

# Environmental Assessment for the Designation of Critical Habitat for the Louisiana Pigtoe (*Pleurobema riddellii*)

Draft Report



Prepared for:



August 2023

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## ACRONYMS AND ABBREVIATIONS

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Full Phrase

BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
BLM	United States Department of the Interior, Bureau of Land Management
CEQ	Council on Environmental Quality
COE	United States Army Corps of Engineers
CWA	Clean Water Act of 1977
DOI	United States Department of the Interior
EA	environmental assessment
EMPSi	Environmental Management and Planning Solutions, Incorporated
EO	Executive Order
ESA	Endangered Species Act of 1973
EPA	United States Environmental Protection Agency
NEPA	National Environmental Policy Act of 1969
PBF	physical and biological feature
ppt	parts per thousand
USFWS	United States Department of the Interior, Fish and Wildlife Service

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# Chapter I. Introduction

The purpose of this environmental assessment (EA) is to analyze the environmental consequences that may result from the designation of critical habitat for the Louisiana pigtoe (*Pleurobema riddellii*), a freshwater mussel. On March 20, 2023, the United States (U.S.) Department of the Interior (DOI), Fish and Wildlife Service (USFWS) published a proposed rule to list the Louisiana pigtoe as threatened under the Endangered Species Act of 1973 (ESA), as amended (USFWS 2023a). It is the USFWS's position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, USFWS does not need to prepare environmental analyses pursuant to the National Environmental Policy Act of 1969 (NEPA; 42 U.S. Code 4321 *et seq.*) in connection with designating critical habitat under the ESA. However, when the range of the species includes states within the Tenth Circuit, in this instance Oklahoma, under the Tenth Circuit ruling in *Catron County Board of Commissioners v. U.S. Fish and Wildlife Service*, 75 F.3d 1429 (10th Cir. 1996), the USFWS will undertake a NEPA analysis for critical habitat designation.

This EA will be used by the USFWS to decide whether critical habitat will be designated as proposed or if further refinements or analyses are needed. If the proposed action is selected as described, or with minimal changes, and no further environmental analyses are needed, a finding of no significant impact would be prepared. If significant impacts are found, or major changes are needed, an environmental impact statement would be prepared. This EA presents the purpose of and need for critical habitat designation, the proposed action, and an evaluation of the direct, indirect, and cumulative effects of the alternatives, pursuant to the NEPA, as implemented by the Council on Environmental Quality (CEQ) regulations (40 CFR 1500, *et seq.*) and according to DOI NEPA procedures (43 CFR 46).

## I.1 PURPOSE OF AND NEED FOR ACTION

The purpose of the action is to propose critical habitat for the Louisiana pigtoe. The proposed designation of critical habitat identifies six geographic areas that are consistent with the definition of critical habitat.

The need for action is that the Louisiana pigtoe is threatened by a combination of factors, including changes to water quality, altered hydrology, habitat structure and substrate changes, and habitat fragmentation; these are all exacerbated by climate change (USFWS 2023a). Predation and collection, as well as other natural or human-induced events or activities that result in direct mortality, are also affecting those populations already experiencing low stream flow. In addition, reservoirs and instream barriers to fish movement limit dispersal and prevent recolonization after stochastic<sup>1</sup> events.

## I.2 PROPOSED ACTION

The proposed action is to designate six geographic units as critical habitat for the Louisiana pigtoe. These critical habitat units contain features that the USFWS considers essential to the conservation of the species. These units are in Little River, Sevier, and Howard Counties, Arkansas; Allen, Rapides, St. Tammany, Vernon, and Washington Parishes, Louisiana; Marion and Pearl River Counties, Mississippi; McCurtain County, Oklahoma; and Anderson, Angelina, Cherokee, Gregg, Hardin, Harrison, Houston,

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<sup>1</sup> Randomly determined; having a random probability distribution or pattern that may be analyzed statistically but may not be predicted precisely.

Jasper, Jefferson, Liberty, Montgomery, Nacogdoches, Orange, Panola, Polk, Rusk, Smith, Trinity, Tyler, Upshur, and Wood Counties, Texas.

The six units are comprised of 16 subunits. In total, 1,028 miles (1,654 kilometers) of rivers are being considered for designation as Louisiana pigtoe critical habitat. For the purposes of critical habitat designation, a unit was determined to be occupied if it contains one or more live Louisiana pigtoe. All units are currently occupied by Louisiana pigtoe.

**Table I-1. Size and Ownership of Units under Consideration for Proposed Critical Habitat for Louisiana Pigtoe**

State	Unit	Subunit <sup>1</sup>	Proposed Critical Habitat Area (River Miles)			
			Total	Ownership		
				Private	State	Federal
AR, OK	LAPT-1: Red River Basin	LAPT-1a: Upper Little River	88	58	1	29
AR		LAPT-1b: Rolling Fork	30	30	0	0
AR		LAPT-1c: Cossatot River	47	34	0	7
AR		LAPT-1d: Saline River	43	43	0	0
TX	LAPT-2: Sabine River Basin	LAPT-2a: Upper Sabine River	110	106	2	2
LA		LAPT-2b: Anacoco Bayou	12	12	0	0
TX	LAPT-3: Neches River Basin	LAPT-3a: Upper Neches River	200	178	0	22
TX		LAPT-3b: Upper Angelina River	67	34	0	34
TX		LAPT-3c: Lower Neches River	76	67	5	4
TX		LAPT-3d: Village Creek	55	11	1	43
TX		LAPT-3e: Big Sandy Creek	44	2	0	42
TX	LAPT-4: San Jacinto River Basin	LAPT-4a: East Fork San Jacinto River	23	23	0	0
LA	LAPT-5: Calcasieu River Basin	LAPT-5a: Upper Calcasieu River	92	72	0	20
LA		LAPT-5b: Whisky Chitto Creek	22	0	22	0
LA		LAPT-5c: Tenmile Creek	32	31	1	0
LA, MS	LAPT-6: Pearl River Basin	LAPT-6a: Lower Pearl River	87	38	12	37
<b>Total River Miles<sup>2</sup></b>			<b>1,028</b>	<b>739</b>	<b>44</b>	<b>240</b>

Source: USFWS GIS 2023

<sup>1</sup> LAPT = Louisiana pigtoe subunit under consideration for proposed critical habitat

<sup>2</sup> Totals may not accurately sum due to rounding



## **I.3 BACKGROUND**

### **I.3.1 Critical Habitat**

#### ***Provisions of the Endangered Species Act***

ESA section 3(5)(A) defines critical habitat as: (i) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the provisions of section 4 of the ESA, on which are found those physical or biological features (1) essential to the conservation of the species and (2) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by a species at the time it is listed in accordance with the provisions of section 4 of the ESA, upon the determination by the Secretary of the Interior that such areas are essential for the conservation of the species.

ESA section 4(b)(2) states that designation of critical habitat will be made “on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impact, of specifying any particular area as critical habitat.” Section 4(a)(3) of the ESA states that critical habitat shall be designated to the maximum extent prudent and determinable and that such designation may be revised periodically as appropriate. A critical habitat designation also describes the physical and biological features (PBFs) essential for species conservation.

The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation does not require implementation of restoration, recovery, or enhancement measures by nonfederal landowners.

#### *Section 4(b)(2) Exclusion Process*

Section 4(b)(2) of the ESA states the Secretary of the Interior may exclude any area from the critical habitat designation after considering the economic, national security, or other relevant impacts of designating the area as critical habitat or if the Secretary determines that the benefit of excluding the area exceeds the benefit of designating it as critical habitat, unless she determines, based on the best scientific and commercial data available, that the failure to designate such area as critical habitat will result in the extinction of the species concerned.

#### *Section 7 Consultation*

The primary means by which critical habitat designation may serve to protect the Louisiana pigtoe is through the ESA section 7 consultation process. Section 7(a)(2) of the ESA requires federal agencies to consult with the USFWS to “insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined to be critical.” Section 7 of the ESA does not apply to tribal, state, local, or private land unless there is a federal nexus (i.e., federal funding, authorization, or permitting).

A federal agency responsible for a proposed action begins the ESA section 7 consultation process by determining the effects of the proposed action on both listed species and designated critical habitat. If the federal action agency determines that there would be no effect on listed species or designated critical habitat, then no consultation is necessary.

If it is determined that the proposed federal action may affect a listed species or critical habitat, the federal action agency and the USFWS typically enter into informal section 7 consultation. Informal consultation is

an optional process for identifying affected species and critical habitat, determining potential effects, and exploring ways to modify the action to remove or reduce adverse effects on listed species or critical habitat (50 CFR 402.13). The informal section 7 consultation process concludes in one of two ways: 1) the USFWS concurs in writing that the proposed action is not likely to adversely affect listed species or critical habitat; or 2) adverse impacts are likely to occur, and formal consultation is initiated.

Formal consultation is initiated when it is determined that the proposed federal action is likely to adversely affect listed species or critical habitat (50 CFR 402.14). Formal consultation assesses whether the proposed federal action is likely to jeopardize the continued existence of a listed species or to destroy or adversely modify critical habitat (50 CFR 402.14[h]). Formal consultation concludes with a biological opinion issued by the USFWS on whether the proposed federal action is likely to jeopardize the continued existence of a listed species or to destroy or adversely modify critical habitat (50 CFR 402.14[h]). Independent analyses are made under both the jeopardy and the adverse modification standards.

A “nonjeopardy” or “no adverse modification” opinion concludes consultation, and the proposed action may proceed under the ESA. The USFWS may prepare an incidental take statement with reasonable and prudent measures to minimize take of non-plant species and associated, mandatory terms and conditions that describe the methods for accomplishing the reasonable and prudent measures. Discretionary conservation recommendations may be included in a biological opinion based on the effects on the species. Conservation recommendations, whether they relate to the jeopardy or adverse modification standard, are discretionary actions recommended by the USFWS. These recommendations may minimize adverse effects on listed species or critical habitat, identify studies or monitoring, or suggest how action agencies can assist species under their own authorities and section 7(a)(1) of the ESA. There are no ESA section 9 prohibitions for critical habitat. Therefore, a biological opinion that concludes there is no anticipated destruction or adverse modification of critical habitat may contain conservation recommendations but would not include an incidental take statement, reasonable and prudent measures, or other terms and conditions.

In a biological opinion that results in a jeopardy or adverse modification conclusion, the USFWS develops mandatory reasonable and prudent alternatives to the proposed action. Reasonable and prudent alternatives are actions that the federal agency can take to avoid jeopardizing the continued existence of the species or adversely modifying the critical habitat. Reasonable and prudent alternatives may vary from minimal project changes to extensive redesign or relocation of the project, depending on the situations involved. Reasonable and prudent alternatives must be consistent with the intended purpose of the proposed action, and they also must be consistent with the scope of the federal agency’s legal authority. Furthermore, the reasonable and prudent alternatives must be economically and technically feasible. A biological opinion that results in an adverse modification finding (but no jeopardy to the species) may include reasonable and prudent alternatives and conservation recommendations but no incidental take statement or associated reasonable and prudent measures and terms and conditions.

### I.3.2 Louisiana Pigtoe<sup>2</sup>

#### **Species Description**

The Louisiana pigtoe is a medium-sized freshwater mussel (shell lengths to greater than 62 millimeters [2.4 inches]) with a brown to black, triangular to subquadrate shell without external sculpturing, sometimes with greenish rays. Burlakova et al. (2011) considered the species rare throughout its range. For a detailed description, see Howells et al. 1996 (pp. 91-92) and Howells 2014 (p. 65). Other native mussel species (e.g., pimpleback, *Cyclonaias pustulosa*; Texas pigtoe, *Fusconaia askewi*; Trinity pigtoe, *F. chunii*; and Wabash pigtoe, *F. flava*) can easily be mistaken for Louisiana pigtoe when identified by shell morphology alone. A recent survey suggested experienced malacologists had a 76 percent success rate accurately identifying the species in the Little River, Oklahoma, when field identifications were compared with genetic analysis results (USFWS 2022).

#### **Distribution**

The range of the Louisiana pigtoe is comprised of multiple river drainages throughout portions of southwest Arkansas, Louisiana, west Mississippi, southeast Oklahoma, and east Texas (Vidrine 1993; Howells et al. 1997; Randklev et al. 2013a, Randklev 2018). In Arkansas, the species has been recorded in the Cossatot, Saline, Rolling Fork, and Little Rivers (USFWS 2014, 2015a, 2017; Randklev 2018). Reported populations from the Ouachita River system in Arkansas were determined to be phylogenetically distinct from Louisiana pigtoe and are not considered in this report (Inoue et al. 2018). In Louisiana, the species has been recorded within the Amite, Bayou Boeuf, Calcasieu, Red, Sabine, and Pearl River systems (Vidrine 1993; Randklev et al. 2013b; Louisiana Natural Heritage Program 2018; Randklev 2018; Johnson et al. 2019). In Mississippi, the species has been observed in the Pearl River (Johnson et al. 2019). In Oklahoma, the species has been recorded in the mainstem of the Little River (Inoue 2018). In Texas, the Louisiana pigtoe has been recorded from several east Texas rivers, including the Big Cypress-Sulphur, Neches-Angelina, Sabine, San Jacinto, and Trinity River basins (Strecker 1931; Howells et al. 1996; Howells 1997, 2006; Burlakova et al. 2012; Ford 2013; Ford et al. 2014, 2016; Randklev 2018). The historical distribution of the species is estimated to have included the entirety of the river basins described above where connectivity was not an issue and conditions were suitable.

#### **Life History**

Louisiana pigtoe are bradyctictic (i.e., long-term brooders; spawning occurs during the summer, and glochidia<sup>3</sup> are held by the female over winter and released the following spring); however, gravid<sup>4</sup> females have been observed in July (Marshall 2014). The primary host fish for Louisiana pigtoe has not been confirmed. Bullhead minnow (*Pimephales vigilax*), blacktail shiner (*Cyprinella venusta*), and red shiner (*Cyprinella lutrensis*) have been suggested as potential fish hosts based on a fish host distribution modeling effort (Marshall 2014). A single juvenile Louisiana pigtoe from the Neches River, Texas, was reported to grow 15 millimeters (0.6 inches) during its first year from an initial shell length of 2 millimeters (0.08 inches) (Ford et al. 2016). Sexual maturity is achieved at shell lengths around 40 millimeters (1.6 inches) (Ford et al. 2016), and Louisiana pigtoe could reach maturity in 3 to 4 years. Based on egg production,

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<sup>2</sup> The references cited in this section are from the proposed rule (USFWS 2023a) and the Species Status Assessment Report (USFWS 2022) and are on file with USFWS.

<sup>3</sup> Microscopic larvae

<sup>4</sup> Pregnant

sexually mature females were estimated by external growth rings to be between 4 and 12 years of age, with shell lengths ranging from 29 to 59 millimeters (1.1 to 2.3 inches; Hinkle 2018).

### **Habitat**

Louisiana pigtoes occur in medium- to large-sized streams throughout portions of southwest Arkansas, Louisiana, west Mississippi, southeast Oklahoma, and east Texas (Vidrine 1993; Howells et al. 1997; Randklev et al. 2013b; Randklev 2018) in flowing waters (0.3 to 1.4 meters [0.98 to 4.6 feet] per second) over substrates of cobble and rock or sand, gravel, cobble, and woody debris; they are often associated with riffle, run, and sometimes larger backwater tributary habitats (Ford et al. 2016; Howells 2010; Williams et al. 2017). Specimens are typically found in shallower waters (0.1 to 1.2 meters [0.3 to 3.9 feet] deep; Howells 2010); however, recent surveys found Louisiana pigtoe as deep as 3.33 meters (10.9 feet) in the lower Neches River (Corbett 2020).

## **I.4 RELATED LAWS, AUTHORIZATIONS, AND PLANS**

### **I.4.1 Federal Laws, Authorizations, and Plans**

#### ***Endangered Species Act***

The Louisiana pigtoe was proposed for listing as endangered under the ESA (16 U.S. Code 1531 et. seq.) on March 20, 2023. Listing provides the opportunity for conservation and protection under sections 6, 7, 9, and 10 of the ESA. These sections include cooperative actions with states (section 6), consultation with federal agencies for actions that may affect the species (section 7[a][2]), protection against take<sup>5</sup> of the species (section 9), cooperative actions with other entities and landowners for the purpose of scientific or enhancement of survival activities involving take (section 10[a][1][A] permit); and lastly, habitat conservation planning under section 10(a)(1)(B).

#### ***Clean Water Act***

Congress passed the Federal Water Pollution Control Act Amendments of 1972 and the Clean Water Act (CWA) of 1977 to provide for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's lakes, streams, and coastal waters. Primary authority for the implementation and enforcement of the CWA now rests with the U.S. Environmental Protection Agency (EPA) and the United States Army Corps of Engineers (COE). In addition to the measures authorized before 1972, the CWA implements a variety of programs, including federal effluent limitations and state water quality standards, permits for the discharge of pollutants and dredged and fill materials into navigable waters, and enforcement mechanisms.

Section 404 of the CWA is the principal federal program that regulates activities affecting the integrity of wetlands. Section 404 prohibits the discharge of dredged or fill material in jurisdictional waters of the United States, unless permitted by the COE under section 404(a) (individual permits) or 404(e) (general permits), or unless the discharge is exempt from regulation as designated in section 404(f).

The limits of jurisdictional waters of the United States (the area covered under section 404) are determined by: 1) in the absence of adjacent wetlands, jurisdiction extends to the ordinary high-water mark; or 2) when adjacent wetlands are present, jurisdiction extends beyond the ordinary high-water

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<sup>5</sup> "Take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.

mark to the limit of the adjacent wetlands; or 3) when the water of the United States consists only of wetlands, jurisdiction extends to the limit of the wetland.

Section 402 of the CWA is the principal federal program that regulates activities affecting water quality. One of the most significant features of the CWA is the creation of a National Pollutant Discharge Elimination System. Except as otherwise provided in the CWA, industrial sources and publicly owned treatment works may not discharge pollutants into navigable waters without a permit. The EPA- or state-authorized programs may issue a permit for discharge upon condition that the discharge meets applicable requirements, which are outlined extensively in the CWA and which reflect, among other things, the need to meet federal effluent limitations and state water quality standards.

The COE regulates the discharge of fill material to waters of the United States, including Louisiana pigtoe habitat, pursuant to CWA section 404, and issues permits for actions proposed within such waters. Jurisdictional, nontidal waters of the United States regulated by the COE are defined in 33 CFR 328.4(c) as those that comprise the area of a water course that extends up to the ordinary high-water mark.

#### **Federal Land Policy and Management Act**

The Federal Land Policy and Management Act of 1976 requires that “. . . the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that. . . will preserve and protect certain public lands in their natural condition; (and) that will provide food and habitat for fish and wildlife . . .”

#### **National Forest Management Act**

The National Forest Management Act of 1976 directs that the National Forest System “...where appropriate and to the extent practicable, will preserve and enhance the diversity of plant and animal communities.” Additionally, section 219.12(g) requires the maintenance of viable populations of native vertebrates in National Forests.

#### **Organic Act**

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values (National Park Service 2006). The National Park Service must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise, and is required to analyze all proposed projects for potential impairment (National Park Service 2006). In addition, the National Park Service determines all management actions for the protection and perpetuation of federally, state, or locally listed species through the park management planning process and includes consultation with lead federal and state agencies as appropriate (National Park Service 2006).

### **1.4.2 State Wildlife Laws, Authorizations, and Plans**

#### **Texas**

The Louisiana pigtoe is listed as threatened by the Texas Parks and Wildlife Department (Texas Parks and Wildlife Department 2023). Under Texas Administrative Code (Title 31, Part 2, Chapter 65, Subchapter G, Rule 65.175), no person may take, possess, propagate, transport, import, export, sell, or offer for sale any species of fish or wildlife listed in this subchapter as threatened. Exceptions occur for those individuals who possess: (1) a copy of an out-of-state permit authorizing the possession of the specimens in the state of origin, valid at the time the specimen enters Texas; (2) a bill of sale identifying the source of the

specimen; or (3) a notarized affidavit stating the source of the specimen and that the specimen(s) was legally obtained. Texas statutes are not designed to address habitat protection, indirect effects, or other threats to state threatened or endangered species.

### **I.5 ISSUES FROM PUBLIC COMMENTS ON PROPOSED LISTING RULE**

Summaries of comments received during the public comment period on the proposed critical habitat designation for the Louisiana pigtoe are included in Chapter 5.

### **I.6 TOPICS ANALYZED IN DETAIL IN THIS ENVIRONMENTAL ASSESSMENT**

During internal scoping and via issues identified by public comments, several resources were identified as potentially affected by the proposed action. These resources are analyzed in Chapter 3, as follows:

1. Fish, wildlife, and vegetation
  - a. Threatened and endangered species
  - b. Migratory birds, including bald and golden eagles and Birds of Conservation Concern (BCC)
  - c. Common fish and wildlife
2. Forest resources
3. Floodplains and wetlands
4. Water use and management, including municipal water supplies and treatment, irrigation, and reservoir operation
5. Lands, including agriculture and travel management
6. Energy resources, including oil and gas
7. Cultural and historic resources
8. Socioeconomics
9. Environmental justice

### **I.7 TOPICS DISMISSED FROM DETAILED ANALYSIS**

Federal regulations (40 CFR 1500 et seq.) require that certain topics be addressed as part of a NEPA analysis. The USFWS reviewed the mandatory topics listed below and determined that the proposed action has no potential to affect them. As such, these topics are dismissed from detailed analysis in this document.

#### **I.7.1 Urban Quality and Design of the Built Environment**

The proposed critical habitat segments specifically exclude urban or other built environments by text and, therefore, would not affect the quality of such environments.

#### **I.7.2 Public Health and Safety**

Actions taken to protect and manage critical habitat for the Louisiana pigtoe would not introduce dangers likely to threaten public health or safety.

### **I.7.3 Climate Change**

Climate change could have an effect of unknown strength on Louisiana pigtoe but would likely exacerbate the negative effects. The effects of critical habitat designation on climate change would likely be insignificant.

Additional section 7 consultations resulting from critical habitat designation may require a very small increase in production of greenhouse gases in the form of fuel for vehicles used for fence construction or other conservation actions. However, the production would be so minor compared with other sources of greenhouse gases, the conservation actions would not contribute to climate change. It is unlikely that designation of critical habitat would result in conservation actions being taken in addition to the actions taken for recovering the population. Therefore, the impact of critical habitat designation on climate change would be insignificant.

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# Chapter 2. Alternatives

## 2.1 ALTERNATIVE A: NO ACTION

The no action alternative is defined as no designation of critical habitat for the Louisiana pigtoe. An analysis of a no action alternative is required by the NEPA and provides a baseline for analyzing effects of the action alternative(s). However, it is not clear that USFWS could, under the law, adopt the no action alternative. The ESA specifies that USFWS must designate critical habitat to the maximum extent prudent and determinable. The proposed rule indicates that critical habitat is prudent. However, analysis of the no action alternative is required by NEPA and describes the existing environment and consequences that are anticipated from the proposed species listing without critical habitat designation.

## 2.2 ALTERNATIVE B: CRITICAL HABITAT DESIGNATION (PROPOSED ACTION)

Under this alternative, approximately 1,028 miles (1,654 kilometers) would be designated as critical habitat for the Louisiana pigtoe in the states of Arkansas, Louisiana, Mississippi, Oklahoma, and Texas (**Appendix A, Figures I-6**). The proposed critical habitat units and approximate length and land ownership of each are shown in **Chapter I, Table I-1**. The occupied units include some or all of the PBFs essential to species conservation:

1. Water quality parameters within the following ranges:
  - a. Water temperature below 27 degrees Celsius (80.6 degrees Fahrenheit);
  - b. Dissolved oxygen levels greater than 3 milligrams per liter;
  - c. Low salinity (less than 2 parts per thousand [ppt]) and total dissolved solids;
  - d. Low total ammonia and nitrogen (below 0.3 to 0.7 milligrams per liter total ammonia nitrogen);
  - e. Low levels of copper, nickel, and other trace metals;
  - f. Low levels of pesticides, sulfate, chloride, potassium, and other harmful constituents; and
  - g. Low pollutants and environmental contaminants common to wastewater.
2. Moderately flowing water rates suitable to prevent excess sedimentation, but not so high as to dislodge individuals or sediment.
3. Stable bank and riffle habitats, point bars, and vegetated run habitat comprising sand, gravel, and larger cobbles.
4. Red shiner (*Cyprinella* [=Notropis] *lutrensis*), blacktail shiner (*Cyprinella venusta*), and bullhead minnow (*Pimephales vigilax*) present (USFWS 2023a).

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# Chapter 3. Affected Environment and Environmental Consequences

## 3.1 METHODOLOGY

Descriptions of the affected environment presented in this section are based on several sources, including:

- Published literature
- Available state and federal agency reports and management plans
- The proposed rule for listing the Louisiana pigtoe under the ESA (USFWS 2023a)
- The Species Status Assessment Report for Two Freshwater Mussels: Louisiana Pigtoe (*Pleurobema riddellii*) and Texas Heelsplitter (*Potamilus amphichaenus*) (USFWS 2022)
- Screening analysis of the likely economic impacts

The impacts evaluation in this chapter focuses on costs and outcomes of additional ESA section 7 consultations resulting from the designation of Louisiana pigtoe critical habitat beyond those consultations needed because of the species being listed under the ESA. The additional analysis can result in time delays for evaluating impacts on critical habitat and the species.

## 3.2 NATURE OF IMPACTS FROM CRITICAL HABITAT DESIGNATION

Impacts on the environment from designation of critical habitat stem from ESA section 7 consultation requirements. Under ESA section 7(a)(2), federal agencies are required to consult with the USFWS on actions that they fund, implement, or authorize that may affect listed species or critical habitat (50 CFR 402). The purpose of section 7 consultation, with respect to critical habitat, is to ensure that the actions of federal agencies do not destroy or adversely modify critical habitat. Critical habitat is defined as habitat that is essential for the conservation of a listed species. Critical habitat designation does not have any impact on the environment other than through the ESA section 7 consultation process. Critical habitat designation alone does not establish blanket rules or restrictions on land use, and it does not automatically prohibit or modify any activity.

Each proposed federal action that may potentially affect designated critical habitat is analyzed individually during the section 7 consultation process. Individuals, organizations, states, local governments, Tribes, Pueblos, and other nonfederal entities are potentially affected by the designation of critical habitat only if their actions occur on federal lands; require a federal permit, license, or other authorization; or involve federal funding. The potential for destruction or adverse modification of critical habitat is assessed by determining the effects of the proposed action on PBFs that are essential to the species' conservation. These anticipated effects are then analyzed to determine how they will influence the function and conservation role of the affected critical habitat unit. This analysis provides the basis for determining the significance of the proposed action's anticipated effects on critical habitat. The threshold for destruction or adverse modification is evaluated in the context of whether the critical habitat would remain functional to serve the intended conservation role for the species.

The currently occupied areas contain the essential PBFs and may require special management considerations or protections to maintain those PBFs.

Critical habitat designation would not require that any parties proactively undertake habitat restoration activities within the designated areas. However, during section 7 consultation, some conservation measures may be needed to avoid destruction or adverse modification.

The key factor related to an adverse modification determination would be whether, with implementation of the proposed federal action, the affected critical habitat would continue to serve its intended function and conservation role for the species. An adverse modification analysis focuses on a project's impacts on the PBFs essential for the conservation of the species, and analyzes impacts on the critical habitat unit's capability to maintain its conservation role and function for the species. From ESA section 3(3): "The terms "conserve," "conserving," and "conservation" mean to use and the use of all methods and procedures [that] are necessary to bring any endangered species or threatened species to the point at which the measures provided under the [ESA] are no longer necessary." Thus, critical habitat designation helps ensure that proposed project actions will not result in the adverse modification of habitat to the point that the species will not achieve recovery.

Incremental effects are those imposed by the critical habitat designation beyond those impacts imposed by species listing. Incremental effects are, therefore, the differences between actions required to avoid jeopardy to the species versus actions that may be required to avoid destruction or adverse modification of critical habitat.

Determining the impacts of a critical habitat designation involves evaluating the "without critical habitat" baseline versus the "with critical habitat" scenario, to identify those effects expected to occur solely due to the designation of critical habitat and not from the protections in place due to the species being listed under the ESA. Effects solely due to the critical habitat designation equal the difference, or increment, between these two scenarios, and include both (1) the effects of changes in the action to avoid destruction or adverse modification of critical habitat, and (2) the costs of increased administrative efforts that result from the designation. These changes can be thought of as "changes in behavior" or the "incremental effect" that would most likely result from the designation, if finalized. Specific measured differences between the baseline (without critical habitat) and the designated critical habitat (with critical habitat) may include, but are not limited to, the economic effects stemming from changes in land or resource use or extraction; changes in environmental quality; or the time and effort expended on administrative and other activities by federal landowners, federal action agencies, and in some instances, state and local governments or private third parties. These are the incremental effects that serve as the basis for the analysis.

The same federal agencies and project activities that would incur baseline costs for section 7 consultation to avoid jeopardy are expected to be the primary agencies and actions that would also consult with the USFWS under section 7 to avoid destruction of or adverse modification of critical habitat.

Project modifications that minimize effects on the Louisiana pigtoe in the absence of critical habitat designation would, in most cases, be the same as those implemented to minimize effects on designated critical habitat. Accordingly, in critical habitat where Louisiana pigtoe occur, it is unlikely that measures needed to avoid the destruction or adverse modification of critical habitat would differ from measures needed to avoid jeopardizing the species. Therefore, in critical habitat where the species occurs,

measurable incremental differences between an analysis without critical habitat (jeopardy analysis) and an analysis with critical habitat (adverse modification analysis) are not anticipated.

The USFWS recognizes the “geographical area occupied by the species” at the time of listing, as stated under ESA section 3(5)(A)(i), as the geographical area that may generally be delineated around the species’ occurrences (i.e., range), as determined by the Secretary of the Interior. Such areas may include those areas used throughout all or part of the species’ life cycle, even if not used on a regular basis (e.g., seasonal habitats, and habitats used periodically, but not solely, by vagrant individuals). The species may or may not be present within all areas of the geographical area occupied by the species. Thus, the “geographical area occupied by the species” can, depending on the species at issue and the relevant data available, be defined on a relatively coarse scale.

Section 7 consultation is required whenever there is a discretionary federal action that may affect listed species or designated critical habitat. Section 7(a)(3) also states that a federal agency shall consult with the Secretary of the Interior on any prospective agency action at the request of, and in cooperation with, the prospective permit or license applicant if the applicant has reason to believe that an endangered species or a threatened species may be present in the area affected by his project and that implementation of such action will likely affect such species. The initiation of section 7 consultation under the jeopardy standard takes place if the species may be present and the action is likely to affect the species.

Because of the relatively coarse scale of analysis allowed by the definition of “critical habitat,” the species may or may not be present within all portions of the “geographical area occupied by the species” or may be present only periodically. Therefore, at the time of any consultation under ESA section 7, the species of interest may not be present within the action area for the purposes of the section 7 consultation, even if that action area is within the “geographical area occupied by the species.” This possibility, however, does not change the “geographical area occupied by the species” stated under section 3(5)(A)(i). It must, however, be reflected in the USFWS’ analysis of the economic impacts of a critical habitat designation. How the USFWS implements each critical habitat designation under section 7 is important because, even when an area is determined to be within the general geographical area occupied by the species at the time of listing, the specific area where a consultation may occur is based on the presence of the species within the action area and the effects on that species. If a species is not present, and the action is not likely to adversely affect the species within a particular area designated as critical habitat at the time of consultation, then the effects of the consultation would likely be considered an incremental effect of the critical habitat; this is because, in almost all cases, the consultation would not have occurred absent the critical habitat designation. These incremental effects would derive both from changes in management, such as costs resulting from restrictions on development and other activities due solely to critical habitat, and changes in the scope of administrative review (i.e., the added costs of considering effects on critical habitat during consultation). Additional administrative costs would also occur in occupied areas due to the need to analyze destruction or adverse modification of critical habitat along with jeopardy to the species. When this EA describes occupancy for purposes of estimating the probable incremental impacts and, therefore, potential economic costs of critical habitat designation, it is referring to the occupancy status within the action area of a particular federal action at the time of an ESA section 7 consultation. In this context, the “geographical area occupied by the species” under section 3(5)(A)(i) and the area where a species may be present or may be affected by a particular federal action under a section 7 consultation may differ. The difference lies in the implementation of the critical habitat designation for purposes of the section 7

consultation; however, within the geographical range occupied by the species under ESA section 3(5)(A)(i), the species may or may not be present at the time of consultation.

Therefore, if an area is designated critical habitat because it is within the geographical area occupied by the species by the time of listing, but the species is not present at the time of consultation, then the ESA section 7 consultation would be necessary solely because of the existence of critical habitat.

These additional section 7 consultations would cause an increase in administrative effort to develop measures to avoid the adverse modification. Therefore, incremental costs would be both administrative costs and the actual costs for implementing measures needed to avoid adverse modification in unoccupied critical habitat areas.

Other impacts of additional or more complicated analysis could include the following:

1. Additional expenditures of effort and money by federal agencies, including the USFWS, to complete the ESA consultations.
2. Additional effort and costs to implement the reasonable and prudent alternatives specified in biological opinions in which adverse modification was concluded and (possibly) discretionary conservation recommendations were made.

### **3.3 CUMULATIVE EFFECTS**

Effects of proposed critical habitat designation for the Louisiana pigtoe on most resource areas generally consist primarily of the potential for minor increases in administrative effort for ESA section 7 consultations to incorporate critical habitat considerations and addition of project modifications to reduce impacts on physical and biological features. These potential project modifications would primarily affect project costs. The total estimated costs are not likely to exceed \$100 million (Industrial Economics, Inc. 2021). Therefore, they would not result in substantial cumulative effects when added to the effects of section 7 consultations for other species and land management plans and policies.

The CEQ defines cumulative effects as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7). The past, present, and reasonably foreseeable future actions in the proposed critical habitat area which could contribute to cumulative effects include:

- Effects of listing, critical habitat designation, and section 7 consultations for other species and other designated critical habitats; and
- Existing land management policies and plans.

Ongoing activities within the project area, such as oil and gas development and timber harvest, would continue to impact the resources identified and analyzed in this EA, with or without the designation of critical habitat.

Impoundments, agricultural activities, ongoing industrial activities, urban development, stormwater runoff, and wastewater discharges contribute to loss of water velocity (which removes sediments), inundation, excessive sedimentation, water quality degradation, groundwater withdrawals, and surface water

diversions (USFWS 2022). The past, present, and reasonably foreseeable projects that have the potential to affect critical habitat are discussed within the following resource topics.

### 3.4 FISH, WILDLIFE, AND VEGETATION

#### 3.4.1 Affected Environment

The occurrence of any given species, whether fish, wildlife, or plant, within the proposed critical habitat varies widely and depends on local and regional environmental conditions such as elevation, climate, stream type, water management activities, and proximity to land development or other human-induced disturbances.

#### **Federally Listed Species**

Federally listed species are species protected under the ESA. According to the USFWS Information, Planning, and Consultation Tool, 36 federally listed species have the potential to occur within the project area (USFWS 2023b). Of these, 16 species are aquatic or inhabit riparian areas affected by water flows within the proposed critical habitat (**Table 3-1**).

**Table 3-1. Aquatic or Riparian Species Protected under the Endangered Species Act within the Project Area**

Species	Status	States with Potential to Occur	Habitat Description	Critical Habitat
<b>Mammals</b>				
West Indian Manatee ( <i>Trichechus manatus</i> )	Threatened	TX	Warm-water sites, including springs, deep water areas, and areas thermally influenced by the Gulf Stream (USFWS 2001)	Yes; does not overlap with project area
<b>Birds</b>				
Eastern Black Rail ( <i>Laterallus jamaicensis</i> ssp. <i>jamaicensis</i> )	Threatened	AR, OK, TX	Wetland-dependent; dense overhead cover and soils that are moist to saturated (occasionally dry) and interspersed with or adjacent to very shallow water (typically ≤ 3 centimeters) (USFWS 2019)	No
Piping Plover ( <i>Charadrius melodus</i> )	Threatened	AR, OK, TX	Sparsely vegetated sandbars and reservoir shorelines on river systems, as well as on the shorelines of alkaline lakes in the Northern Great Plains (USFWS 2016)	Yes; does not overlap with the project area
<b>Reptiles</b>				
Alligator Snapping Turtle ( <i>Macrochelys temminckii</i> )	Proposed Threatened	AR, LA, MS, OK, TX	Early summer: shallow water. Late summer/mid-winter: deep water; large rivers, major tributaries, bayous, canals, swamps, lakes, ponds, and oxbows (USFWS 2021a).	No
Ringed Map Turtle ( <i>Graptemys oculifera</i> )	Threatened	LA, MS	Pearl River and its major tributaries, in Mississippi and Louisiana; requires basking structures (e.g., logs and snags) and suitable nesting habitat (large, high, sandbars adjacent to the river; USFWS 2020)	No

Species	Status	States with Potential to Occur	Habitat Description	Critical Habitat
<b>Fishes</b>				
Gulf Sturgeon ( <i>Acipenser oxyrinchus desotoi</i> )	Threatened	LA, MS	Majority of its life is spent in fresh water; migrates from salt water into large coastal rivers to spawn and spend the warm months (USFWS 1995)	Yes; overlaps with the project area
Leopard Darter ( <i>Percina pantherina</i> )	Threatened	AR, OK	Pools that have predominately rubble and boulder substrates with current velocities less than 48 centimeters per second and preferred water depths of approximately 20 to 102 centimeters (USFWS 2012)	Yes; does not overlap with the project area
<b>Clams</b>				
Inflated Heelsplitter ( <i>Potamilus inflatus</i> )	Threatened	LA, MS	Sand, gravel, mud, and silts within small streams to moderate-sized rivers (USFWS 2018a)	No
Ouachita Rock Pocketbook ( <i>Arcidens wheeleri</i> )	Endangered	AR, OK	Stable substrates containing gravel, sand, and other materials within pools, backwaters, and side channels of rivers and large creeks in or near the southern slope of the Ouachita Uplift (USFWS 2004)	No
Pink Mucket ( <i>Lampsilis abrupta</i> )	Endangered	AR, LA	Relatively silt-free substrates of sand, gravel, and cobble in good flows of smaller streams (USFWS 1985)	No
Rabbitsfoot ( <i>Quadrula cylindrica cylindrica</i> )	Threatened	AR, OK	Substrates include a mixture of sand and gravel in small- to medium-sized streams and some larger rivers, from depths up to 3 meters (USFWS 2023c)	Yes; overlaps with project area
Scaleshell Mussel ( <i>Leptodea leptodon</i> )	Endangered	AR, OK	Medium to large rivers with low to medium gradients; stable riffles and runs with gravel or mud substrate and moderate current velocity (USFWS 2010)	No
Texas Heelsplitter ( <i>Potamiulus amphichaenus</i> )	Proposed Endangered	TX	Substrates consisting of firm mud, sand, or finer gravel bottoms, in still to moderate flows in streams and rivers of the Trinity, Neches, and Sabine River drainages; sometimes associated with fallen timber (USFWS 2022)	Proposed; overlaps with project area
Winged Mapleleaf ( <i>Quadrula fragosa</i> )	Endangered	AR, OK	Inhabit relatively dense and diverse mussel beds with coarser and more compacted sediments (USFWS 2015b)	No
<b>Flowering Plants</b>				
Neches River Rose-mallow ( <i>Hibiscus dasycalyx</i> )	Threatened	TX	Along sloughs, oxbows, terraces, and sand bars of depressional or low-lying areas in the Neches River floodplains, Mud Creek, or Tatanbogue Creek; endemic to the open, wetland habitats of the East Texas Pineywoods ecoregion (USFWS 2018b)	Yes; does not overlap with the project area



Species	Status	States with Potential to Occur	Habitat Description	Critical Habitat
<b>Ferns and Allies</b>				
Louisiana Quillwort ( <i>Isoetes louisianensis</i> )	Endangered	LA	Sandy soils and gravel bars in or near shallow blackwater streams and overflow channels in riparian woodland/bayhead forests of pine flatwoods and upland longleaf pine (USFWS 1996)	No

Source: USFWS 2023

### **Birds of Conservation Concern and Migratory Birds**

All agencies are required to consider in planning documents, including NEPA documents, all BCC by Executive Order 13186. The Migratory Bird Treaty Act makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products. In addition, this act serves to protect environmental conditions for migratory birds from pollution or other ecosystem degradations. **Table 3-2** lists the BCC and migratory birds with the potential to occur in the project area.

**Table 3-2. Birds of Conservation Concern and Migratory Birds with the Potential to Occur in the Project Area**

Species	States with Potential to Occur
American golden-plover ( <i>Pluvialis dominica</i> )	LA, TX
American kestrel ( <i>Falco sparverius paulus</i> )	AR, LA, MS, OK, TX
Bachman's sparrow ( <i>Aimophila aestivalis</i> )	LA, TX
Brown-headed nuthatch ( <i>Sitta pusilla</i> )	AR, LA, MS, OK, TX
Cerulean warbler ( <i>Dendroica cerulea</i> )	LA, MS
Chimney swift ( <i>Chaetura pelagica</i> )	AR, LA, MS, OK, TX
Eastern whip-poor-will ( <i>Antrostomus vociferus</i> )	LA, TX
Gull-billed tern ( <i>Gelochelidon nilotica</i> )	LA, MS
Henslow's sparrow ( <i>Ammodramus henslowii</i> )	LA, MS, TX
Kentucky warbler ( <i>Oporornis formosus</i> )	AR, LA, MS, OK, TX
Lesser yellowlegs ( <i>Tringa flavipes</i> )	AR, LA, MS, OK, TX
Painted bunting ( <i>Passerina ciris</i> )	LA, MS
Prairie warbler ( <i>Dendroica discolor</i> )	AR, LA, MS, OK, TX
Prothonotary warbler ( <i>Protonotaria citrea</i> )	AR, LA, MS, OK, TX
Red-headed woodpecker ( <i>Melanerpes erythrocephalus</i> )	AR, LA, MS, OK, TX
Rusty blackbird ( <i>Euphagus carolinus</i> )	LA, MS
Swallow-tailed kite ( <i>Elanoides forficatus</i> )	LA, MS, OK, TX
Sprague's Pipit ( <i>Anthus spragueii</i> )	TX
Wood thrush ( <i>Hylocichla mustelina</i> )	AR, LA, MS, OK, TX

Source: USFWS 2023

### **Bald and Golden Eagles**

Bald eagles (*Haliaeetus leucocephalus*) are found in the project area and are protected under the Bald and Golden Eagle Protection Act of 1940 (BGEPA) (16 U.S. Code 668-668c). The BGEPA prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The BGEPA provides for civil and criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner,

any bald eagle, ... alive or dead, or any part, nest, or egg thereof.” The BGEPA defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.” “Disturb” is further defined by regulation as: “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.”

### **Common Plants and Wildlife**

Common wildlife species in the proposed critical habitat units are typical of those found throughout rivers in Arkansas, Louisiana, Mississippi, Oklahoma, and Texas. These include freshwater fish species, such as largemouth bass (*Micropterus salmoides*), flathead catfish (*Pylodictis olivaris*), channel catfish (*Ictalurus punctatus*), black crappie (*Pomoxis nigromaculatus*), white crappie (*P. annularis*), bluegill (*Lepomis macrochirus*), and redear sunfish (*L. microlophus*); mussel species such as western pimpleback (*Quadrula mortoni*), tapered pondhorn (*Unio merus declivis*), pondhorn (*U. tetralasmus*), Texas lilliput (*Toxolasma texasense*), and pondmussel (*Legumia subrostrata*); and aquatic invertebrates such as red swamp crayfish (*Procambarus clarkii*), aquatic beetles (order *Coleoptera*), and water striders (*Rhagovelia* sp.) (Robertson et al. 2018, 2019; Rodgers et al. 2018).

Common tree species within the riparian areas include loblolly pine (*Pinus taeda*), American sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), white oak (*Quercus alba*), overcup oak (*Quercus lyrata*), American beech (*Fagus granifolia*), blackgum or black tupelo (*Nyssa sylvatica*), sweetgum (*Liquidambar styraciflua*), and red maple (*Acer rubrum*). Common herbaceous and shrub species include deciduous holly (*Ilex decidua*), hawthorn (*Crategeus* sp.), cross vine (*Bignonia capreolata*), inland sea oats (*Chasmanthium latifolium*), hazel alder (*Alnus serrulata*), Virginia creeper (*Parthenocissus quinquefolia*), grape (*Vitis* sp.), pluchea (*Pluchea odorata*), sedges (*Carex* sp.), greenbrier (*Smilax* sp.), swamp rose mallow (*Hibiscus palustris*), and peppervine (*Ampelopsis arborea*) (Robertson et al. 2018).

## **3.4.2 Environmental Consequences**

### **Alternative A**

Under this alternative, federally supported actions that may affect the Louisiana pigtoe would require section 7 consultation under the jeopardy standard in all areas occupied by the species. Analysis under the adverse modification standard would not be required because no critical habitat would be designated.

Some of the projects that would likely go through the section 7 consultation process, whether or not critical habitat is designated, include projects affecting water operations from actions on state, local, or private lands that require a federal permit; actions on lands administered by the National Park Service; or actions that involve some other federal action (e.g., funding from the Federal Highway Administration, Federal Energy Regulatory Commission, Federal Emergency Management Agency, U.S. Department of Agriculture Animal and Plant Health Inspection Service, or the U.S. Department of Agriculture, Natural Resources Conservation Service).

Recommendations for avoiding jeopardy include avoiding activities that cause physical habitat disturbance (i.e., removal or sedimentation of mussel beds or suitable substrates inhabited by Louisiana pigtoe) and the degradation of water quality in streams occupied by the species. Activities to be avoided include any channel disturbance (e.g., placement of fill, dredging, and channelization); sedimentation, either through

bank erosion or as runoff from roads, agricultural areas, or other disturbed sites; inputs of dissolved solids or contaminants; and reduction in water availability.

Project modifications could include seeking to relocate project activities outside of occupied habitat or close to such areas to avoid stream disturbance in occupied areas. Other modifications could include reducing the amount of area impacted or requiring strict pollution-control methods that would protect habitat and water quality.

Other wildlife and federally listed and proposed species are likely to benefit from the improvements in aquatic habitat and secondary improvements to riparian vegetation resulting from these project modifications for the Louisiana pigtoe. Most native aquatic invertebrates, fish, and amphibians would benefit from maintenance of flowing streams and water quality. Many migratory birds and BCC are riparian dependent and would likely benefit from protection and management of flowing streams and herbaceous riparian vegetation, as would a number of common native invertebrates, reptiles, and mammals.

### **Alternative B**

Under this alternative, federally supported actions that may affect the Louisiana pigtoe or its critical habitat would require section 7 consultation under the adverse modification standard, as well as the jeopardy standard. The critical habitat provisions of section 7 consultation would apply to private, state, or tribal lands only when a federal action is involved, such as permitting, funding, or implementation. The number of consultations with other federal agencies could be greater than in Alternative A because Louisiana pigtoe may not be present at the time of section 7 consultation. In areas where the species is not present, section 7 consultation would be necessary solely because critical habitat is present.

In addition to project modifications to avoid jeopardy in occupied critical habitat, project modifications may be proposed that would protect the PBFs in unoccupied critical habitat. The PBFs essential to the conservation of the Louisiana pigtoe consist of the following:

5. Water quality parameters within the following ranges:
  - a. Water temperature below 27 degrees Celsius (80.6 degrees Fahrenheit);
  - b. Dissolved oxygen levels greater than 3 milligrams per liter;
  - c. Low salinity (less than 2 ppt) and total dissolved solids;
  - d. Low total ammonia and nitrogen (below 0.3 to 0.7 milligrams per liter total ammonia nitrogen);
  - e. Low levels of copper, nickel, and other trace metals;
  - f. Low levels of pesticides, sulfate, chloride, potassium, and other harmful constituents; and
  - g. Low pollutants and environmental contaminants common to wastewater.
6. Moderately flowing water rates suitable to prevent excess sedimentation, but not so high as to dislodge individuals or sediment.
7. Stable bank and riffle habitats, point bars and vegetated run habitat comprising sand, gravel, and larger cobbles.
8. Red shiner (*Cyprinella [=Notropis] lutrensis*), blacktail shiner (*Cyprinella venusta*), and bullhead minnow (*Pimephales vigilax*) present (USFWS 2023a).

Project modifications are not likely to be necessary for most fish, wildlife, and vegetation restoration projects because projects intended to benefit fish, wildlife, and vegetation would also likely benefit the PBFs for the Louisiana pigtoe critical habitat. However, project modifications to avoid adverse modification of Louisiana pigtoe critical habitat from other types of projects (e.g., oil and gas, highway construction, livestock grazing, and water management and use) would likely improve habitat for most other aquatic and riparian-associated species of fish, wildlife, and native vegetation.

Many special status species (federally listed, proposed, candidate, and state listed), migratory birds, and BCC are dependent upon or associated with aquatic and riparian areas. These species would benefit from improved aquatic habitat and potentially improved riparian conditions due to the maintenance of flowing water. Most common native invertebrates, fish, and amphibians also would benefit from maintenance of flowing streams with suitable water quality.

In summary, designation of critical habitat for the Louisiana pigtoe would likely benefit ESA-listed and other sensitive species. It also would likely benefit critical habitat for other listed species. In addition, it would likely benefit common fish, wildlife, and vegetation. However, this benefit would not likely be greater than any benefits achieved through listing the Louisiana pigtoe under the ESA alone because the PBFs of critical habitat would also need to be maintained to avoid jeopardy to the species. Consequently, designation of critical habitat would have a limited beneficial effect on fish, wildlife, and vegetation.

### **3.5 FOREST RESOURCES**

#### **3.5.1 Affected Environment**

##### **Arkansas**

The proposed critical habitat units within Arkansas are within the West Gulf Coastal Plain ecoregion in southwestern Arkansas. The predominant forest types in southwestern Arkansas are mixed-pine-hardwoods and pure hardwoods. Most common are the second-growth stands of shortleaf pine (*Pinus echinata*) and loblolly pine in mixture with various hardwoods. Loblolly is dominant in the southern part of the state, whereas shortleaf mixed with hardwoods are common along the foothills of the Ouachita Mountains. Bottomland hardwood forests are found along the rivers and in many of the smaller stream bottoms. This forest type is dominated by sweetgum and black gums, red (*Quercus rubra*) and white oaks, baldcypress (*Taxodium distichum*), and ash (*Fraxinus* sp.). Stands of red gum, post oak (*Quercus stellata*), hickory (*Carya* sp.), and a few pines form the upland hardwood type, which occurs in scattered patches throughout the pine stands (Eldredge 1937).

##### **Louisiana**

The proposed critical habitat units within Louisiana are in the Southeast and Southwest Forest survey units. The predominant forest type is oak-gum-cypress followed closely by loblolly-shortleaf. Loblolly pine is the most dominant tree in the state. Baldcypress, shortleaf pine, slash pine (*Pinus elliottii*), and longleaf pine (*Pinus palustris*) make up the softwood growing stock, while oaks (*Quercus* sp.), sweetgum, tupelos (*Nyssa* sp.), hickories, ashes, and willows (*Salix* sp.) make up the hardwood growing stock (Rosson et al. 1988).

##### **Mississippi**

The proposed critical habitat units within Mississippi are within the East Gulf Coastal Plain ecoregion. This region is made up of xeric-mesic upland forests/woodlands, mesic upland forests, bottomland hardwood

forests, swamp forests, riverfront forests, wet pine savannas/flatwoods, and artificial habitats (pine plantations; Mississippi Forestry Commission 2020).

### **Oklahoma**

The proposed critical habitat is in the southeastern part of Oklahoma where timberlands comprise approximately 84 percent of the forest land in this unit. Post oak is the most common species. Loblolly, shortleaf pine, and winged elm (*Ulmus alata*) are also common (Dooley and Randolph 2014).

### **Texas**

The proposed critical habitat is within the East Texas Piney Woods, the principal forest region in Texas. The five major forest types that make up this region are loblolly-shortleaf pine, longleaf-slash, oak-hickory, bottomland hardwood, and oak-pine. Other forest types found in East Texas include small acreages of mesquite (*Prosopis* sp.), exotic hardwoods, red cedar (*Juniperus virginiana*), and unproductive lands that are considered forested but do not meet stocking requirements (Texas Almanac 2023).

## **3.5.2 Environmental Consequences**

### **Alternative A**

Trends in timber harvest volumes, cut volumes, and silvicultural techniques would not change under Alternative A, beyond those already resulting from the associated requirements of ESA section 7. Section 7 consultation on the effects of federal timber projects on the Louisiana pigtoe under the jeopardy standard would still be required.

### **Alternative B**

Under Alternative B, critical habitat designation would require re-initiation of some section 7 consultations for timber management. New and ongoing federal timber management-related projects within designated critical habitat would be analyzed under the section 7 consultation process for potential effects on PBFs, as well as effects on the species. While habitat is already considered in consultations on effects on the species, the consultations would need to address PBFs. Timber projects may require that a Louisiana pigtoe management plan be developed. For projects where there is no federal nexus, critical habitat designation does not impose rules or restrictions on land use, so there would be no impacts under Alternative B.

## **3.6 FLOODPLAINS AND WETLANDS**

### **3.6.1 Affected Environment**

All the critical habitat units are riverine, are contained within floodplains, and are associated with wetlands. Wetland types for each of the 16 subunits are listed in **Table 3-3**.

**Table 3-3. Wetland Types in the Louisiana Pigtoe Critical Habitat Stream Reaches with a 0.25-mile Buffer**

<b>Subunit<sup>1</sup></b>	<b>Subunit Name</b>	<b>Wetland Type</b>	<b>Acres</b>	<b>Percent</b>
LAPT-1a	Upper Little River	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Lake, Riverine	15,645	0.59
LAPT-1b	Rolling Fork	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Riverine	3,781	0.49

### 3. Affected Environment and Environmental Consequences

<b>Subunit<sup>1</sup></b>	<b>Subunit Name</b>	<b>Wetland Type</b>	<b>Acres</b>	<b>Percent</b>
LAPT-1c	Cossatot River	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Lake, Riverine	4,313	0.33
LAPT-1d	Saline River	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Lake, Riverine	5,376	0.52
LAPT-2a	Upper Sabine River	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Lake, Riverine	14,038	0.45
LAPT-2b	Anacoco Bayou	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Lake, Riverine	1,797	0.61
LAPT-3a	Upper Neches River	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Lake, Riverine	28,935	0.56
LAPT-3b	Upper Angelina River	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Riverine	10,031	0.60
LAPT-3c	Lower Neches River	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Lake, Riverine	18,141	0.83
LAPT-3d	Village Creek	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Riverine	4,996	0.39
LAPT-3e	Big Sandy Creek	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Riverine	3,016	0.29
LAPT-4a	East Fork San Jacinto River	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Lake, Riverine	1,662	0.27
LAPT-5a	Upper Calcasieu River	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Riverine	16,746	0.76
LAPT-5b	Whisky Chitto Creek	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Riverine	3,703	0.61
LAPT-5c	Tenmile Creek	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Riverine	3,622	0.52
LAPT-6a	Pearl River	Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Lake, Riverine	21,357	0.92
<b>Total</b>			<b>157,160</b>	<b>0.58</b>

Source: USFWS GIS 2023

<sup>1</sup> LAPT = Louisiana pigtoe subunit under consideration for proposed critical habitat

Projects that could impact wetlands would require delineation of jurisdictional wetlands and a COE section 404 permit and, therefore, would have a federal nexus requiring ESA section 7 consultation.

### 3.6.2 Environmental Consequences

#### **Alternative A**

Under this alternative, federally supported actions that may affect the Louisiana pigtoe would require section 7 consultations under the jeopardy standard in all areas occupied by the species.

Potential new consultations also could occur on projects designed to manage floodplains or wetlands, such as riparian habitat restoration or water management and delivery.

Recommendations for avoiding jeopardy include avoiding activities that cause physical habitat disturbance (that is, sedimentation of the mussel beds inhabited by Louisiana pigtoe) and degradation of water quality in streams occupied by the species. Activities to be avoided include channel disturbance; sedimentation through bank erosion or as runoff from roads, agricultural areas, or other disturbed sites; inputs of dissolved solids or contaminants; and reduction in water availability.

Project modifications could include seeking to relocate project activities outside of occupied habitat or close to such areas to avoid wetland disturbance and floodplain degradation in occupied areas. Other modifications could include reducing the amount of area impacted or requiring strict pollution-control methods that would protect habitat and water quality.

These recommendations and project modifications are likely to benefit wetlands and floodplains by maintaining hydrologic function and reducing contaminants.

#### **Alternative B**

Under this alternative, federally supported actions that may affect the Louisiana pigtoe or its critical habitat would require section 7 consultations under the adverse modification standard, as well as the jeopardy standard. The critical habitat provisions of section 7 consultation would apply to private, state, or tribal lands only when a federal action is involved, such as permitting, funding, or implementation.

The number of consultations with other federal agencies would be the same as Alternative A because Louisiana pigtoe is present at the time of section 7 consultation in all areas designated as critical habitat.

Project modifications may be proposed to avoid jeopardy and protect PBFs in occupied critical habitat. The PBFs essential to the conservation of the Louisiana pigtoe consist of the following:

1. Water quality parameters within the following ranges:
  - a. Water temperature below 27 degrees Celsius (80.6 degrees Fahrenheit);
  - b. Dissolved oxygen levels greater than 3 milligrams per liter;
  - c. Low salinity (less than 2 ppt) and total dissolved solids;
  - d. Low total ammonia and nitrogen (below 0.3 to 0.7 milligrams per liter total ammonia nitrogen);
  - e. Low levels of copper, nickel, and other trace metals;
  - f. Low levels of pesticides, sulfate, chloride, potassium, and other harmful constituents; and
  - g. Low pollutants and environmental contaminants common to wastewater.
2. Moderately flowing water rates suitable to prevent excess sedimentation, but not so high as to dislodge individuals or sediment.

3. Stable bank and riffle habitats, point bars, and vegetated run habitat comprising sand, gravel, and larger cobbles (USFWS 2023a).

Most actions that would affect wetland hydrology and function (bank stabilization, dams, and actions requiring a COE section 404 permit) would require section 7 consultation as a result of species listing. Therefore, administrative effort under Alternative B would likely be the same as Alternative A, as projects in designated critical habitat would occur where the Louisiana pigtoe is present. Floodplains and wetlands would benefit from flowing water that would be maintained in the areas of critical habitat, the same as under Alternative A.

### **3.7 WATER USE AND MANAGEMENT**

#### **3.7.1 Affected Environment**

Approximately 1,028 river miles in 3 counties in Arkansas, 5 parishes in Louisiana, 2 counties in Mississippi, 1 county in Oklahoma, and 21 counties in Texas fall within the boundaries of the proposed critical habitat for the Louisiana pigtoe. The proposed critical habitat for Louisiana pigtoe consists of six units: 1) Little River, 2) Sabine River, 3) Neches River, 4) San Jacinto River, 5) Calcasieu River, and 6) Pearl River (USFWS 2022). Reaches within the six units are mostly rural, within riparian woodlands, and bordered by agricultural lands (Little River, Sabine River, Neches River) and developed areas (East Fork San Jacinto River). All units, except the Little River, experience extreme drought and flooding, causing extreme low-flow conditions with associated reduced water quality or extreme high flows that mobilize substrates, erode habitat, or deposit sediments on Louisiana pigtoe populations (USFWS 2022).

A species status assessment revealed that four factors pose the largest risk to species' future viability: degradation of water quality, altered hydrology, substrate changes, and habitat fragmentation; these are all exacerbated by climate change (USFWS 2022). Each of these influences is affected by water use and management practices. Impoundments, agricultural activities, ongoing industrial activities, urban development, stormwater runoff, and wastewater discharges contribute to loss of water velocity (which removes sediments), inundation, excessive sedimentation, water quality degradation, groundwater withdrawals, and surface water diversions (USFWS 2022).

Special management considerations may be required to reduce sedimentation, improve water quality, maintain adequate flows, and improve habitat connectivity. Inundation causes an increase in sediment deposition, eliminating interstitial spaces<sup>6</sup> that the juvenile species inhabits. Deep waters are unsuitable due to low temperatures and lack of oxygen (USFWS 2022). At the other extreme, low flows or drying of streams also degrade and eliminate Louisiana pigtoe habitat. Management of water releases from reservoirs (e.g., timing, intensity, and duration) can affect both high and low flows. High flows below dams may be reduced in intensity but have longer durations, altering sediment transport, often leading to scour and shear stress. Regulated water releases from dams may cause low flows and drying of rivers in some cases. Drought in combination with increasing trends in groundwater extraction may lead to lower river flows of longer duration than previously recorded. Lowered water levels can concentrate salinity and contaminants and impair water quality. Maintaining adequate water flow would improve water quality, dilute contaminants, decrease salinity, and decrease sediment accumulation (USFWS 2022).

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<sup>6</sup> small openings in an otherwise closed matrix of substrate, created by gravel, cobble, boulders, tree roots, and other vegetation, with some amount of fine sediment (i.e., clay and silt) necessary to provide appropriate shelter



### **LAPT-1 Little River Unit**

The Little River Unit in Arkansas and Oklahoma consists of the Upper Little River, Rolling Fork, Cossatot River, and Saline River subunits. Drought conditions and flooding are seldom extreme, but these subunits are impacted by impoundments and ongoing agricultural activities.

The Upper Little River subunit is impacted by hydroelectric dam-related cold water releases from Broken Bow Reservoir. Tributaries and portions of the Little River and Rolling Fork are listed as impaired on the CWA section 303(d) list for mercury, zinc, lead, silver, pH, dissolved oxygen, and turbidity. Six wastewater permits allow for the discharge of 4.7 million gallons of wastewater into the Little River daily (USFWS 2022; USFWS GIS 2023).

The Cossatot River does not have any 303(d) impairments listed; however, mercury levels in fish tissue exceed the EPA's recommended consumption level. The Cossatot River contains over 60 wastewater-permitted facilities, mainly pig farms, as well as sand and gravel mining operations. Upstream, Gillham Lake alters natural stream flows (USFWS 2022).

In the Saline River, several sections are not in compliance with dissolved oxygen requirements. The natural flow conditions have been modified by Dierk's Lake and, although variable flow is uncommon, prolonged high water is common for flood control (USFWS 2022).

### **LAPT-2 Sabine River Unit**

The Sabine River Unit consists of the Upper Sabine River subunit in Texas and Anacoco Bayou subunit in Louisiana. These subunits are affected by impoundments, ongoing agricultural activities, mining and industrial activities, urban development, and municipal wastewater and stormwater runoff.

Two segments within the Sabine River are on the CWA section 303(d) list of impaired waters for bacteria. A new poultry processing plant has been permitted to release wastewater in the upper portion of the Sabine River downstream of Lake Tawakoni. Wastewater releases are permitted at 2.18 million gallons per day with an ammonia limit of 3.94 milligrams per liter, which is beyond the threshold for freshwater mussel tolerances. Consequently, water quality degradation is expected, despite wastewater dilution from mixing with stream flow. The construction of Lake Tawakoni and Toledo Bend Reservoir impacted natural hydrologic conditions, and dam releases caused substrate scouring, eliminating mussel habitat downstream until sheer stress dissipates. An additional off-channel reservoir in the middle of the Sabine River and a water diversion project are proposed to meet future water demand. When constructed, water quality and hydrologic conditions would further degenerate from current conditions and the diversion would increase habitat fragmentation. Bank erosion is prevalent throughout the Sabine River, resulting in elevated inputs of sediment impacting suitable substrates for mussel beds (USFWS 2022; USFWS GIS 2023).

Bayou Anacoco is currently on the CWA section 303(d) impaired waterbodies list for total dissolved solids and fecal coliform. Municipal and industrial wastewater discharges into Bayou Anacoco include Boise Packing and Newsprint-Deridder Paper Mill (39 million gallons per day) and City of Leesville Wastewater Treatment Facility (2.1 million gallons per day). Lake Vernon and Anacoco Lake are upstream of the Bayou Anacoco. The two impoundments and wastewater discharges have altered natural hydrologic and water quality conditions throughout the Bayou Anacoco (USFWS 2022; USFWS GIS 2023).

### **LAPT-3 Neches River Unit**

The Neches River Unit consists of the Upper Neches River, Upper Angelina River, Lower Neches River, Village Creek, and Big Sandy Creek subunits in Texas. These subunits are being affected by impoundments, ongoing agricultural activities, mining and industrial activities, urban development, and municipal wastewater and stormwater runoff, resulting in excessive sedimentation, water quality degradation, groundwater withdrawals, and surface water diversions.

Segments of the Angelina River are on the CWA section 303(d) impaired waterbodies list for bacteria. Fecal coliform often exceeded standards in the late 1990s, and elevated ammonia levels were routinely observed in 2008. No impoundments are on Angelina River upstream or within the occupied area; however, Lake Columbia and Ponta Reservoirs have been proposed and would be constructed on Mud Creek in the upper watershed of the Angelina River, altering hydrology and substrates (USFWS 2022; USFWS GIS 2023).

Tributaries and segments of the Neches River are on the CWA section 303(d) impaired waterbodies list for dioxin and mercury in edible tissue, bacteria, and depressed dissolved oxygen. Numerous segments had concerns for nutrients, particularly ammonia and total phosphorus; however, decreasing trends for these parameters were often observed. Stream flows are influenced by Lake Palestine and B.A. Steinhagen Reservoir (USFWS 2022; USFWS GIS 2023).

### **LAPT-4 East Fork San Jacinto River Unit**

The East Fork San Jacinto River Unit in Texas is affected by ongoing agricultural activities, development, and mining operations resulting in excessive sedimentation, water quality degradation, groundwater withdrawals, and surface water diversions. East Fork San Jacinto River is on the CWA section 303(d) impaired waterbodies list for bacteria. Sand mining has led to increased nutrient loads in the San Jacinto River, which can increase cyanobacteria levels (USFWS 2022; USFWS GIS 2023).

### **LAPT-5 Calcasieu River Unit**

The Calcasieu River Unit in Louisiana is comprised of the Upper Calcasieu River, Whisky Chitto Creek, and Tenmile Creek subunits. These subunits are affected by ongoing agricultural activities and development, resulting in excessive sedimentation, water quality degradation, groundwater withdrawals, and surface water diversions. The Upper Calcasieu River is listed as impaired for pH and fecal coliform on the CWA section 303(d) list. Pollution sources include municipal wastewater discharges, paper mill effluent, and sand and gravel mining. The Calcasieu River is recognized as part of Louisiana's Natural and Scenic River System, which entails a permit process and specific regulations to safeguard these waterways. Restrictions are in place to prevent channelization, impoundment construction, and channel realignment. The projected population growth at the current rate will further intensify the demand for high-quality water supplies for both public and industrial use. Anticipated consequences include increased water extraction during periods of low rainfall to support local agricultural practices (USFWS 2022; USFWS GIS 2023).

### **LAPT-6 Pearl River Unit**

The Pearl River Unit in Louisiana and Mississippi is affected by ongoing agricultural activities and development, resulting in excessive sedimentation, water quality degradation, groundwater withdrawals, and surface water diversions.

The main channel of the Pearl River, along with numerous tributaries, have been identified on the CWA section 303(d) list as impaired waterbodies due to various factors such as biological impairment, sulfate levels, pH imbalance, low dissolved oxygen, and turbidity. Other past and current stressors to water quality include point and nonpoint source pollution from urban areas and chemical releases from a paper mill near Bogalusa, Louisiana, in 2011, causing a substantial fish kill (Piller and Geheber 2015, p. 243). The Ross R. Barnett Reservoir influences the current hydrologic condition of the Pearl River. An additional reservoir on the main channel of the Pearl River below the Ross R. Barnett Reservoir is proposed for flood control (USFWS 2022).

### **3.7.2 Environmental Consequences**

#### **Alternative A**

Under this alternative, federally supported actions that may affect the Louisiana pigtoe would require section 7 consultations under the jeopardy standard in all areas occupied by the species. Analysis under the adverse modification standard would not be required because no critical habitat would be designated.

Recommendations for avoiding jeopardy include avoiding activities that cause physical habitat disturbance (i.e., sedimentation of the mussel beds, suitable habitat, and substrates inhabited by Louisiana pigtoe) and degradation of water quality in streams occupied by the species. Activities to be avoided include channel disturbance; sedimentation through bank erosion or as runoff from roads, agricultural areas, or other disturbed sites; inputs of dissolved solids or contaminants; and reduction in water availability.

Project modifications could include seeking to relocate project activities outside of occupied habitat or close to such areas to avoid stream disturbance in occupied areas. Other modifications could include reducing the amount of area impacted or requiring strict pollution-control methods that would protect habitat and water quality.

The Calcasieu River, as part of Louisiana's Natural and Scenic River System, benefits from a permit process that serves to safeguard its waterways. This permit process ensures protective measures and enables specific prohibitions on activities such as channelization, impoundment construction, and channel realignment (USFWS 2022).

#### **Alternative B**

Under this alternative, federally supported actions that may affect the Louisiana pigtoe or its critical habitat would require section 7 consultations under the adverse modification standard, as well as the jeopardy standard. The critical habitat provisions of section 7 consultation would apply to private, state, or tribal lands only when a federal action is involved, such as permitting, funding, or implementation.

The number of consultations with other federal agencies would be the same as Alternative A because Louisiana pigtoe is present at the time of section 7 consultation in all areas designated as critical habitat.

The same agencies required to consult under the jeopardy standard are also likely to consult with USFWS on effects on critical habitat. The number of consultations with other federal agencies would be similar to Alternative A because the consultations for projects implemented in areas currently occupied by the Louisiana pigtoe would have occurred as a result of species listing.

For projects occurring in occupied critical habitat, the USFWS does not expect to recommend different project modifications under the adverse modification standard than under the jeopardy standard because threats to the species are habitat related (e.g., habitat degradation) and would already be covered under the jeopardy analysis. Nevertheless, future section 7 consultations would evaluate whether proposed actions jeopardize the continued existence of the Louisiana pigtoe or adversely modify or destroy critical habitat. Each consultation would be evaluated on a case-by-case basis (50 CFR 402). Project modifications to dam operations would depend on the proposed change to dam operation and would be developed during the section 7 consultation process. Similarly, project modifications would be likely for irrigation practices, water diversions, and water uses, and effects would be anticipated. The USFWS may recommend practices that would protect PBFs and maintain or improve the water and substrate quality of the river.

Conservation actions to protect PBFs in occupied critical habitat are likely to benefit water resources (water quality and quantity) within the critical habitat units and downstream of the units.

### 3.8 LANDS

#### 3.8.1 Affected Environment

##### *Land Ownership*

**Table 3-4** displays the proposed critical habitat areas by land ownership for each state, expressed as approximate stream lengths in miles. The proposed critical habitat designation includes lands under federal (26 percent), state (1 percent), and private (73 percent) ownership. **Table 3-4** summarizes the land ownership status in the project area.

**Table 3-4. Acres of Land Ownership in the Project Area**

Ownership	Acres	Percent of Total
Federal	70,414	26
U.S. DOI, Bureau of Indian Affairs	436	<1
U.S. Department of Defense	2	<1
USFWS	24,101	9
U.S. DOI, National Park Service	28,697	11
U.S. Army Corps of Engineers	1,376	<1
U.S. Department of Agriculture, Forest Service	15,802	6
State	3,175	1
Private	195,433	73
<b>Total</b>	<b>269,021</b>	<b>100</b>

Source: USFWS GIS 2023

Note: Totals may not sum due to rounding.

While many activities on private, county, or state lands may not have a federal nexus because no federal funds or permits are required, a federal nexus may exist for land conversion for development purposes or when a COE section 404 permit is required. Land clearing for roads (transportation) and utilities often also have a federal nexus and may result in section 7 consultations. The U.S. Department of Agriculture, Natural Resources Conservation Service also oversees enrollment of conservation easements under its Wetlands Reserve Program and provides technical and financial support to help landowners implement conservation actions and restore wetlands.

The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area; does not allow the government or public to access private lands; and does not require implementation of restoration, recovery, or enhancement measures by nonfederal landowners. Where a landowner seeks or requests federal agency funding or authorization for an action that may affect a listed species or critical habitat, the consultation requirements of ESA section 7(a)(2) would apply, but even in the event of a destruction or adverse modification finding, the obligation of the federal action agency and the landowner is not to restore or recover the species, but to implement reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat.

### **Agriculture**

Agriculture significantly contributes to the economies of all five states. Agriculture products of particular importance include rice, cattle, cotton, sorghum, wheat, soybeans, and corn (Arkansas Department of Agriculture 2023; Oklahoma Farm Bureau Foundation for Agriculture 2023; Texas Department of Agriculture 2023; University of Arkansas Division of Agriculture 2023; Mississippi Department of Agriculture and Commerce 2023; Louisiana State University Ag Center 2020).

Prime agricultural land is defined (7 U.S. Code 4202[a]) as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. No prime agricultural land occurs within the proposed critical habitat (U.S. Department of Agriculture, Natural Resources Conservation Service 2023).

The primary influences of agriculture on Louisiana pigtoe include water withdrawals for irrigation, potential increases in sedimentation, and potential increases in contamination.

### **Travel Management**

Highway or road construction and reconstruction can directly destroy or modify Louisiana pigtoe habitat. In addition to direct habitat loss, road construction has the potential for inundating habitat upstream of low-water crossings. In addition, low-water crossings could be susceptible to contaminant spills. Inadvertent transport of contaminants and contaminated soils by traffic usage could occur. The topography and steep slopes of low-water crossings could allow spilled contaminants and contaminated soils to directly enter surface water and negatively impact the species (Clarkin et al. 2006).

The Arkansas, Louisiana, and Texas Departments of Transportation provided information about specific future actions anticipated to occur in proposed critical habitat areas. Arkansas Department of Transportation identified four transportation projects that could intersect one or more of the proposed critical habitat units for Louisiana pigtoe, and voiced concern that section 7 consultation may need to be re-initiated. The Louisiana Department of Transportation and Development noted that threatened and endangered species coordination efforts in the Pearl River Basin are not expected to increase significantly due to the existence of designated critical habitat for other federally listed species; however, because there are currently no other federally listed aquatic species in the Calcasieu River and Sabine River basins, threatened and endangered species coordination efforts in those river basins are expected to increase. The Texas Department of Transportation stated that 23 planned, upcoming, or ongoing transportation improvement projects could intersect with one or more of the recommended critical habitat units for Louisiana pigtoe.

### 3.8.2 Environmental Consequences

#### **Alternative A**

Under Alternative A, federally supported actions that may affect the Louisiana pigtoe would require section 7 consultation under the jeopardy standard in all areas occupied by the species. These include the planned, upcoming, and ongoing transportation improvement projects identified by the Arkansas Department of Transportation, Louisiana Department of Transportation and Development, and Texas Department of Transportation. Analysis under the adverse modification standard would not be required because no critical habitat would be designated.

Recommendations for avoiding jeopardy include avoiding activities that cause physical habitat disturbance (i.e., removal or sedimentation of the mussel beds, suitable habitat, and substrates inhabited by Louisiana pigtoe) and water quality degradation in streams occupied by the species. Activities to be avoided include any channel disturbance (e.g., placement of fill, dredging, and channelization); sedimentation, either through bank erosion or as runoff from roads, agricultural areas, or other disturbed sites; inputs of dissolved solids or contaminants; and reduction in water availability.

Project modifications could include seeking to relocate project activities outside of occupied habitat or close to such areas to avoid stream disturbance in occupied areas. Other modifications could include reducing the amount of area impacted or requiring strict pollution-control methods that would protect habitat and water quality. Project modifications would be developed during the section 7 consultation process to protect Louisiana pigtoe habitat and water quality.

#### **Alternative B**

Under Alternative B, all proposed critical habitat areas are occupied by the Louisiana pigtoe; therefore, land management actions in those areas would be subject to section 7 consultations regardless of the area's status as critical habitat. However, compared with Alternative A, Alternative B could result in a small but unknown increase in the number of additional new and reinitiated section 7 consultations for land management actions based solely on the presence of designated critical habitat, and the addition of an analysis of adverse modification of critical habitat to future section 7 consultations on the Louisiana pigtoe in critical habitat, as well as the jeopardy standard.

The consultation analyses for effects on a listed species and effects on critical habitat are similar in many respects and are parallel processes because the health of a species cannot be disassociated from the health of its habitat. The outcomes of these future consultations would depend on the details of project proposals and the analysis of effects, which are unknown at this time.

The designation of critical habitat has been suggested to negatively affect private property values (List et al. 2006; Mamun et al. 2022). This literature references particular species, habitat conditions, and geographic contexts, and the transferability of the results to other species and regions, particularly aquatic species, is uncertain. Literature and public feedback suggest that the public perceives critical habitat designation as potentially resulting in incremental changes to private property values, above and beyond any effects associated with specific forecast project modifications under ESA section 7. Literature and feedback suggest that a property inhabited by a threatened or endangered species, or that lies within a critical habitat designation, may have a lower market value than an identical property not inhabited by the species or that lies outside of critical habitat. This lower value results from the perception that critical habitat will preclude, limit, or slow development, or somehow alter the highest and best use of the

property. This perception results from regulatory uncertainty. Because the proposed critical habitat crosses mostly private lands, incremental costs from public perception of the designation of critical habitat have some potential to arise. Therefore, Alternative B has the potential to result in perceptual effects on private property land values.

Agricultural uses occur only on the private land within the proposed critical habitat. The critical habitat provisions of section 7 consultation would apply to private and state lands only when a federal action is involved, such as permitting, funding, or implementation. No known federal actions are associated with agricultural uses of the proposed critical habitat; therefore, the designation of critical habitat would likely not affect agricultural uses. Prime agricultural land would not be affected by critical habitat designation.

Under Alternative B, the Departments of Transportation in the five states would be required to consult under the jeopardy standard, as well as on effects on critical habitat. For projects occurring in occupied critical habitat, the USFWS does not expect to recommend different project modifications under the adverse modification standard than under the jeopardy standard because threats to the species are habitat related (e.g., habitat degradation) and would already be covered under the jeopardy analysis. Nevertheless, future section 7 consultations would evaluate whether proposed actions jeopardize the continued existence of the Louisiana pigtoe or adversely modify or destroy critical habitat. Each consultation would be evaluated on a case-by-case basis (50 CFR 402).

### **3.9 ENERGY RESOURCES**

#### **3.9.1 Affected Environment**

The region is a known producer of energy, particularly from oil and natural gas. A major formation capable of producing large amounts of gas is the Haynesville-Bossier<sup>7</sup> tight oil shale gas play of Jurassic age, located in the Texas-Louisiana-Mississippi Salt Basin in eastern Texas and western Louisiana. Both Texas and Louisiana are among top producers of energy resources. Texas is the top crude oil and gas producer in the nation (42 percent of nation's crude oil and 27 percent of natural gas production; U.S. Energy Information Administration 2023a). Louisiana ranks third in natural gas production and fifth in proved natural gas reserves among the states (U.S. Energy Information Administration 2023b). The Bossier and Haynesville Formations of the onshore and state waters portion of the U.S. Gulf Coast is estimated to contain approximately 4 billion barrels of oil, 304 trillion cubic feet of natural gas, and 2 billion barrels of natural gas liquids (Paxton et al. 2017a, b). Total wells permitted and completed in the Bossier and Haynesville shales included 1,796 gas wells and 325 permits as of January 1, 2023 (Railroad Commission of Texas 2023).

Major producing oil and gas fields associated with the Haynesville-Bossier shale that encompass or are close to the Louisiana pigtoe critical habitat areas include Oak Hill (Cotton Valley), Willow Springs, and East Texas fields along Upper Sabine River. Smaller fields in or near river segments with Louisiana pigtoe habitat associated with Texas-Louisiana-Mississippi Salt sedimentary basin and the Western Gulf sedimentary basin directly to the south are found along the Angelina River and Neches River. Several of the proposed river units (all in Texas) are in or adjacent to authorized U.S. Department of the Interior, Bureau of Land Management (BLM) oil and gas leases. Of the authorized BLM leases, one is listed as

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<sup>7</sup> <https://atlas.eia.gov/apps/fossil-fuels/explore>

currently held by production; this lease covers the entirety of Harrison County in Texas where Oak Hill field exists along portions of the Sabine River (BLM 1989).

Wind, solar, and geothermal energy development does not currently occur within the proposed critical habitat, and no future development is known to be planned.

### **3.9.2 Environmental Consequences**

#### **Alternative A**

Conventional gas extraction involves extracting natural gas from permeable rock formations such as siltstones, sandstones, and carbonates. Groundwater extraction for oil and gas activities, along with drought, may result in reduced future stream flow along the rivers. River crossings are also frequently used by vehicles and commercial trucks associated with construction and transportation activities that involve oil and gas development.

Under this alternative, federally supported actions that may affect the Louisiana pigtoe would require section 7 consultations under the jeopardy standard in all areas occupied by the species. Analysis under the adverse modification standard would not be required because no critical habitat would be designated.

Recommendations for avoiding jeopardy include avoiding activities that cause physical habitat disturbance (i.e., removal or sedimentation of the mussel beds, suitable habitat, and substrates inhabited by Louisiana pigtoe) and water quality degradation in streams occupied by the species. Activities to be avoided include any channel disturbance (e.g., placement of fill, dredging, and channelization); sedimentation, either through bank erosion or as runoff from roads, agricultural areas, or other disturbed sites; inputs of dissolved solids or contaminants; and reduction in water availability.

Project modifications could include seeking to relocate project activities outside of occupied habitat or close to such areas to avoid stream disturbance in occupied areas. Other modifications could include reducing the amount of area impacted or requiring strict pollution-control methods that would protect habitat and water quality.

#### **Alternative B**

Energy resource extraction activities would likely not occur within proposed critical habitat units; however, these activities occur throughout the region and could indirectly impact the proposed units (e.g., via groundwater depletion). Under this alternative, federally supported actions that may affect the Louisiana pigtoe or its critical habitat would require section 7 consultation under the adverse modification standard, as well as the jeopardy standard. The critical habitat provisions of section 7 consultation would apply to private, state, or tribal lands only when a federal action is involved, such as permitting, funding, or implementation.

### **3.10 CULTURAL AND HISTORIC RESOURCES**

#### **3.10.1 Affected Environment**

The term “cultural resources” is inclusive of a broad scope of resources and has been adopted and widely used to refer to the diverse human record found in sites, structures, objects, and places created and/or used by people. These may comprise archaeological, historic, or architectural sites, structures, objects, or places. They also could include locations of traditional cultural or religious importance to a particular social and/or cultural group, often referred to as traditional cultural properties.



Cultural resources include archaeological resources, as defined in the Archaeological Resources Protection Act of 1979, and other sites, structures, objects, items, and places as addressed in other statutes and regulations (for example, the American Indian Religious Freedom Act of 1978, the Antiquities Act of 1906, the NEPA, and the Native American Graves Protection and Repatriation Act of 1990). Cultural resources are most frequently identified and recorded through federal compliance with Section 106 of the National Historic Preservation Act and subsequent consultation with Native American tribes and State Historic Preservation Offices. Section 106 requires federal agencies that fund, approve, authorize, license, or permit actions or undertakings to consider effects on historic properties that could occur due to the proposed undertakings. Historic properties, as defined in the National Historic Preservation Act and its implementing regulations found at 36 CFR 800, are sites, structures, buildings, and objects determined eligible for listing in the National Register of Historic Places.

Federal regulations define specific criteria for National Register of Historic Places eligibility (found at 36 CFR 60.4) and provide the measures for evaluating cultural resources for their inclusion in the National Register of Historic Places. Once a cultural resource has been determined eligible for the National Register of Historic Places, the agency must consider the potential effects of a proposed action on the historic property and provide measures to either reduce or mitigate any adverse effects. Consequently, compliance with Section 106 provides a primary mechanism for federal agencies to assess and take into account the effects of proposed federal actions or undertakings on cultural resources during NEPA reviews.

Land ownership and administration in the project area buffer (269,021 acres) involves a variety of federal and state agencies, as well as private landowners, and includes over 400 acres of U.S. Department of Interior, Bureau of Indian Affairs-administered lands (see **Section 3.7.1**). The USFWS does not have information regarding cultural resources known to be present within the project area buffer. It is assumed that cultural resources, including potentially historic properties as defined under the National Historic Preservation Act, are present within the project area.

### **3.10.2 Environmental Consequences**

#### **Alternative A**

Under Alternative A, critical habitat would not be designated for the Louisiana pigtoe. There would be no impacts on cultural resources from not designating critical habitat. Regardless of land ownership or administration in the project area, federal undertakings that may affect the Louisiana pigtoe would continue to require compliance with Section 106 of the National Historic Preservation Act. Under Alternative A, there would be no effects on cultural resources.

#### **Alternative B**

Under Alternative B, critical habitat would be designated for the Louisiana pigtoe. There would be no impacts on cultural resources from the designation of critical habitat. Regardless of land ownership or administration in the project area, federal undertakings that may affect the Louisiana pigtoe would continue to require compliance with Section 106 of the National Historic Preservation Act. Under Alternative B, there would be no effects on cultural resources.

### 3.11 SOCIOECONOMICS

#### 3.11.1 Affected Environment

Regulations for implementing NEPA require analysis of social effects when they are interrelated with effects on the physical or natural environment (40 CFR 1508.14). Economic effects have been analyzed in a separate economic analysis of the proposed designation of critical habitat for the Louisiana pigtoe (Industrial Economics, Inc. 2021). This separate economic analysis is referred to herein as the Screening Analysis. The Screening Analysis was done for two species of mussels; however, this section incorporates findings of the Screening Analysis specific to the Louisiana pigtoe.

As part of the rulemaking process, the USFWS must consider the economic impacts, including costs and benefits, of the proposed rule in the context of three separate requirements:

- Executive Order 12866, Regulatory Planning and Review, which directs agencies to assess the costs and benefits of the regulatory action;
- ESA section 4(b)(2), which requires the Secretary of the Interior to consider economic impacts prior to designating critical habitat; and
- The Regulatory Flexibility Act, which requires federal agencies to prepare and make available for public comment an initial regulatory flexibility analysis that describes the effect of a proposed rule on small entities. No initial regulatory flexibility analysis is required if the head of the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities.

The socioeconomic analysis area includes the 27 counties in Arkansas, Mississippi, Oklahoma, and Texas and five parishes in Louisiana, that contain assigned critical habitats, as listed in **Section 1.2**. The proposed designation for the Louisiana pigtoe crosses mostly private lands (Industrial Economics, Inc. 2021). For more detailed information on the units with occupied proposed critical habitat, see Section 3 of the Screening Analysis (Industrial Economics, Inc. 2021).

#### 3.11.2 Environmental Consequences

##### **Alternative A**

Under the no action alternative, critical habitat would not be designated for the Louisiana pigtoe. As a result, there would be no socioeconomic impacts due to critical habitat designation, as none would be designated. Under this alternative, federally supported actions that may affect the Louisiana pigtoe would require section 7 consultations under jeopardy standards in all areas occupied by the species. Analysis under the adverse modification standard would not be required because no critical habitat would be designated.

##### **Alternative B**

###### *Endangered Species Act Section 7 Costs of the Critical Habitat Rule*

The Screening Analysis (Industrial Economics, Inc. 2021) determined that critical habitat designation for the Louisiana pigtoe would be unlikely to generate costs exceeding \$100 million in a single year. Therefore, the rule is unlikely to meet the threshold for an economically significant rule, with regards to costs, under Executive Order 12866.

Incremental costs associated with section 7 consultations for Louisiana pigtoe would likely be limited to administrative costs. This conclusion is largely based on substantial protections that are anticipated to be provided by the concurrent listing of the species even absent critical habitat designation, as well as other conservation actions for other threatened and endangered freshwater mussels species in these areas that would already be anticipated. In particular:

- Projects with a federal nexus would be subject to ESA section 7 consultation requirements for this species regardless of whether critical habitat is designated. All units for the Louisiana pigtoe are occupied. Thus, activities with a federal nexus are likely to be subject to section 7 consultation requirements for the species regardless of critical habitat designation.
- Section 7 consultations are unlikely to proceed due solely to critical habitat designation. The USFWS does not expect that the critical habitat designation would result in many additional consultations because all units being proposed for designation as critical habitat are occupied. As a result, critical habitat is not expected to result in additional consultations beyond those required due to species presence.
- Project modifications are unlikely to be affected by the designation of critical habitat. In its incremental effects memorandum (USFWS 2021b), the USFWS states that consultation is already necessary when there is a federal action in an occupied area and consultation under the jeopardy standard focuses on the effects of habitat degradation. The designation of critical habitat is unlikely to generate recommendations for additional project modifications in occupied areas. Project modifications requested to avoid adverse modification are likely to be the same as those needed to avoid jeopardy in occupied habitat. Thus, the USFWS does not forecast any incremental costs associated with project modifications that would involve additional conservation efforts for these species.

**Table 3-5** summarizes the estimated annual incremental costs by consultation type. Estimated annual incremental costs are provided for the units with occupied Louisiana pigtoe habitat. However, the Upper Sabine River, Upper Neches River, and Lower Neches River units contain both Louisiana pigtoe and Texas Heelsplitter habitats. The Upper Sabine River unit contains 110.3 river miles (177.5 kilometers) of occupied proposed critical habitat for the Louisiana pigtoe. The Upper Neches River unit contains 200.6 river miles (322.8 kilometers) of occupied proposed critical habitat for the Louisiana pigtoe. The Lower Neches River unit contains 76.3 river miles (122.8 kilometers) of occupied proposed critical habitat for both Texas heelsplitter and Louisiana pigtoe (Industrial Economics, Inc. 2021).

Because the Screening Analysis was done for both species, the 10-year and annual incremental costs for the Louisiana pigtoe alone are expected to be lower than those displayed in **Table 3-5**. Although the specific geographic distribution of these costs is uncertain, it appears likely that most costs associated with the Louisiana pigtoe would occur in the Upper Sabine River and Upper Neches River units, which together comprise 55 percent of proposed critical habitat for the Louisiana pigtoe.

Of the units that contain only Louisiana pigtoe, the unit with the highest potential costs resulting from designation of Louisiana pigtoe critical habitat is the Lower Pearl River. This unit makes up 6 percent of the total proposed critical habitat and intersects private, state, and federal land (Industrial Economics, Inc. 2021). The Screening Analysis estimates that considering adverse modification of Louisiana pigtoe and Texas heelsplitter critical habitat during section 7 consultation would result in incremental costs of no more than \$51,800 (2021 dollars) per year (Industrial Economics, Inc. 2021).

**Table 3-5. Summary of 10-year and Annual Incremental Costs of Critical Habitat Designation for the Louisiana Pigtoe and Texas Heelsplitter by Unit and Consultation Type (2021 \$)**

Unit	State	Formal Consultation Costs	Informal Consultation Costs	Total Costs
Upper Little River	AR, OK	\$26,500	\$2,600	<b>\$29,100</b>
Rolling Fork	AR	\$10,600	\$2,600	<b>\$13,200</b>
Cossatot River	AR	\$10,600	\$0	<b>\$10,600</b>
Saline River	AR	\$10,600	\$0	<b>\$10,600</b>
Upper Sabine River*	TX	\$63,600	\$10,400	<b>\$74,000</b>
Bayou Anacoco	LA	\$5,300	\$0	<b>\$5,300</b>
Upper Neches River*	TX	\$63,600	\$5,200	<b>\$68,800</b>
Upper Angelina River	TX	\$21,200	\$2,600	<b>\$23,800</b>
Lower Neches River*	TX	\$37,100	\$2,600	<b>\$39,700</b>
Village Creek	TX	\$26,500	\$0	<b>\$26,500</b>
Big Sandy Creek	TX	\$21,200	\$0	<b>\$21,200</b>
East Fork San Jacinto River	TX	\$5,300	\$0	<b>\$5,300</b>
Upper Calcasieu River	LA	\$21,200	\$7,800	<b>\$29,000</b>
Whisky Chitto Creek	LA	\$10,600	\$0	<b>\$10,600</b>
Tenmile Creek	LA	\$10,600	\$0	<b>\$10,600</b>
Lower Pearl River	LA, MS	\$21,200	\$23,400	<b>\$44,600</b>
<b>Total 10-year cost</b>		<b>\$365,700</b>	<b>\$57,200</b>	<b>\$422,900</b>
<b>Annual cost</b>		<b>\$36,570</b>	<b>\$5,720</b>	<b>\$42,290</b>

Source: Industrial Economics, Inc. 2021

#### *Other Costs of the Critical Habitat Rule*

The Screening Analysis (Industrial Economics, Inc. 2021) provides information on other potential costs of the critical habitat rule. These types of costs include triggering additional requirements or project modifications under state laws or regulations, as well as perception effects on markets. These types of impacts could occur even when activities do not have a federal nexus for consultation.

The USFWS is unaware of any relevant county or state regulation that would be triggered by the designation of critical habitat for the Louisiana pigtoe. Therefore, Alternative B is not expected to result in incremental costs due to additional state regulation occurring outside of the section 7 consultation process.

As described in the Screening Analysis, existing economic literature suggests that critical habitat could affect property values. Similarly, comments received regarding proposed designations of critical habitat in various locations throughout the United States indicate that the public perceives critical habitat designation as potentially resulting in incremental changes to private property values, above and beyond any effects associated with specific forecast project modifications under ESA section 7. Further, public attitudes about the limits and costs that the ESA may impose can cause real economic effects on property owners, regardless of whether such limits are actually imposed (Industrial Economics, Inc. 2021). Because the proposed designation for the Louisiana pigtoe crosses mostly private lands, incremental costs from public perception of the designation could arise under Alternative B. However, some of the project area overlaps with previously designated critical habitat for other listed aquatic species, which increases the likelihood that landowners would already be aware of listed species. Therefore, perceptual effects on land values are possible as a result of critical habitat for the Louisiana pigtoe under Alternative B.

Under Alternative B, conservation of the Louisiana pigtoe could have various economic benefits, including benefits associated with recreational wildlife viewing and non-use values. However, additional efforts to conserve the Louisiana pigtoe are not forecasted. Because the designation is not expected to result in additional project modifications recommendations for the species, ancillary economic benefits are not expected (Industrial Economics, Inc. 2021).

## 3.12 ENVIRONMENTAL JUSTICE

### 3.12.1 Affected Environment

Federal agencies are required to “identify and address disproportionately high and adverse human health or environmental effects” of their programs and actions on minority populations and low-income populations, as directed by Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations).

As discussed in **Section 2.1**, there are 27 counties in Arkansas, Mississippi, Oklahoma, and Texas, and five parishes in Louisiana that contain occupied proposed critical habitat for the Louisiana pigtoe. The counties and parishes listed in Section 2.1 comprise the environmental justice analysis area. The USFWS used 2021 U.S. Census Bureau data to identify potential environmental justice communities. This section describes the methodology used to identify potential environmental justice populations. **Table 3-6** displays minority and low-income population by county and notes which counties and parishes met the criteria for being considered potential environmental justice counties/parishes.

The CEQ issued guidance for considering environmental justice within the NEPA process (CEQ 1997). This guidance defines minorities as individuals who identify as being one or more of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. The guidance further defines a minority population as follows: “Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis” (CEQ 1997). The CEQ guidance does not define what constitutes meaningfully greater.

The total minority populations are defined as the total population minus those who identify as white, of non-Hispanic descent. For this analysis, the USFWS used a threshold analysis and meaningfully greater analysis. The 50 percent threshold analysis involves identifying any counties or parishes with a total minority population of 50 percent or greater. Based on 2021 U.S. Census Bureau data, no counties or parishes met this threshold. For the meaningfully greater analysis, the USFWS used 110 percent of the minority percentage of the geographic reference area as the threshold for meaningfully greater (Environmental Justice Interagency Working Group 2016; BLM 2022). In this case, 110 percent of the total minority population for Arkansas, Louisiana, Mississippi, Oklahoma, and Texas (the reference areas) is 32 percent, 46 percent, 48 percent, 39 percent, and 65 percent, respectively (U.S. Census Bureau 2021a). Based on 2021 U.S. Census Bureau data, Howard and Sevier Counties, Arkansas, met the criteria for the meaningfully greater analysis. Thus, these two counties are considered environmental justice communities.

Low-income populations are defined relative to the annual statistical poverty thresholds from the U.S. Census Bureau (CEQ 1997). The CEQ guidance on environmental justice (CEQ 1997) defines low-income populations based on the U.S. Census Bureau’s annual statistical poverty thresholds. The CEQ guidance does not provide criteria for determining low-income populations as specifically as it does for minority

populations; however, for this analysis, the USFWS defines low-income individuals as people whose income is less than or equal to twice (200 percent of) the federal “poverty level” (Environmental Justice Interagency Working Group 2016; BLM 2022). For this analysis, the USFWS used a 50 percent threshold analysis and low-income threshold analysis. For the 50 percent threshold analysis, areas in which the percent of the population living at or below 200 percent of the poverty line exceeds 50 percent are considered low-income populations. Based on 2021 U.S. Census Bureau data, one county (Marion County, Mississippi) met this threshold (U.S. Census Bureau 2021b). For the low-income threshold analysis, any environmental justice analysis area that has a low-income percentage of the population equal to or higher than the reference area is identified as having a low-income environmental justice community of concern. The reference area in this instance is the respective state. Based on 2021 U.S. Census Bureau data, 21 counties and four parishes met the low-income threshold and are identified as having low-income environmental justice communities of concern for this analysis (see **Table 3-6**).

Howard County and Sevier Counties, Arkansas, were the only two counties with both minority and low-income population exceeding the low-income threshold and meaningfully greater threshold. A total of 21 counties and four parishes across the five states were identified as potential environmental justice communities (U.S. Census Bureau 2021a, b).

**Table 3-6. Environmental Justice Screening Results**

County	Total Population	Low-income Population	Low-income Population Exceeds Threshold?	Minority Population	Minority Population is Meaningfully Greater?
<b>Arkansas</b>	<b>3,006,309</b>	<b>38%</b>	-	<b>32%</b>	-
Howard County	12,894	46%	yes	37%	yes
Little River County	12,104	36%	no	27%	no
Sevier County	16,074	49%	yes	44%	yes
<b>Louisiana</b>	<b>4,657,305</b>	<b>38%</b>	-	<b>46%</b>	-
Allen Parish	23,085	40%	yes	30%	no
Rapides Parish	130,459	41%	yes	39%	no
St. Tammany Parish	262,799	26%	no	23%	no
Vernon Parish	49,064	41%	yes	30%	no
Washington Parish	45,794	49%	yes	35%	no
<b>Mississippi</b>	<b>2,967,023</b>	<b>41%</b>	-	<b>48%</b>	-
Marion County	24,609	50%	yes	36%	no
Pearl River County	55,972	35%	no	19%	no
<b>Oklahoma</b>	<b>3,948,136</b>	<b>36%</b>	-	<b>39%</b>	-
McCurtain County	31,112	46%	yes	40%	no
<b>Texas</b>	<b>28,862,581</b>	<b>33%</b>	-	<b>65%</b>	-
Anderson County	58,133	41%	yes	43%	no
Angelina County	86,584	43%	yes	40%	no
Cherokee County	50,564	40%	yes	41%	no
Gregg County	123,744	38%	yes	44%	no
Hardin County	56,124	30%	no	15%	no
Harrison County	68,674	37%	yes	38%	no
Houston County	22,288	47%	yes	39%	no
Jasper County	33,369	43%	yes	26%	no
Jefferson County	256,755	38%	Yes	61%	no
Liberty County	89,948	40%	yes	41%	no
Montgomery County	607,999	22%	no	36%	no

County	Total Population	Low-income Population	Low-income Population Exceeds Threshold?	Minority Population	Minority Population is Meaningfully Greater?
Nacogdoches County	64,822	44%	yes	41%	no
Orange County	85,045	28%	no	21%	no
Panola County	22,583	36%	yes	27%	no
Polk County	49,372	40%	yes	29%	no
Rusk County	52,542	33%	yes	37%	no
Smith County	231,429	32%	no	41%	no
Trinity County	13,695	40%	yes	23%	no
Tyler County	20,032	37%	yes	22%	no
Upshur County	40,781	37%	yes	20%	no
Wood County	44,615	33%	yes	19%	no

Source: U.S. Census Bureau 2021a, b

### 3.12.2 Environmental Consequences

#### Alternative A

Under the no action alternative, critical habitat would not be designated for the Louisiana pigtoe. As a result, there would be no environmental justice impacts due to critical habitat designation, as none would be designated. Under this alternative, federally supported actions that may affect the Louisiana pigtoe would require section 7 consultations under jeopardy standards in all areas occupied by the species. Analysis under the adverse modification standard would not be required because no critical habitat would be designated.

#### Alternative B

The designation of critical habitat is not expected to trigger additional requirements under state or local regulations. It is possible that the designation of critical habitat may cause some developers or landowners to perceive that private lands will be subject to use restrictions or litigation from third parties, resulting in costs. This could impact communities adjacent to the proposed units, including environmental justice populations. As described in **Section 3.11.1**, of the 27 counties across Arkansas, Mississippi, Oklahoma, and Texas and the five parishes in Louisiana with occupied proposed critical habitat, 21 counties and four parishes are considered environmental justice communities. Under Alternative B, designation of critical habitat for the Louisiana pigtoe could have a disproportionately high impact on minority and low-income populations in some portions of the analysis area. Adverse impacts on human health or the natural environment are not anticipated; however, potential impacts on environmental justice populations would be limited to economic impacts on the human environment.

Economic costs, distributed across all parties, would be less than \$100 million in any one year (Industrial Economics, Inc. 2021). Costs associated with designation of critical habitat for the Louisiana pigtoe are not likely to have a significant impact on low-income or minority populations because: 1) total costs are less than \$100 million in any one year; and 2) costs would be distributed among multiple agencies and private parties. Therefore, significant disproportionately high and adverse impacts on minority or low-income populations are unlikely.

### 3.13 RELATIONSHIP BETWEEN SHORT- AND LONG-TERM PRODUCTIVITY

Proposed designation of critical habitat is a programmatic policy that would have no effect on short- or long-term productivity.

### **3.14 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

Irreversible commitments of resources are those effects that cannot be reversed. For example, the extinction of a species is an irreversible commitment. Irretrievable commitments of resources are those that are lost for a period of time, but may be reversed, such as building a shopping center on farmland. The land cannot be used for farming again until the pavement is removed and soils are restored to productivity. Designation of critical habitat for Louisiana pigtoe would not result in irreversible or irretrievable commitments of resources.

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# Chapter 4. Council on Environmental Quality Analysis of Significance

The primary purpose of preparing an EA under NEPA is to determine whether a proposed action would have significant impacts on the human environment. If significant impacts may result from a proposed action, then an environmental impact statement is required (40 CFR 1502.3). Whether a proposed action exceeds a threshold of significance is determined by analyzing the context and the intensity of the proposed action (40 CFR 1508.27). Context refers to the setting of the proposed action and potential impacts of that action. The context of a significance determination may be society as a whole (human, national), the affected region, the affected interests, or the locality. Intensity refers to the severity of the impacts.

The context of short- and long-term impacts of the proposed designation of critical habitat for the Louisiana pigtoe includes portions of Little River, Sevier, and Howard Counties, Arkansas; Allen, Rapides, St. Tammany, Vernon, and Washington Parishes, Louisiana; and Marion and Peal River Counties, Mississippi; McCurtain County, Oklahoma; Anderson, Angelina, Cherokee, Gregg, Hardin, Harrison, Houston, Jasper, Jefferson, Liberty, Montgomery, Nacogdoches, Orange, Panola, Polk, Rusk, Smith, Trinity, Tyler, Upshur, and Wood Counties, Texas. Under regulations of the CEQ, which is responsible for ensuring compliance with NEPA, intensity is determined by considering 10 criteria (CFR 40 1508.27[b]): (1) beneficial and adverse impacts; (2) the degree of impacts on health and safety; (3) impacts on the unique characteristics of the area; (4) the degree to which the impacts would likely be highly controversial; (5) the degree to which the proposed action would impose unique, unknown, or uncertain risks; (6) the degree to which the proposed action might establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration; (7) whether the proposed action is related to other actions, which cumulatively could produce significant impacts; (8) the degree to which the proposed action might adversely affect locales, objects, or structures eligible for listing in the National Register of Historic Places; (9) the degree to which the proposed action might adversely affect an endangered or threatened species or its habitat, as determined to be critical under the ESA; and (10) whether the proposed action threatens a violation of federal, state, or local law. Each of these 10 points is considered as follows:

1. Potential impacts on environmental resources, both beneficial and adverse, would be minor. Impacts of critical habitat designation on natural resources within the areas proposed as Louisiana pigtoe critical habitat are analyzed and discussed in **Chapter 3**. Applying the analysis of impacts to the significance criteria identified above, the USFWS concludes that the adverse impacts of critical habitat designation would not be significant.
2. There would be no impacts on public health or safety from the proposed designation of critical habitat. No significant impacts on fire management activities or flood control would occur.

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# Chapter 5. Coordination with the Public

The following issues and concerns associated with the designation of critical habitat were identified through comments received during the public comment period (March 20 through May 19, 2023) on the proposed rule (88 *Federal Register* 16776; USFWS 2023a) and the public hearing held on May 2, 2023:

- Commenters are concerned that the mussel survey data is incomplete and relies on predictive analysis. Commenters request surveys of local densities of Louisiana pigtoe throughout its range, along with its habitat associations, to allow estimation of total population sizes within the different waterbodies. Specific concerns were expressed that:
  - population numbers for Louisiana pigtoe may be underestimated based on the recent discovery of greater depth preference and sampling bias towards public access areas;
  - expanding critical habitat outside of occupied habitat, through habitat prediction surveys or other subjective analyses, could result in a far-reaching extent that limits forest restoration, restricts management activities, impacts local economies, and increases forest fragmentation and conversion; and
  - scientific data regarding documented concentration levels, locations of parameter exceedance within the relevant river basins, and causal connection to current or future mussel population status is lacking.
- Commenters request that the state-approved best management practices and scientifically based forest management strategies be incorporated into the development of any ESA 4(d) rule and/or critical habitat designation to ensure the best available scientific and commercial data are used.
- Commenters requested the following components be considered when designating critical habitat:
  - Consider naturally occurring ambient water quality when identifying protective thresholds as components of critical habitat
  - Provide justification for the total ammonia nitrogen threshold as a component of critical habitat and consider its reasonableness
  - Include confirmed, rather than potential, fish host species as a component of critical habitat for the Louisiana pigtoe
  - Remove from the designation of critical habitat the Neches River Saltwater Barrier and areas downstream of the saltwater barrier
- Commenters are concerned that critical habitat designation would restrict the utilization of riparian and instream habitat and would cause a significant burden to foresters, water managers, and ranchers and threaten the livelihood of agriculture operations and other industries.

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## Chapter 6. Preparers and Contributors

This EA was prepared by an interdisciplinary team of staff from the USFWS and their consultant, Environmental Management and Planning Solutions, Incorporated (EMPSi). The following table lists those who prepared or contributed to the development of this EA.

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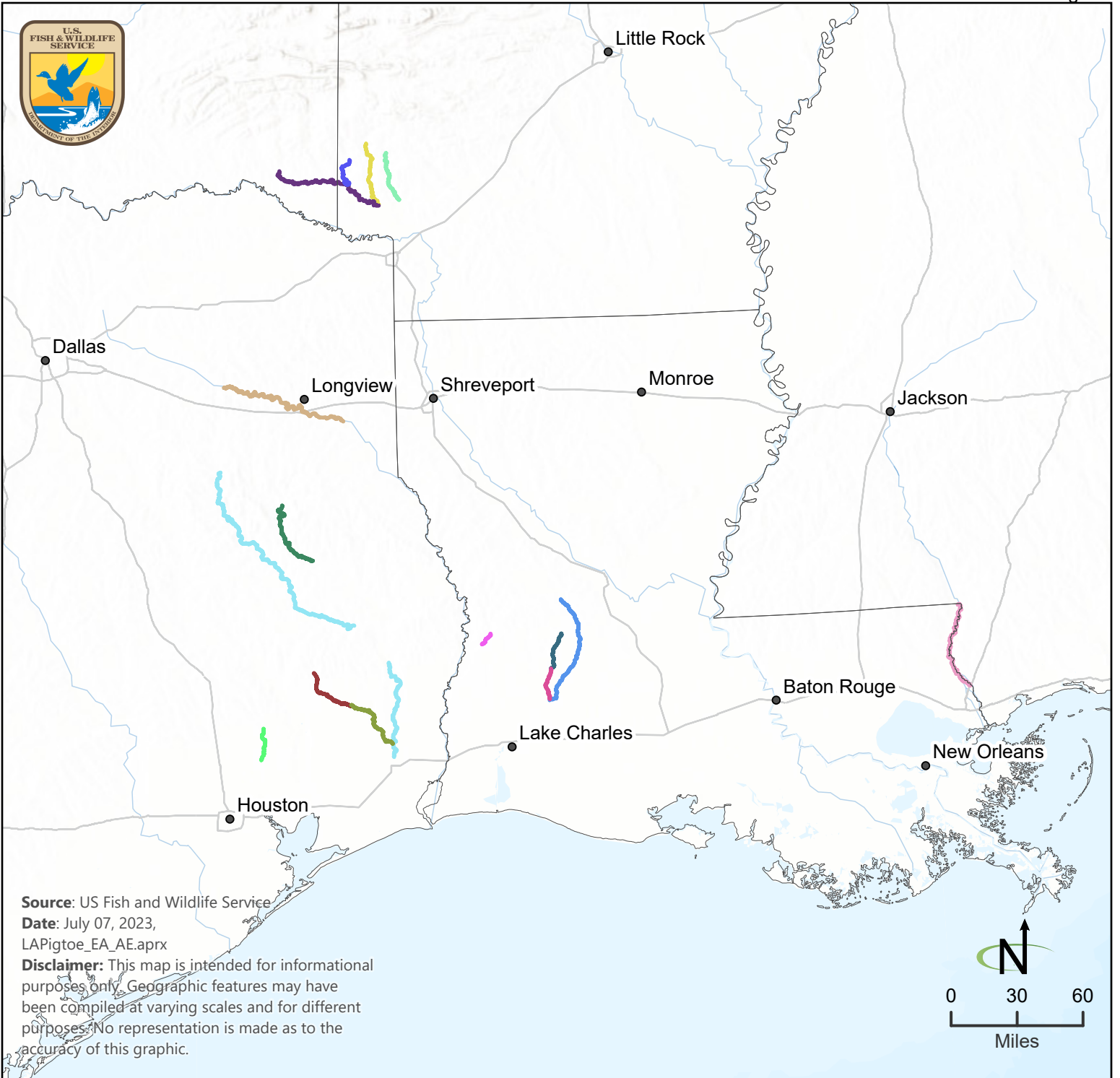
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# Appendix A

Figures

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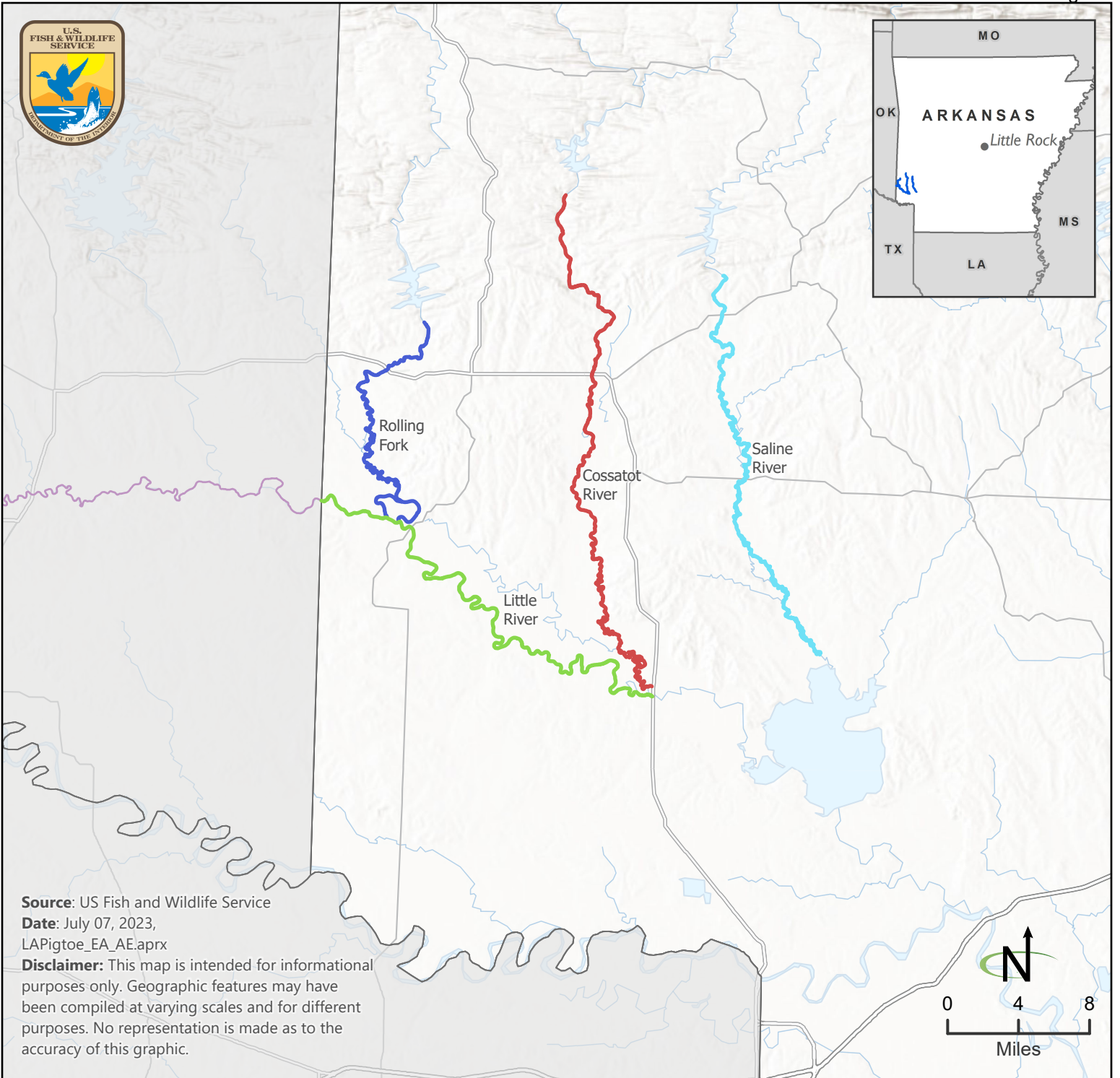
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**Figure 1**  
**LA Pigtoe Critical Habitat by Waterbodies**

- |                 |                             |                     |
|-----------------|-----------------------------|---------------------|
| Angelina River  | East Fork San Jacinto River | Sabine River        |
| Bayou Anacoco   | Little River                | Saline River        |
| Big Sandy Creek | Neches River                | Tenmile Creek       |
| Calcasieu River | Pearl River                 | Village Creek       |
| Cossatot River  | Rolling Fork                | Whisky Chitto Creek |

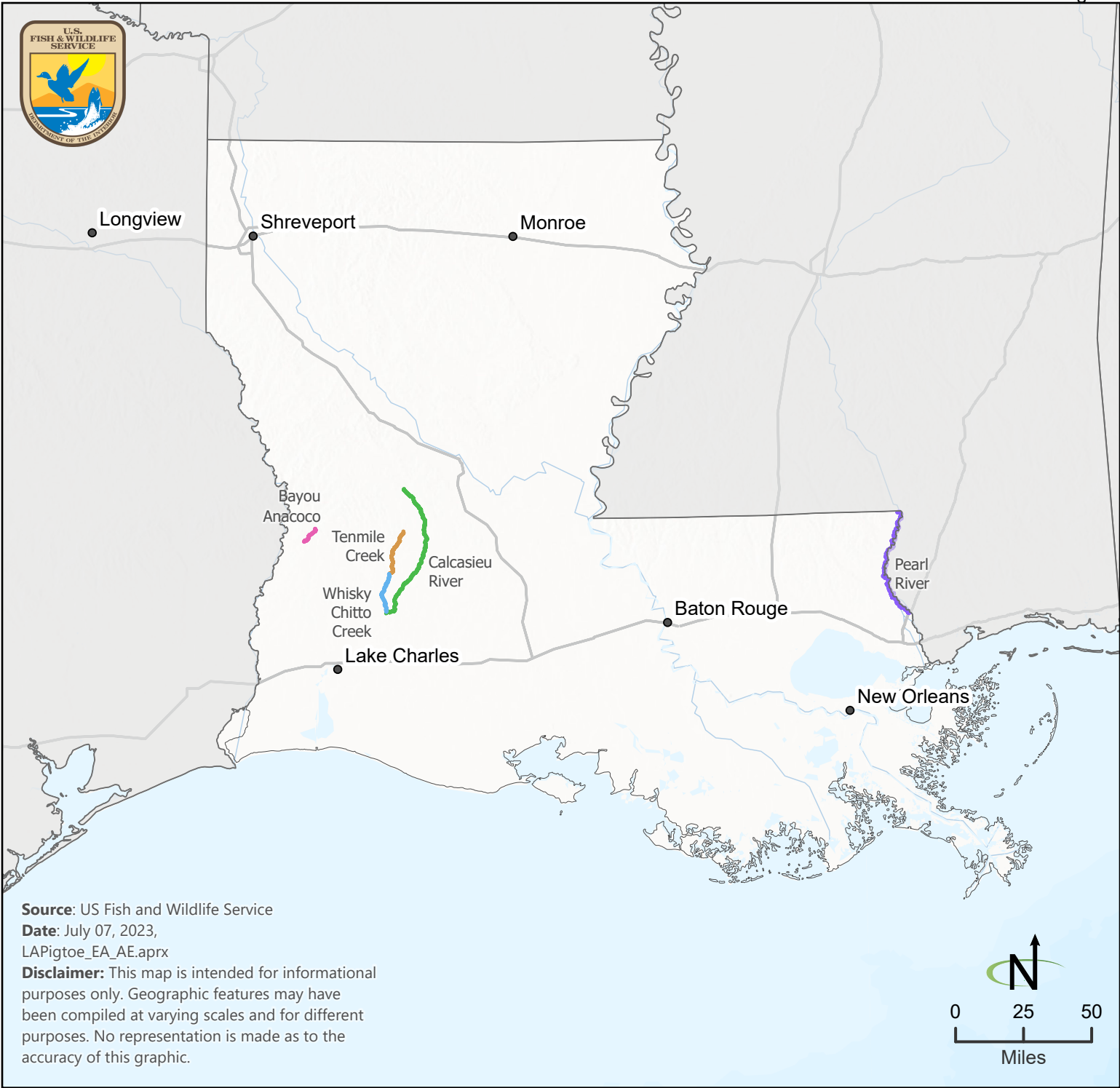




**Figure 2**  
**LA Pigtoe Critical Habitat in Arkansas**

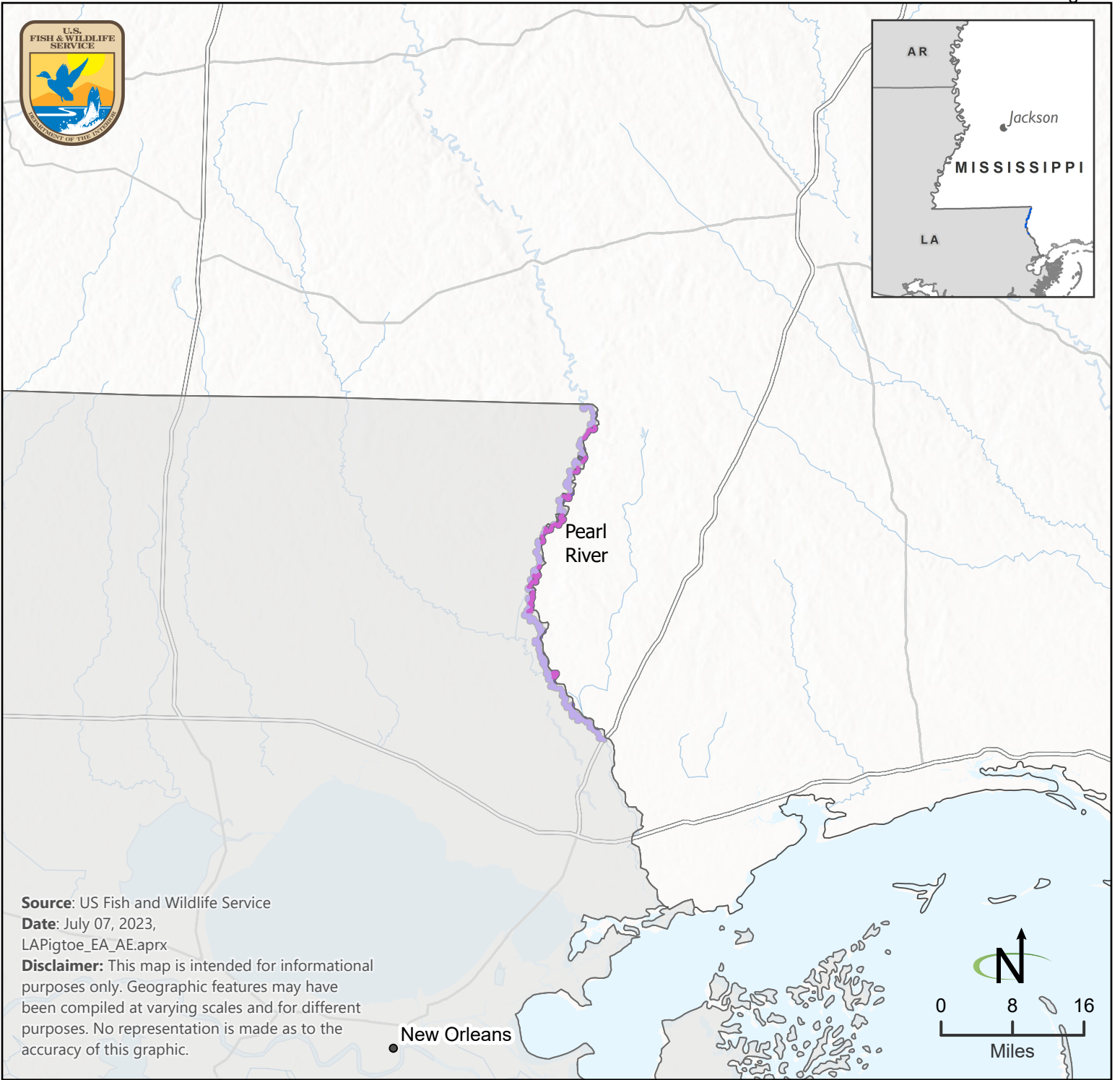
- LAPT-1a Little River
- LAPT-1b Rolling Fork
- LAPT-1c Cossatot River
- LAPT-1d Saline River





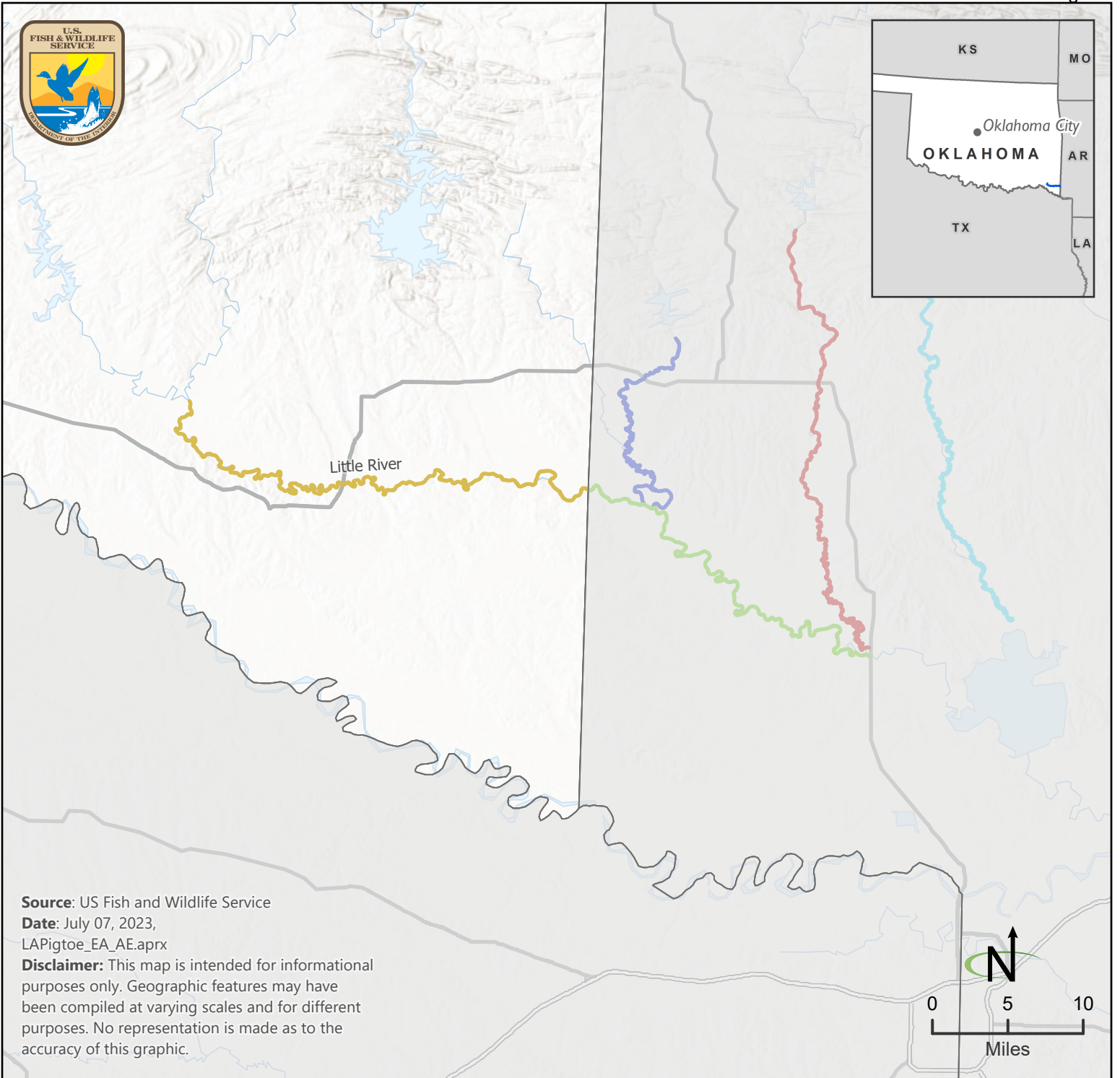
**Figure 3**  
**LA Pigtoe Critical Habitat in Louisiana**

- LAPT-2b Bayou Anacoco
- LAPT-5a Calcasieu River
- LAPT-5b Whisky Chitto Creek
- LAPT-5c Tenmile Creek
- LAPT-6a Pearl River



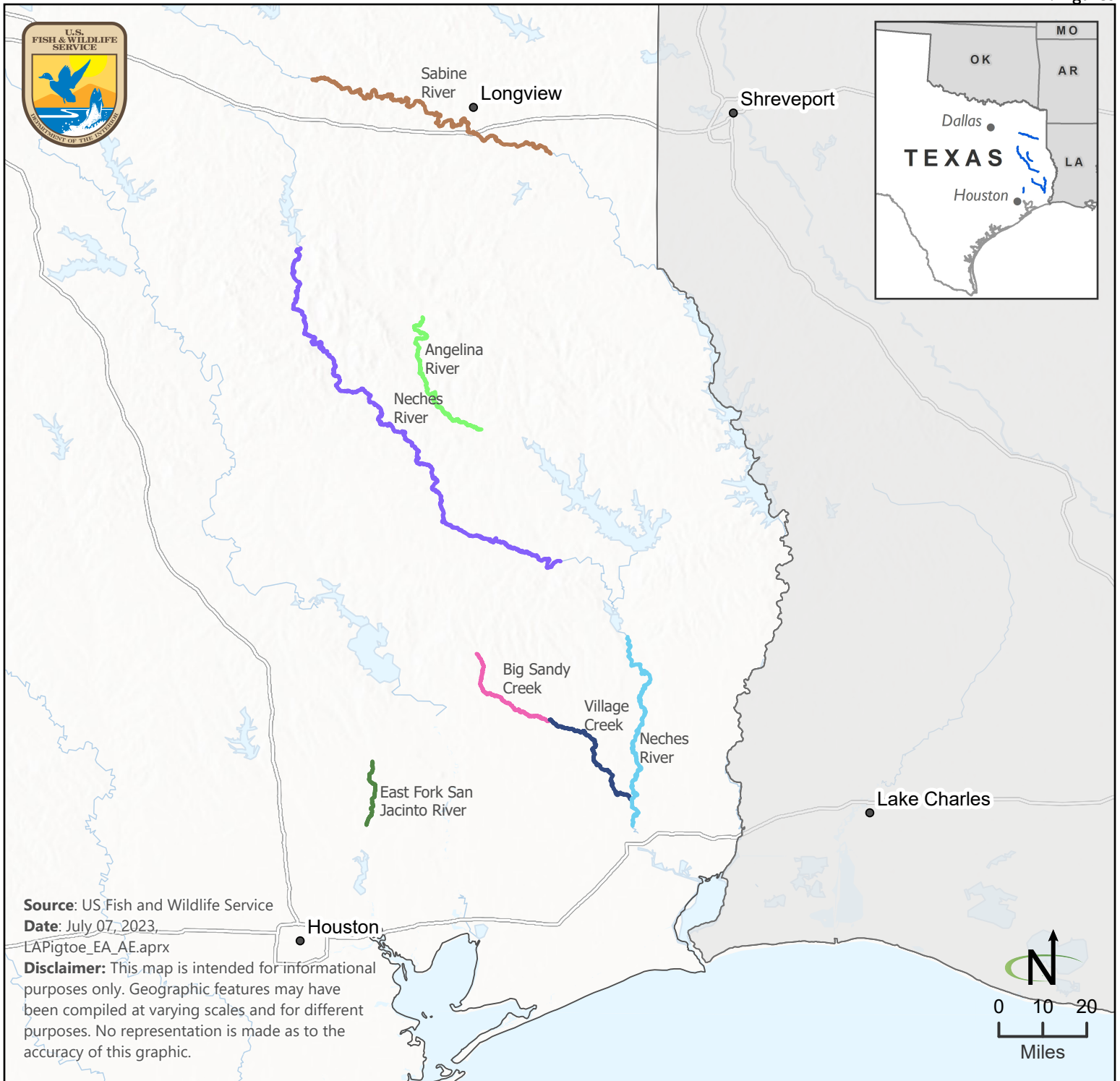
**Figure 4**  
**LA Pigtoe Critical Habitat in Mississippi**

— LAPT-6a Pearl River



**Figure 5**  
**LA Pigtoe Critical Habitat in Oklahoma**

— LAPT-1a Little River



**Figure 6**  
**LA Pigtoe Critical Habitat in Texas**

- LAPT-2a Sabine River
- LAPT-3a Neches River
- LAPT-3b Angelina River
- LAPT-3c Neches River
- LAPT-3d Village Creek
- LAPT-3e Big Sandy Creek
- LAPT-4a East Fork San Jacinto River