***	**Buildings, caves, trees, rocks and wood piles**
Northern long-eared bat	***Myotis septentrionalis***	**Caves, mines, trees, cliffs, buildings, barns, bridges**
Tricolored bat	***Perimyotis subflavus***	**Caves, trees, cliffs, buildings, barns**
Prairie gray fox	*Urocyon cinereoargenteus ocythous*	Forested areas, grasslands, riparian zones along tributaries

Common Name	Scientific Name	Preferred Habitat
Plains spotted skunk	***Spilogale putorius interrupta***	**Open grasslands, brushy areas, cultivated land**
Illinois chorus frog	***Pseudacris illinoensis***	**Sand prairies, sandy agricultural fields**
Alligator snapping turtle*	***Macroclemys temmincki***	**Deep rivers, steep banks, lakes, swamps**
Blanding's turtle	***Emydoidea blandingii***	**Wetlands, marshes, creeks, sloughs, pond edges**
Western chicken turtle	***Deirochelys reticularia miaria***	**Lakes, swamps, ephemeral bodies of water**
Golden-winged warbler	***Vermivora chrysoptera***	**Shrubby habitat near tall forests, close to water**
Monarch butterfly**	***Danaus plexippus***	**Open fields, meadows, weedy areas roadsides**
Linda's roadside skipper	***Amblyscirtes linda***	**Woodland streams**
Regal fritillary	***Speyeria idalia***	**Tall-grass prairie, damp meadows, wet fields**
Frosted elfin butterfly	***Callophrys irus***	**Open woods, forested edges, fields, scrub areas**
Small-headed pipewort	***Eriocaulon kornickianum***	**Sandy perm. moist seeps, depressions over granite**
Texas trillium	***Trillium pusillum texanum***	**Hardwood bottoms, seeps, borders of streams**

*Species has court-ordered dates associated with it. Court-ordered dates apply to those species with court-ordered deadlines and final listing determinations. **Monarch butterfly covered in Chapter 3.

Bolded entries are species with suitable habitat within the action alternatives.

The Black River provides suitable habitat for nine of the Workplan-listed mussel, fish, and turtle species. Suitable habitats within the river include gravel, rock, and mud substrates, and substrates with flat rocks and roots. The Black River provides suitable mussel habitat as well as suitable habitat for the alligator snapping turtle and for fish listed in the Workplan. Summer roosting forest and structure habitat consistent with the habitat requirements of federally-listed bat species would be considered suitable habitat for the Workplan-listed bat species. Brushy areas along field edges and forest edges within the action alternatives provide suitable habitat for the butterfly, bird, frog, and skunk species listed in the Workplan. Bottomland hardwoods (forested wetlands) within the action alternatives could provide suitable habitat for the two Workplan plant species. Ephemeral ditches and emergent wetlands located within the action alternatives could provide suitable habitat for the other Workplan-listed turtle species.

***Cyprogenia aberti* (Conrad, 1850) – Western Fanshell and Ouachita Fanshell**

Harris et al. (2010) chose to recognize specimens from the Black and St. Francis Rivers in Arkansas as *Cyprogenia stegaria* (Rafinesque, 1820) which was subsequently proven incorrect by Chong et al. (2016). Based on Roe and Chong (2014), Arkansas populations of *C. aberti* are considered to represent two taxa (K. J. Roe, Iowa State University, personal communication). *Cyprogenia aberti sensu stricto* occurs (or previously occurred) in the Arkansas, St. Francis, and White River drainages. *Cyprogenia sp. cf aberti* is restricted to the Ouachita River drainage. To determine their conservation status, Harris and Posey (2015) evaluated the two taxa envisioned by Roe and Chong as *Cyprogenia aberti* (Arkansas, St. Francis, White) and *Cyprogenia sp. cf aberti* (Ouachita). The form that occurs in the Black River received a statewide conservation rank of S3, Vulnerable - At moderate risk of extirpation due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors. Rust (1993) data found *C. aberti* with a similar distribution to *Theliderma cylindrica* in that it occurred primarily over approximately 20 river miles between Black Rock and Pocahontas in the portion of the Black River that closely abuts the Ozark Highlands Central Plateau (Woods et al., 2004), and in habitat composed of more gravel and rock substrates. One individual of this species was collected at Alternative 2 during the mussel survey conducted within the Black River for this project (**Attachment D**). No individuals were collected at Alternative 3.

***Pleurobema rubrum* – Pink/Pyramid Pigtoe**
Like many *Pleurobema* species, *Pleurobema rubrum* identification with certainty is difficult given the paucity of conchological identifying characters and the proclivity for environment driven morphological variation. Various museum specimens from Black River localities have been tentatively identified as *P. rubrum* (e.g., Ohio State University Museum of Zoology (OSUM) 47681, OSUM 47941, OSUM 79505; Arkansas State University Museum of Zoology (ASUMZ) Lot 587, ASUMZ Lot 1067, and ASUMZ Lot 1117). Rust (1993) did not identify any specimens from the Black River as *P. rubrum*; however, he found *P. sintoxia* (as *P. coccineum*) to be widespread but not abundant within his study area (19 major beds, 4 minor beds; relative abundance 0.2%-4.6% within mussel beds). This species was not found during the mussel survey conducted within the Black River for this project (**Attachment D**).

***Simpsonaias ambigua* – Salamander Mussel**
Simpsonaias ambigua is a diminutive species that is found under large, flat rocks, often in fine mud, and it has also been reported living inside dead shells of larger species (McMurray et al., 2012). A relict shell was found in the Black River at Black Rock (North Carolina Museum of Natural Sciences as NCSM 88702), but no live specimens have been reported from the Black River (Harris et al., 2010). There is the potential for *Simpsonaias ambigua* to occur at both the Alternative 2 and Alternative 3 proposed crossings of the Black River. However, this species was not found during the mussel survey conducted within the Black River for this project (**Attachment D**).

***Epioblasma triquetra* – Snuffbox (Not Identified in the IPaC system)**
A long, but sporadic, collection history for the snuffbox appears in the 300-RM Black. Pre-1980 records exist for sites in Lawrence County, Arkansas, and Butler County, Missouri, where the species is thought to be extant only near the headwaters in the Ozark Plateaus. A single live male (1.5 inches, ~4 years) was collected in Wayne County, Missouri among 51 Missouri sites sampled in 2002 (Hutson and Barnhart, 2004). The species has become extirpated from the lower river on the Mississippi Embayment including Arkansas (Butler, 2007). Some *Epioblasma triquetra* museum collection records from the Black River in Arkansas are based on misidentifications (e.g., Museum of Comparative Zoology 268260) (Harris et al., 2007; Harris, unpublished data). Most museum records are from "Pocahontas" or "Black Rock" and date prior to 1990. It is considered doubtful that *Epioblasma triquetra* occurs at the proposed Black River project crossings, and the proposed project is not likely to affect the species (Harris, 2021). This species was not found during the mussel survey conducted within the Black River for this project (**Attachment D**).

Cumberlandia monodonta* – Spectaclecase
The spectaclecase mussel can grow as large as nine inches and has an elongated shape that is sometimes curved. This mussel species is found in larger rivers, often in clusters in firm mud, under rock slabs, and tree roots in sheltered areas (USFWS, 2019). Most populations are reported as small and geographically isolated in short stream reaches. Suitable habitat for the spectaclecase is found within the Black River in or near the proposed crossings of Alternatives 2 and 3. However, this species was not found during the mussel survey conducted within the Black River for this project (**Attachment D**). No other suitable habitat is located within any of the action alternatives.

***Orconectes marchandi* – Mammoth Spring Crayfish**
The Mammoth Spring crayfish is a reddish-brown crayfish with pincers that have black specks on the basal parts. This crayfish is found only in the Spring River near Mammoth Spring. No suitable habitat is located within the action alternatives.

***Ambystoma barbouri* – Streamside Salamander**
The streamside salamander is typically brownish-gray to black, has small light gray speckles and can grow to 5.5 inches in length. This salamander species is found in upland forests near streams (Conant et al., 1998). Few upland forests located near streams are documented within the action alternatives, but those present could provide suitable habitat.

***Percina nasuta* – Longnose Darter**
The longnose darter is a small darter of four inches in length with an elongated snout and head. Its coloration is yellowish with 10-14 vertical blotches. This species occupies streams and river with high water quality and gravel or large cobble substrates (ODWC, 2021). Suitable habitat within the Alternatives 2 and 3 proposed crossings of the Black River is possible.

***Etheostoma pallididorsum* – Paleback Darter**
The paleback darter is a slender darter with a large head and has a distinct pale stripe extending along the middle of the back. This species only occurs within the upper Caddo River and tributaries in Arkansas. There is no suitable habitat within the action alternatives.

***Noturus taylori* – Caddo Madtom**
The Caddo madtom is slender madtom that is white with black saddles. It inhabits clear, shallow pools with gravel substrates of upland streams. Preferred sections of streams include those where riffles exist below well-compacted gravel areas where it lives under rocks (Robinson and Buchanan, 1988). No upland streams with clear, shallow pools were identified within the action alternatives.

***Notropis perpallidus* – Colorless Shiner**
The colorless shiner is a small shiner that inhabits pools and slower moving runs within small to medium sized rivers of the Quachita and Red River drainages in Arkansas. It can be found in still water near vegetation (Page and Burr, 1991). These river systems are not located close to the action alternatives and therefore this species' habitat is not anticipated to be encountered.

***Notropis ozarcanus* – Ozark Shiner**
The Ozark shiner is a silvery shiner with large eyes and is endemic to the Ozark uplands of northern Arkansas. It prefers high-gradient streams below riffles in large streams and rivers and occurs within the White and Black River systems. Suitable habitat within the Black River may occur within Alternative 2 and 3 proposed crossings.

***Notropis suttkusi* – Rocky Shiner**
The rocky shiner is a small shiner that inhabits clear, moderate to high gradient streams with gravel and rubble substrates within the Ouachita uplands. The project is not located within the Ouachita region of Arkansas and is therefore not anticipated to be encountered by the project.

***Myotis lucifugus* – Little Brown Bat**
The little brown bat is a small *Myotis* species that feeds on aquatic insects such as mayflies, caddisflies, mosquitos, and midges (Bat Conservation International, 2021). This bat species roosts in large colonies in buildings, caves, wood piles, and trees. Suitable habitat for this species would be consistent with the habitat requirements of the Northern Long-eared Bat and other federally-listed bat species within the action alternatives.

***Myotis septentrionalis* – Northern Long-eared Bat**
This species and its suitable habitat is previously described in Chapter 3.

***Perimyotis subflavus* – Tricolored Bat**
The tricolored bat is formerly known as the eastern pipistrelle and is a small pale reddish-brown bat commonly found hibernating in moist caves during winter months. Summer roosting habitat includes trees, cliffs, barns, and buildings (MDC, 2021). Suitable habitat for this species would be consistent with the habitat requirements of the northern long-eared bat and other federally-listed bat species within the action alternatives.

***Urocyon cinereoargenteus ocythous* – Prairie Gray Fox**
The prairie gray fox is a subspecies of the gray fox and is characterized by grayish fur on the upper body and a black tipped tail. This species can be found in forest habitat and grassland areas where it uses dens year-round and feed on small rodents and mammals, birds, and reptiles (77 FR 71759, December 4, 2012). Suitable grassland areas are marginal within the action alternatives.

***Spilogale putorius interrupta* – Plains Spotted Skunk**
This skunk species historically lived throughout much of the plains of the United States. It has a slender body and a triangle patch on the forehead. They live in dens below the ground in grassy banks and fence rows, haystacks, woodpiles, and brush heaps (MDC, 2021). They are found in open grasslands, cultivated areas, and brushy areas. Potentially suitable habitat is located throughout the action alternatives as it contains over 90% cultivated areas.

***Pseudacris illinoensis* – Illinois Chorus Frog**
The Illinois chorus frog is a small tan to gray frog with black lines on the back. It inhabits sand prairies and remnants of sandy agricultural fields. After burrowing in sandy areas, it emerges after significant rains in early spring to breed in ditches, ponds, and flooded fields (Prairie Research Institute, 2021). Some of the agricultural fields located within the action alternatives could be sandy in nature as identified by Natural Resources Conservation Service soils survey data and many are flooded during certain times of the year, which would provide suitable habitat for this species.

***Macroclemys temmincki* – Alligator Snapping Turtle**
The alligator snapping turtle is a large, aquatic turtle and is found in deep water habitats of deep rivers, swamps, and lakes (Fuller and Somma, 2021). This is the largest freshwater turtle in the United States and reaches lengths of 31.5 feet and 251 pounds (Pritchard, 1989; Conant and Collins, 1998). The Black River is the predominant hydrology feature providing suitable habitat for this species within Alternatives 2 and 3.

***Emydoidea blandingii* – Blanding's Turtle**
This species is a medium sized turtle inhabiting wetlands of shallow water and abundant aquatic vegetation. It also typically inhabits wet prairies, sloughs creeks, and ponds (Purdue University, 2021). Suitable habitat in the form of temporarily flooded fields, sloughs and banks of the Black River and streams is located within the action alternatives.

***Deirochelys reticularia miaria* – Western Chicken Turtle**
The western chicken turtle is an aquatic turtle species found in bodies of freshwater with aquatic vegetation. Its commonly found in lakes, marshes, ephemeral bodies of water, and flooded forests (Texas Turtles, 2021). Riparian zones of the Black River, soughs, and ephemeral field ditches could provide suitable habitat for this species within the action alternatives.

***Vermivora chrysoptera* – Golden-Winged Warbler**
The golden-winged warbler is considered very uncommon in the eastern side of the state (Douglas and Neal, 1986). This species is found in shrubby areas near the edges of taller forests and close to water

(Cornell Lab of Ornithology, 2021). Suitable habitat consisting of taller forests near water are found the Black River riparian zones, wooded agricultural drainage features, and wooded fencerows are located within action alternatives.

***Danaus plexippus* – Monarch Butterfly**
The monarch butterfly inhabits fields, meadows, marshes, and roadside ditches (Lotts and Naberhaus, 2021). Some of the action alternatives have fallow fields and emergent wetlands that would be considered suitable habitat as these areas have the potential to contain milkweed and other flowering plants the species needs to service and reproduce.

***Amblyscirtes linda* – Linda's Roadside Skipper**
Linda's roadside skipper can be found near woodland streams (Lotts and Naberhaus, 2021). Woodland streams and wooded riparian zones of agricultural ditches are located within the action alternatives and would be considered suitable habitat.

***Speyeria idalia* – Regal Fritillary**
The regal fritillary is found in tall-grass prairies, open sites, and damp meadows and wet fields (Lotts and Naberhaus, 2021). There are no tall-grass prairies within the action alternatives; however, there are wet fields throughout all the action alternatives.

***Callophrys irus* – Frosted Elfin Butterfly**
This butterfly species is found along forest edges, open wooded areas, fields, and scrub habitat (Lotts and Naberhaus, 2021). These habitat types are located within the action alternatives and would be considered suitable habitat.

***Eriocaulon kornickianum* – Small-headed Pipewort**
The small-headed pipewort is a plant that can be found in wet depressions overlying granite flatrocks and bare rock, and in Arkansas, near upland sandstone glade seeps, sandy hillside seeps, and permanently moist, acidic, sandy seeps. No such habitat was identified within the action alternatives.

***Trillium pusillum texanum* – Texas Trillium**
This plant species is found in bottomland hardwood forested areas and borders of ravine streams. The action alternatives contain bottomland hardwood forests predominantly within the riparian zones of the Black River.

5.3 Environmental Consequences

No Action Alternative

The No Action Alternative would have no effect on Workplan-listed species beyond what would be proposed for improvements deemed necessary by governing officials.

Alternative 2

For the Workplan-listed bat, insect, and aquatic species with suitable habitat within the action alternatives, Alternative 2 would have the same direct and indirect impacts as those identified for federally-listed bat, insect, and aquatic species. Approximately 2.7 acres of suitable Streamside Salamander habitat would be directly impacted by clearing and grading activities for roadway construction and ROW clearing. Approximately 2,086 acres of suitable habitat for the habitat generalist species (plains spotted skunk, regal fritillary, frosted elfin butterfly) would be directly impacted by clearing and grading activities for roadway construction and ROW. An estimated 40.4 acres of suitable

Blanding's turtle and western chicken turtle habitat would be directly impacted by clearing and grading activities. An estimated 834 acres of suitable Illinois chorus frog habitat would be directly impacted by clearing and grading activities for roadway construction and ROW. Approximately 46 acres of suitable Texas trillium habitat would be directly impacted by clearing and grading activities.

Alternative 3

For the Workplan-listed bat, insect, and aquatic species with suitable habitat within the action alternatives, Alternative 3 would have the same direct and indirect impacts as those identified for federally-listed bat, insect, and aquatic species. Approximately 6.9 acres of suitable Streamside Salamander habitat would be directly impacted by clearing and grading activities for roadway construction and ROW. Approximately 2,213 acres of suitable habitat for the habitat generalist species (plains spotted skunk, regal rritillary, frosted elfin butterfly) would be directly impacted by clearing and grading activities for roadway construction and ROW. An estimated 28.2 acres of suitable Blanding's turtle and western chicken turtle habitat would be directly impacted by clearing and grading activities for roadway construction and ROW. An estimated 19 acres of suitable Illinois chorus frog habitat would be directly impacted by clearing and grading activities. Approximately 41 acres of suitable Texas trillium habitat would be directly impacted by clearing and grading activities.

Alternative A

For the Workplan-listed bat, insect, and aquatic species with suitable habitat within the action alternatives, Alternative A would have the same direct and indirect impacts as those identified for federally-listed bat, insect, and aquatic species. Approximately 128 acres of suitable habitat for the habitat generalist species (plains spotted skunk, regal fritillary, frosted elfin butterfly) would be directly impacted by clearing and grading activities. An estimated four acres of suitable Blanding's turtle and western chicken turtle habitat would be directly impacted by clearing and grading activities. Approximately 11 acres of suitable Illinois chorus frog habitat would be directly impacted by clearing and grading activities. Approximately three acres of suitable Texas trillium habitat would be directly impacted by clearing and grading activities. Impacts to other Workplan-listed species are not anticipated due to lack of habitat within Alternative A.

Alternative B

For the Workplan-listed bat, insect, and aquatic species with suitable habitat within the action alternatives, Alternative B would have the same direct and indirect impacts as those identified for federally-listed bat, insect, and aquatic species. Approximately 113 acres of suitable habitat for the habitat generalist species (plains spotted skunk, regal fritillary, frosted elfin butterfly) would be directly impacted by clearing and grading activities for roadway construction and ROW. An estimated 10 acres of suitable Blanding's turtle and western chicken turtle habitat would be directly impacted by clearing and grading activities. Approximately 11 acres of suitable Texas Trillium habitat would be directly impacted by clearing and grading activities.

Alternative C

For the Workplan-listed bat, insect, and aquatic species with suitable habitat within the action alternatives, Alternative C would have the same direct and indirect impacts as those identified for federally-listed bat, insect, and aquatic species. Approximately 147 acres of suitable habitat for the habitat generalist species (plains spotted skunk, regal fritillary, frosted elfin butterfly) would be directly impacted by clearing and grading activities for roadway construction and ROW. An estimated 5.3 acres of suitable Blanding's turtle and western chicken turtle habitat would be directly impacted by clearing and grading activities. Approximately six acres of suitable Texas trillium habitat would be directly impacted by clearing and grading activities.

5.4 Avoidance, Minimization, and Mitigation

As mentioned earlier, the larger conceptual level alternative corridors were refined to 400 feet in width and evaluated as proposed ROW. The proposed ROW of the action alternatives were identified to minimize or avoid impacts to forested wetlands, T&E species habitat, conservation areas, and major gas pipelines. Locations of other resources within and near the action alternatives' proposed ROWs were also considered, such as floodplains and the ability to achieve perpendicular crossings of the Black River. Avoidance and mitigation of state-listed species habitat includes the same as those identified for the federally-listed species. BMPs to control off-site sedimentation would be implemented to ensure off-site areas would not be impacted.

Chapter 6 – References

6.1 Acronyms

AGFC	Arkansas Game and Fish Commission
AMM	Avoidance and Minimization Measures
ANHC	Arkansas Natural Heritage Commission
ARDOT	Arkansas Department of Transportation
ASUMZ	Arkansas State University Museum of Zoology
BMPs	Best Management Practices
BO	Biological Opinion
BRM	Black River Mile
CFR	Code of Federal Regulations
CR	County Road
DBH	Diameter at Breast Height
DEIS	Draft Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ERW	Extraordinary Resource Water
ESA	Endangered Species Act
FHWA	Federal Highway Administration
FR	Federal Register
LF	Linear Feet
LSP	Lateral Scour Pool
MBTA	Migratory Bird Treaty Act
MDC	Missouri Department of Conservation
NLCD	National Land Cover Dataset
OSUM	Ohio State University Museum of Zoology
PAA	Project Action Area
RCB	Reinforced Concrete Box
ROW	Right of Way
SE	State Endangered
SP	Special Provision
ST	State Threatened
T&E	Threatened and Endangered
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WMA	Wildlife Management Area

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