

Reevaluation

**White River & Relief Strs & Apprs
Clarendon, Monroe County**

Federal Aid Project BRN-0048(12)

Prepared by:

**U.S. Department of Transportation
Federal Highway Administration
Arkansas Division Office**

June 2017

Reevaluation

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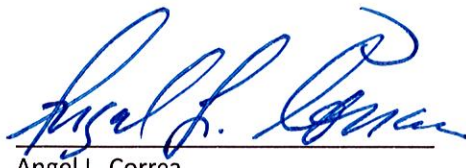
**Federal Aid Project BRN-0048(12)
Approval Memorandum**

An Environmental Assessment (EA) for this project was previously approved on February 29, 2000. A reevaluation of the EA was subsequently approved on August 16, 2005. A Finding of No Significant Impact (FONSI) was issued on December 20, 2006. Finally, a Design Reassessment was completed on May 26, 2010. These documents have been reviewed and examined for content, accuracy, and overall scope of work regarding the project. This Reevaluation then examined the current project and the potentially affected environment since the issuance of the EA, it's subsequent reevaluations and FONSI. After a thorough review and reconsideration of these documents based on additional environmental studies and approvals FHWA determines that all previous findings and decisions remain valid and that no new or additional significant impacts will result from the project. Based on this determination the activities on the subject project may continue to proceed.

Approval: _____

6/26/2017

Date



Angel L. Correa
Arkansas Division Administrator
Federal Highway Administration

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1.0 PURPOSE of REEVALUATION

This Reevaluation is being prepared by the Arkansas Division office of the Federal Highway Administration (FHWA) to examine February 29, 2000 Environmental Assessment (EA) for the White River & Relief Structures & Approaches Project, which includes construction a new Highway 79 bridge over the White River and to remove the older White River Bridge in Clarendon, Arkansas. This document is being prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), and all other applicable Federal and state laws and regulations, specifically 23 CFR § 771.129. The agency is required to complete a Reevaluation to update the analysis in prior NEPA documents when there are changes to the project which could affect the prior determination of potential environmental impacts. 23 C.F.R. § 771.129(c).

Following the issuance of the EA in February 2000 the project required completion an initial Reevaluation on August 16, 2005 since the project was not commenced within that time period. Following consideration of the 2005 Reevaluation a Finding of No Significant Impact (FONSI) was then issued on December 20, 2006. Following the issuance of a FONSI a reassessment of the design was considered in a second Reevaluation, which was approved on May 26, 2010. Work on the various portions of the project commenced after that time. This 2017 Reevaluation, the third completed on the project, is required given developments in the area since 2010. This document discusses the project background, considers the impacts of the listing of the western approaches of the bridge to the National Historic Register completed in 2015, considers the potential impacts on species recently listed as endangered in the area and reviews the newly proposed bicycle and pedestrian use.

2.0 PROJECT BACKGROUND

Following the issuance of the 2000 EA, the 2006 FONSI, and the later reevaluations, three construction projects have been let to contract to date. They are referenced as Arkansas State Highway and Transportation (AHTD) Job Nos. 110503, 110394, and 110395. These projects are summarized as follows:

110503: Let to contract in April 2009. This project constructed a portion of the new western approach across Roc Roe Bayou with a temporary connector back to the existing Highway 79. It also removed the existing portion of Highway 79 up to the temporary connector (including Bridge B01253 over Roc Roe), restored the natural topography, and provided vehicular access down to the Roc Roe Bayou. This work was completed to comply with the requirements of the Compatibility Determination (CD) included as Appendix A.

110394: Let to contract in July 2010. This project built the new location Bridge over the White River, south of the old bridge, and a new eastern approach in the City of Clarendon.

110395: Let to contract in November 2010. This project built the new location western approach from the temporary connector to the new White River Bridge.

These three projects have completed the construction of the new roadway and new bridges required for the new Highway 79 crossing of the White River.

AHTD plans to now undertake Job No. 110540 which will remove the remainder of old Highway 79, including two bridges (No. 01253 and No. B1253) and embankment, which starts in the City of Clarendon with the eastern approach, spans the White River and in its western approach runs through the Cache and White River National Wildlife Refuges (Refuges) to connect with the new Highway 79. This project is anticipated to be let to contract in July 2017. Figure 1 illustrates the proposed project area.

On December 6, 2007, the U.S. Fish and Wildlife Service (USFWS) approved a CD that determined the replacement of the Highway 79 structures and approaches with the construction of a new bridge structure, was compatible with the purposes and missions of the Cache River and White River National Wildlife Refuges. The approval of the CD was based on commitments made in the August 16, 2005 environmental document. These commitments were included as stipulations in the CD and the Exchange Deed for the highway easement between the AHTD and USFWS.

Stipulation No. 1 states that the bridge structures and embankment through the Refuges will be demolished and all resultant materials removed; the right of way will be restored to natural topography; and native hardwood vegetation will be reestablished on the right of way. Per the stipulations, the Roc Roe Bayou Bridge has already been demolished, the approaches have been restored, and vehicular access for Refuge visitors has been provided on both the east and west sides of the bayou. Most of the remaining stipulations are scheduled to be completed during Job No. 110540, with the remainder being completed soon thereafter, including releasing the right of way easement following the completion of the project. A summary of the stipulations and the status of their completion is shown in Appendix A.

The old White River Bridge (No. 01253) over the White River was originally listed in the National Register of Historic Places (NRHP or Register) on November 1, 1984 as part of the Clarendon Multiple Resource Area submission as a historic district; thus, only the main metal truss bridge spans (Figure 2), and the eastern approach and retaining walls were listed in the NHRP at that time. The western approach is located outside of Clarendon and lies within the Cache and White River Refuges. In 1992, the AHTD submitted Historic American Engineering Record (HAER) standard photography and a written history of the Clarendon Bridge to the National Park Service's Heritage Documentation Program, which is listed in the Library of Congress records as AR-49. The original Memorandum of Agreement (MOA) between the Federal Highway Administration (FHWA), the AHTD, and Arkansas State Historic Preservation Officer (SHPO) for removal of the bridge was executed and accepted by the Advisory Council on Historic Preservation on April 18, 1997. Due to the adverse effect on the historic Clarendon Bridge, all parties agreed in the MOA that the bridge should be documented to Arkansas Historic Preservation Program (AHPP) standards. The AHTD also submitted an Arkansas Architectural Resource Form, dated February 20, 2013, including photographs of the bridge and approaches, along with a location map and the original bridge plans to the SHPO.

3.0 Listing of Western Approaches in 2015

In August 2015, the AHPP State Review Board submitted an amendment to the Register nomination adding the remainder of the western approach, which included the East Old River Lake Bridge (the western approach of AHTD Bridge No. 01253), and the West Old River Lake Bridge (No. B1253), along with the roadway on built embankment. While the AHTD disagreed with the manner in which these structures were nominated to the register, this amended the original nomination in the National Register of Historic

Places (NRHP) on September 28, 2015. This action completed the listing of the remaining structures built in the 1931 bridge project over the White River.

The original MOA signed by the AR SHPO, FHWA, AHTD, and the ACHP was amended in May 2017 to address the NHRP listing of AHTD Bridge Numbers 01253 and B1253 as discussed above. These structures and approaches will be documented by AHTD to the AHPP standards and provided to the Arkansas SHPO. The documentation already created and planned meets and exceeds the AHPP standards. A copy of the executed amended MOA is included at Appendix B.

Section 4(f) of the DOT Act of 1966 does not apply to the western approaches that were placed on the Register in September 2015. The designation of the western approaches was made approximately ten years after the FONSI was signed for the project. In light of this fact, FHWA has determined that Section 4(f) does not apply to the western approaches, as a significant amount of coordination was conducted with the SHPO in good faith regarding the eligibility of the western approaches when the original EA was completed and FONSI signed in 2006 (23 U.S.C. 303 and 23 C.F.R. 774). To verify, this consultation was completed with Office of Planning, Environment & Realty (HEP) and after reviewing Section (f) Policy Paper dated July 20, 2012, specifically Part II, Question 26.

4.0 Bicycle & Pedestrian Use

The AHTD's draft Arkansas Bicycle and Pedestrian Plan does not show any trails or proposed trails at or near Clarendon, although there was public interest expressed during the public outreach process about retaining the Clarendon Bridge for that purpose. However, this proposal is not included as a part of any long range plan. AHTD's Bicycle Facility Accommodation Policy, dated June 28, 2005, states in part that "accommodation of bicycles will be given due consideration when a proposed highway project is on a route that has been designated as a bicycle route by a locally adopted bicycle plan or master street plan and the Department concurs that the route should be a designated bicycle route...When bicycle accommodations are to be made on routes with an open shoulder section, the paved shoulder will be used to accommodate bicycles..." The newly constructed portion of Highway 79 will accommodate bicycles on its 8 foot shoulders.

5.0 Endangered Species Surveys & Coordination

Following the approval of the Reevaluation on August 16, 2005, the USFWS issued a letter (June 21, 2006) concurring with the determination that the project was not likely to adversely affect threatened or endangered species. This determination was based on negative survey results for the Ivory-billed Woodpecker (*Campephilus principalis*), the pink mucket mussel (*Lampsilis abrupta*), and the fat pocketbook mussel (*Potamilus capax*). In addition to the negative survey findings the AHTD agreed to relocate all mussels from the direct footprint of the project. Between August 17-26, 2010 AHTD personnel relocated 2,722 freshwater mussels representing 27 species from the construction footprint of the new bridge. One of the species collected and relocated during this effort was the rabbitsfoot mussel (*Quadrula cylindrica cylindrica*). Eleven individuals were relocated to two areas upstream of the collection site. During informal consultation with the USFWS during late 2012, it was determined that a freshwater mussel survey of the footprint of the demolition project would be conducted within the calendar year prior to the demolition activities to comply with Section 7 Endangered Species Act requirements.

On September 17, 2013, the USFWS listed the rabbitsfoot mussel as threatened under the Endangered Species Act. On April 30, 2015, the USFWS designated the segment of the White River beginning at US Highway 79 at Clarendon, AR and extending downstream to Highway 1 near St. Charles, AR as critical habitat unit RF8b (see Appendix C of this document). In anticipation of the scheduled demolition, the AHTD contracted Ecological Specialists Inc. (ESI), to complete the survey. It was conducted July 12-13, 2016 and yielded a total of 802 mussels of 22 species; however, no threatened or endangered species were collected (ESI 2016). The report was submitted to USFWS September 1, 2016 by FHWA. USFWS responded on September 15, 2016 that the survey was adequate and complete. A biological assessment was completed by AHTD to address the critical habitat issue for the rabbitsfoot mussel and submitted by FHWA to the USFWS on November 14, 2016. A biological opinion was issued by the USFWS on November 18, 2016 in which the USFWS stated that "based on the negative results of the survey, any potential effects to these species are unlikely and discountable since none of these species were found within the surveyed area. Furthermore, any effects to these species outside of the survey area are also unlikely and discountable due to the use of BMPs, similar habitat type, distance, and lack of records for these species in the vicinity of the action". Copies of this correspondence is included at Appendix D of this document.

6.0 Permit Revisions

On November 10, 2008, the US Army Corps of Engineers (USACE) issued Permit No. MVM 2008-00267. This permit covered all construction and demolition activities to be completed under AHTD Job No. 110123. Compensatory mitigation for the unavoidable loss of 75.8 acres of wetlands was provided at the Brushy Lake (539.5 mitigation credits) and Glaise Creek (469.8 mitigation credits) mitigation banks.

A permit modification, MVM 2008-00267-1, was requested and issued June 18, 2010, due to revisions in the White River Bridge bent locations. At the request of the USFWS, an additional modification (MVM 2008-00267-2) was granted July 25, 2012 to allow a portion of the temporary construction work roads to become permanent USFWS access roads. A request for extension and modification for Job 110540 was submitted to the USACE on August 8, 2016, and is pending approval. The modification request was submitted to allow temporary fills into the White River generated by dropping the existing bridge into the channel during demolition.

The U.S. Coast Guard (USCG) issued Bridge Permit (6-10-8) for the proposed Clarendon Highway Bridge, Mile 98.7 White River on June 8, 2010. Condition 6 requires the existing bridge be removed within 90 days after the new bridge is open to traffic. The new bridge was opened to traffic and the old bridge closed to traffic in August 2016. On May 29, 2014 the USCG stated its willingness to allow the existing bridge structure to remain in place, if there was a desire to retain the bridge for a transportation use.

7.0 Transfer of Bridge in Place (Additional Considerations)

At the time this Reevaluation was prepared, the FHWA and AHTD were discussing transferring the main span over the White River and the eastern approach in Clarendon city limits to the City of Clarendon. If this occurs, additional coordination with the USFWS regarding Section 7 of the Endangered Species Act and refuge compatibility, the Army Corps of Engineers regarding Section 10 of the Clean Water Act, and the U.S. Coast Guard will be required. This coordination would need to be addressed in a separate environmental document.

8.0 Conclusions

In completing this Reevaluation, FHWA determines that the Finding of No Significant Impact (FONSI) from December 20, 2006 still remains valid and that the project may proceed.

Figures 1-2

Figure 1. Project area showing newly opened Hwy 79 Bridge to the south of the old Hwy 79 White River Bridge, the Town of Clarendon to the east, and USFWS refuge property to the west.



Figure 2. Main span of Old Hwy 79 White River Bridge at Clarendon, AR



Appendix A

U.S. Fish & Wildlife Service

Compatibility Determination and Stipulations

COMPATIBILITY DETERMINATION

REPLACEMENT OF U.S. HIGHWAY 79 STRUCTURE AND APPROACHES NEAR THE CITY OF CLARENDON IN MONROE COUNTY, ARKANSAS

USE: Granting of replacement right-of-way for existing Hwy. 79 for the purpose of new bridge (and approaches) construction over the White River and associated floodplain.

REFUGE NAME(S): White River National Wildlife Refuge (Established in 1935), Cache River National Wildlife Refuge (Established in 1986)

ESTABLISHING AND ACQUISITION AUTHORITIES:

White River NWR

Executive Order 7173, 4 September 1935; Migratory Bird Conservation Act

Cache River NWR

Emergency Wetlands Act; Migratory Bird Conservation Act; Fish and Wildlife Act of 1956

REFUGE PURPOSE(S):

White River NWR

"... As a refuge and breeding ground for migratory birds and other wildlife..." (Executive Order 7173, 4 September 1935).

"...For use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act).

"... Shall be administered by him [Secretary of the Interior] directly or in accordance with cooperative agreements...and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife, resources thereof, and its habitat thereon..."(Fish and Wildlife Coordination Act).

"...Suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species..." 16 U.S.C., 460k-1"... the Secretary...may accept and use ...real...property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors..." 16 U.S.C., 460k-2 (Refuge Recreation Act; 16 U.S.C., 460k-460k-4, as amended).

"...Provide environmental and economic benefits to the State of Arkansas...and to the Nation." (Arkansas-Idaho Exchange Act of 1992).

COPY

Cache River NWR

"... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act).

"... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and help to fulfill international obligations contained in various migratory bird treaties and conventions ..." 16 U.S.C. 3901 (b) (Emergency Wetlands Resources Act of 1986).

"... for the development, advancement, management, conservation, and protection of fish and wildlife resources..." 16 U.S.C. 742f (a) (4). (Fish and Wildlife Act of 1956).

"... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. 742(b) (1) (Fish and Wildlife Act of 1956),

"(1) to protect, enhance, restore, and manage an appropriate distribution and diversity of wetland ecosystems and other habitats for migratory birds and other fish and wildlife in North America;

(2) to maintain current or improved distributions of migratory bird populations; and,

(3) to sustain an abundance of waterfowl and other migratory birds consistent with the goals of the North American Waterfowl Management plan and the international obligations contained in the migratory bird treaties and conventions and other agreements with Canada, Mexico, and other countries." 16 U.S.C. 4401 (North American Wetlands Conservation Act)."

NATIONAL WILDLIFE REFUGE SYSTEM MISSION: The mission of the National Wildlife Refuge System is "to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

DESCRIPTION OF USE: The proposed project consists of providing replacement right-of-way to the State of Arkansas through the Arkansas Highway and Transportation Department (AHTD) for the construction of new structures spanning the White River, Old River Lake, Roc Roe Bayou, and the St. Louis Southwestern Railroad on the White River National Wildlife Refuge (Refuge). An environmental assessment conducted as part of National Environmental Policy Act compliance by the Federal Highway Administration (FHWA) and the AHTD (Environmental Assessment AHTD Job Number 110123 FAP Number BRN-0048(12) White River & Relief Strs. & Apprs. (Clarendon) (Hwy. 79) Monroe, County Arkansas; approved February 29, 2000) and an accompanying Finding of No Significant Impact issued by FHWA December 20, 2006 demonstrated that there

was no feasible and prudent alternative to the currently proposed location for the project on national wildlife refuge lands due to the fact that the current right-of-way for U.S. Hwy. 79 serves as the southern boundary of Cache River NWR and the northern boundary for White River NWR. The White River NWR boundary extends uninterrupted for over 50 miles to the south, making a southern avoidance alternative unfeasible. The Cache River NWR boundary extends uninterrupted for over 10 miles to the north with the exception of one small break in ownership approximately 5.5 miles north of the current location of Hwy. 79. However, this area is not suitable to bridge construction due to a sharp bend in the river that would cause navigation, engineering, and safety concerns.

The proposed project will consist of approximately 4.7 miles of construction on new alignment immediately south of the existing alignment with a roadway cross-section of two 12-foot lanes with eight-foot shoulders. The White River Bridge will provide a minimum of 52 feet clearance above the two percent flow line of 170 feet for the width of the proposed 283-foot wide channel span (between piers). This project will replace the existing roadway approaches and bridges over the White River, Old River Lake, and Roc Roe Bayou because these structures are functionally and structurally deficient and pose public safety concerns. The replacement structures will enable safe vehicular passage and improve the hydrological conditions for the Refuges due to increased elevated spans across the floodplain.

AVAILABILITY OF RESOURCES: All resources for the actual project costs will be provided by funds made available by the FHWA and the AHTD. Resources provided by the Service will include replacement right-of-way for the existing Hwy. 79 structures and approaches, and staff participation needed to process permits, monitor and ensure compliance with SUP conditions, and various other administrative tasks associated with the project.

ANTICIPATED IMPACTS OF THE USE: There are numerous negative impacts from construction of the proposed highway project that could potentially affect wildlife and/or their habitats on refuge lands. These include, but are not limited to, impacts to threatened or endangered species, migratory birds, forested wetlands and uplands, and other wildlife (black bear, white-tailed deer, turkey, small mammals). Public use impacts will also result from the proposed project. Positive impacts on aquatic and terrestrial habitats and associated fish and wildlife populations also will result from implementation of this project. These issues are addressed in the following paragraphs.

Threatened and Endangered Species

Three federally listed endangered species potentially occur within the project vicinity: the endangered pink mucket mussel (*Lampsilis abrupta*), the endangered fat pocketbook mussel (*Potamilus capax*), and the recently rediscovered Ivory-billed Woodpecker. The endangered plant pondberry (*Lindera melissafolia*) has been recorded from Monroe County but is not known to occur within the project action area. Extensive surveys for all endangered species revealed that none were present in the area of impact. A determination that the project was "not likely to adversely affect" any of the endangered species listed above was made by the FHWA and concurrence was issued by the Service

on June 21, 2006. Conditions ultimately will be improved for mussels as well other aquatic organisms because of enhanced hydrologic function and habitat restoration.

Migratory Birds

The primary purpose of the Refuges is migratory bird conservation, specifically waterfowl. Impacts to waterfowl and other birds such as neotropical migrants resulting from construction work will be in the forms of noise disturbance and destruction of habitat. Such impacts will occur over five to seven years of construction. Habitat restoration and enhanced management that will occur as a result of this project will provide potential long-term benefits to these species by increasing available habitat.

Forested Wetlands and Uplands

A total of 79 acres of forested and farmed wetlands and 0.8 acre of forested upland will be directly impacted through permanent conversion to right-of-way for the new alignment of Hwy. 79. However this loss will be countered by restoration of adjacent habitat and management of replacement habitat for wildlife values. Additional acreage may be temporarily impacted through construction of work roads, soil compaction, and interruption of floodplain flows.

Other Wildlife

Wildlife such as black bear, white-tailed deer, turkey, small mammals, and aquatic fauna will be affected during the course of the project as a result of habitat destruction, noise, and other disturbance associated with large scale construction projects. These disturbances may result in direct mortality or interruption in important life history aspects such as feeding or breeding. Removal of existing bridge superstructures and piers will likely result in minor, temporary, localized fish kills and death of other aquatic fauna such as freshwater mussels, turtles, etc.; however, overall conditions ultimately will be improved. Reclamation and restoration of former right-of-way could result in direct mortality of wildlife within the project area; however, the ultimate outcome will be a positive benefit to wildlife due to improved habitat conditions.

Public Use

Construction activities will occur over five to seven years in areas frequently accessed by the public for fishing, hunting, camping, and wildlife viewing. Noise and construction activity will negatively impact these public uses in portions of the project area at least periodically throughout the duration of the project. Reclamation of the historic borrow pits will eliminate popular fishing areas used by local anglers, but will provide long-term benefits to other users interested in hunting, or observing/photographing wildlife that will be attracted to habitats restored to a more natural (pre-construction) condition.

PUBLIC REVIEW AND COMMENT:

This Draft Compatibility Determination was available for comment from October 22, 2007 – November 21, 2007 through a local news release provided to the following newspapers: *Brinkley Argus*, *Daily Leader*, *Daily World*, *DeValls Bluff Times*, *Grand Prairie Herald*, *Monroe County Sun*, *Stuttgart Daily Leader*, *Times Herald*, *White River Delta Dispatch*, *White River Journal*, and *Woodruff County Monitor*. In addition, public

notices were printed in *Monroe County Sun and the Arkansas Democrat-Gazette*. Copies of the Proposed Draft Compatibility Determination were available for public review at White River NWR headquarters in St. Charles, Arkansas or Cache River NWR headquarters in Dixie, Arkansas. Copies of the Draft Compatibility Determination were requested and sent to Tricia Rogers of Clarendon and J.T. Davis of Roe. No comments were received by the close of comment period.

DETERMINATION (CHECK ONE BELOW):

USE IS NOT COMPATIBLE

USE IS COMPATIBLE WITH THE FOLLOWING STIPULATIONS

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

1. Bridge Numbers 01253, B1253, and A1253 crossing White River, Old River Lake, and Roc Roe Bayou will be demolished and all resultant materials removed, the right-of-way will be restored to natural topography, and native hardwood vegetation will be re-established at these sites.
2. Borrow pits adjacent to the existing roadway fill sections will be restored to natural topography utilizing the existing roadway fill, and native hardwood vegetation will be re-established at these sites. A special provision will specifically direct the construction sequencing for filling of the borrow pits in order to minimize adverse impacts to aquatic resources during the restoration. As borrow pits are restored from east to west, passageways for fishes and other aquatic organisms will be maintained to allow retreat into Roc Roe Bayou.
3. Abandoned right-of-way that is legally entitled to the United States of America will be so deeded in fee title for incorporation into the Refuges.
4. Vehicular access for Refuge visitors will be provided to Roc Roe Bayou and the Refuges on both the east and west sides of the bayou.
5. Vehicular access, paved parking area to accommodate 20 vehicles and boat trailers, and a concrete boat ramp for use by Refuge visitors will be provided in the vicinity of the existing First Old River Lake boat ramp.
6. Property identified for reforestation in order to achieve enhanced hydrologic conditions on the Refuges as a result of two dimensional surface water velocity conditions described in Alternative 2 in Water-Resources Investigations Report 02-4256, and as subsequently defined by correspondence provided to the AHTD dated March 18, 2004 and June 17, 2005 will be acquired by AHTD. The portion required as replacement property for taking Refuge land will be provided to the United States in fee title. Any remaining property acquired by AHTD and not deeded to the United States will be

managed as part of the Refuges contingent on mutually acceptable Memorandum of Agreement between the responsible agencies.

7. Large “entering and leaving” refuge signs will be furnished and erected on the new highway right-of-way. Service personnel will be consulted concerning sign design.

8. Useable material from the project that is salvageable will be made accessible to the Service upon request for use on the Refuges. However, all material excess to the Service needs will be removed from the Refuges and properly disposed of off site.

9. AHTD will complete all necessary environmental, cultural resource, and other reviews and analyses, properly fulfill all public and agency coordination processes, and secure all required local, state, and federal permits prior to performing any construction activities on the Refuges.

JUSTIFICATION: The following justification(s) for the proposed project will be addressed in relation to the anticipated impacts of the use.

Threatened and Endangered Species

Surveys were conducted for three federally listed endangered species that potentially occur within the project vicinity: the pink mucket mussel (*Lampsilis abrupta*), the fat pocketbook mussel (*Potamilus capax*), and Ivory-billed Woodpecker. No specimens of any species were encountered. A determination that the project was “not likely to adversely affect” any of the endangered species listed above was made by the FHWA and concurrence was issued by the Service on June 21, 2006. Habitat for each species is present in the project area and could become occupied in the future. Short term impacts to available habitat will be offset by the benefits of habitat restoration that will occur as a result of the proposed project. Restoration of former right-of-way, acquisition of adjacent agricultural properties with subsequent reforestation, and substantially longer elevated spans for all bridges will improve hydrologic functions (as demonstrated by the U.S. Geological Survey Water-Resources Investigations Report 02-4256) that were disturbed by the historic project.

Migratory Birds

As discussed previously, negative short-term impacts to available habitat for migratory birds will be offset by the positive benefits of habitat restoration that will occur as a result of the proposed project. Also, acreage added to the Refuges as a result of the project will provide additional habitat for migrating waterfowl and other species of migratory birds. More than 212 acres of current agricultural field will be reforested. Some of this will be deeded to the United States in fee title to be incorporated into the Refuges as replacement property, and the remainder acquired for flow velocity mitigation of impacts to fish and wildlife resources and will be made available for Service management through a formal Memorandum of Agreement. Management rights to the 320-acre AHTD Brushy Lake Wetland Mitigation Bank, which is adjacent to the project area and the White River NWR on the east side of the White River, will also be granted to the Service through

formal Memorandum of Agreement. In total, an additional 532.2 acres of habitat suitable for migratory birds will be made available for refuge management.

Forested Wetlands and Uplands

Forested and farmed wetlands that will be negatively impacted by the project will be mitigated through replacement lands and through Section 404 of the Clean Water Act compliance. A total of approximately 79.8 acres (west of White River) will be negatively impacted by the project. Of this acreage, 51.9 acres is Service property with 51.1 acres of wetlands and 0.8 acre of upland. The remaining 27.9 acres of private in-holdings are also delineated as farmed or forested wetlands. Approximately 212.2 acres (195 acres south of Hwy. 79 and 17.2 acres north of Hwy. 79) of farmed wetland within the area of impact will be added to the Refuges (either deeded in fee title or through management rights) and restored as replacement property or for mitigation purposes. Any additional wetland impacts will be debited from the 320-acre Brushy Lake Wetland Mitigation Bank. The relatively small amount of upland (0.8 acre) to be converted to right-of-way is negligible in the context of the Refuges resources.

Other Wildlife

Black bear, white-tailed deer, turkey, small mammals, and aquatic fauna that will be negatively affected as a result of the project will also receive some benefits. Longer elevated bridge spans around water bodies and in the Refuges floodplains will provide greater opportunity for wildlife passage through the area without the need to cross the roadway surface. Greater sight distances for motorists will help reduce wildlife mortality from vehicle strikes. Acreage added to the Refuges will provide additional habitat for the benefit of numerous species of wildlife, and improved hydrologic functions that result from the project will improve habitat for aquatic flora and fauna as well.

Public Use

Conditions of the current highway and bridge spans are obsolete, structurally deficient, and not up to current standards for safety of roadway users, including visitors to the Refuges. Bridge approach embankments are unstable, and the travel lanes and shoulders require frequent maintenance.. The project area serves as a major access artery to the Refuges and the completed project will result in increased safety and reduced risk of visitor injury or death. Following project construction, public access to Roc Roe Bayou and Old River Lake in particular will be safer and much improved due to wider shoulders, improved sight distances, safer ingress/egress points, new boat launches, and adequate parking areas.

Noise and construction activity will negatively impact most of the project area for public uses such as fishing, camping, and hunting at least periodically throughout the duration of the project. However, public access to all current facilities will be maintained throughout project construction. Additional acreage added to the Refuges will also provide hunting, fishing, and wildlife viewing opportunities to the public in areas not previously accessible due to private ownership. Restored areas will provide additional benefit to visitors seeking to engage in Priority Public Uses on the Refuges.

NEPA COMPLIANCE FOR REFUGE USE DECISION (check one below):

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact (FONSI)
The proposed project was evaluated in a February 29, 2000 Environmental Assessment and subsequent re-evaluation dated June 29, 2005 by the FHWA and the AHTD. The FONSI was issued by the FHWA on December 20, 2006.

Environmental Impact Statement and Record of Decision

Signature: Refuge Manager: *Jonathan L. Hendley* 11/23/07
(Signature and Date)

Signature: Refuge Manager: *Dennis W. Sharp* 11/26/07
(Signature and Date)

REVIEW: REGIONAL
COMPATIBILITY COORDINATOR *Steve Seibert* 12/6/07

Review: Refuge Supervisor: *Stephen [unclear]* 11/30/07
(Signature and Date)

Concurrence: Regional Chief: *Jon [unclear]* 12-6-07
(Signature and Date)

MANDATORY RE-EVALUATION DATE (provide month and year):

Mandatory 15-year Re-Evaluation Date (for priority public uses)

Mandatory 10-year Re-Evaluation Date (for all uses other than priority public uses)

Mandatory 10- or 15-year Re-evaluation Date: 12-06-2017

No.	Stipulations Necessary To Ensure Compatibility	Current Status
1	<ul style="list-style-type: none"> • Bridge Numbers 01253, B01253, A1253 crossing White River, Old River Lake, and Roc Roe Bayou will be demolished and all resultant materials removed, and the right-of-way (ROW) will be restored to natural topography. • Native hardwood vegetation will be re-established at these sites. 	<ul style="list-style-type: none"> • Bridge No. A1253 crossing Roc Roe Bayou was demolished and the associated ROW restored to natural topography during Job No. 110503. • The remaining bridges through the Refuge will be demolished, removed and the ROW restored to natural topography during Job Number 110540. • Planting with hardwood vegetation will be performed after the contractor has completed the work.
2	<ul style="list-style-type: none"> • Borrow pits adjacent to the existing roadway fill sections will be restored to natural topography utilizing the existing roadway fill. • Native hardwood vegetation will be re-established at these sites. • A special provision will specifically direct the construction sequencing of the borrow pits in order to minimize adverse impacts to aquatic resources during restoration. As borrow pits are restored from east to west, passageways for fishes and aquatic organisms will be maintained to allow retreat into Roc Roe Bayou. 	<ul style="list-style-type: none"> • On Job 110503, borrow pits adjacent to the existing roadway fill sections were restored to natural topography utilizing the existing roadway fill. • A special provision was utilized to direct the construction sequencing of the borrow pits in order to minimize adverse impacts to aquatic resources during restoration. Borrow pits were restored from east to west, maintaining passageways for fishes and aquatic organisms to allow retreat into Roc Roe Bayou. • The remaining borrow pits will be filled and restored to natural topography during Job Number 110540. • Planting with native hardwood vegetation will occur after the contractor has completed the work.
3	<ul style="list-style-type: none"> • Abandoned ROW that is legally entitled to the United States of America will be so deeded in fee title for incorporation into the Refuges. 	<ul style="list-style-type: none"> • Abandoned ROW that is legally entitled to the USA will be so deeded in fee title for incorporation into the Refuges after completion of Job No. 110540.
4	<ul style="list-style-type: none"> • Vehicular access for Refuge visitors will be provided to Roc Roe Bayou and the Refuges on both the east and west sides of the bayou. 	<ul style="list-style-type: none"> • Vehicular access for Refuge visitors to Roc Roe Bayou and the Refuges on both the east and west sides of the bayou was constructed under Job 110503, as shown on the enclosed figure.
5	<ul style="list-style-type: none"> • Vehicular access, paved parking area to accommodate 20 vehicles and boat trailers, and a concrete boat ramp for use by Refuge visitors will be provided in the vicinity of the existing First Old River Lake boat ramp. 	<ul style="list-style-type: none"> • Vehicular access, a gravel* parking area to accommodate 20 vehicles and boat trailers, and a concrete boat ramp will be constructed in the vicinity of the existing First Old River Lake boat ramp as a part of Job 110540. <p>*Per request of USFWS, gravel will be used instead of paving.</p>
6	<ul style="list-style-type: none"> • Property identified for restoration in order to achieve enhanced hydrologic conditions on the Refuges as a result of two dimensional surface water velocity conditions described in Alternative 2 in Water-Resources Investigations Report 02-4256, and as subsequently defined by correspondence provided to the AHTD dated March 18, 2004 and June 17, 2005 will be acquired by AHTD. • The portion required as replacement property for taking Refuge land will be provided to the USFWS in fee title. • Any remaining property acquired by AHTD and not deeded to the USFWS will be 	<ul style="list-style-type: none"> • A flowage easement was purchased on 17.64 acres identified for the enhanced hydrologic restoration, as shown on the enclosed figure. This property has been planted to restore native hardwood vegetation. • 146.8 acres required as replacement property for taking Refuge land, as shown on the enclosed figure, has been provided to the USFWS in fee title, and has been planted to restore native hardwood vegetation. • 56.8 acres of property acquired by AHTD, as shown on the enclosed figure, will be managed as part of the White River Refuge contingent on a mutually acceptable MOA between the responsible agencies. A draft MOA is under review.

	<p>managed as part of the Refuges contingent on a mutually acceptable Memorandum of Agreement (MOA) between the responsible agencies.</p>	
7	<ul style="list-style-type: none"> • Large “entering and leaving” refuge signs will be furnished and erected on the new highway right-of-way. • USFWS personnel will be consulted concerning sign design. 	<ul style="list-style-type: none"> • Large “entering and leaving” refuge signs have been furnished and erected on the new highway right-of-way. • USFWS personnel were consulted concerning sign design.
8	<ul style="list-style-type: none"> • Useable material from the project that is salvageable will be made accessible to the USFWS upon request for use on the Refuges. • All material excess to the USFWS needs will be removed from the Refuges and properly disposed of offsite. 	<ul style="list-style-type: none"> • (16) 67-foot steel I-beams were provided upon the request of the USFWS as salvageable material for use on the Refuges during Job 110503. • All material excess to USFWS needs has been and will continue to be removed from the Refuges and properly disposed of offsite. This work will be completed under Job 110540.
9	<ul style="list-style-type: none"> • AHTD will complete all necessary environmental, cultural resources, and other reviews and analyses, and properly fulfill all public and agency coordination processes. • AHTD will secure all required local, state, and federal permits prior to performing any construction activities on the Refuges. 	<ul style="list-style-type: none"> • AHTD will complete all necessary environmental, cultural resources, and other reviews and analyses, and properly fulfill all public and agency coordination processes. • AHTD will secure all required local, state, and federal permits prior to performing any construction activities on the Refuges.

Appendix B
Amended Section 106 MOA

AMENDED MEMORANDUM OF AGREEMENT
AMONG THE FEDERAL HIGHWAY ADMINISTRATION,
THE ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT,
THE ARKANSAS STATE HISTORIC PRESERVATION OFFICE, AND
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING THE WHITE RIVER AND RELIEF STRUCTURES AND APPROACHES
(CLARENDON), (HWY. 79) IN MONROE COUNTY, ARKANSAS
AHTD JOB NUMBER 110123

WHEREAS, the Federal Highway Administration (FHWA) as the lead federal agency administers Federal Aid Program funding under 23 Code of Federal Regulations (CFR) that enabled the Arkansas State Highway and Transportation Department (AHTD) to fund the replacement of the White River and Relief Structures and Approaches on Highway 79 near Clarendon, Arkansas in Monroe County (undertaking); and

WHEREAS, the undertaking consists of the replacement of three bridges and their approaches: the White River Bridge (Bridge Number 01253), the West Old River Lake Bridge (Bridge Number B1253), and the Roc Roe Bayou Bridge (Bridge Number A1253); and

WHEREAS, the White River Bridge is a structure included as a part of the Clarendon Multiple Resource Area submission listed in the National Register of Historic Places (NRHP) on November 1, 1984;

WHEREAS, the FHWA, acting as the lead federal agency; and the U.S. Army Corps of Engineers, the U.S. Coast Guard, and the U.S. Fish and Wildlife Service (USFWS) acting as cooperating agencies; completed environmental documentation in accordance with the National Environmental Policy Act of 1969 (NEPA); and

WHEREAS, the FHWA and AHTD conducted public hearings on the undertaking in April, 2000 and March, 2006; and

WHEREAS, the project requires the removal of the White River Bridge (Bridge Number 01253), the West Old River Lake Bridge (Bridge Number B1253), and the Roc Roe Bayou Bridge (Bridge Number A1253), and the roadway on built embankment; and

WHEREAS, the FHWA determined that this undertaking would have an adverse effect on the National Register property Clarendon Multiple Resource Area; and consulted with the State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (ACHP) pursuant to 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended (54 U.S. Code 306108); and

WHEREAS, the Memorandum of Agreement (MOA) to mitigate effects on the Clarendon Multiple Resource Area was developed pursuant to Section 106 of the NHPA, and executed on April 18, 1997, remains in effect, and can be found in Attachment A; and

WHEREAS, the AHTD began construction in April, 2009 of the White River and Relief Structures and Approaches; and in 2013, the Roc Roe Bayou Bridge (Bridge Number A1253) was demolished; and

WHEREAS, in June 2015, FHWA and AHTD were notified there was an error by the SHPO's office on the National Register nomination for the Clarendon Multiple Resource Area, stating the west approach of the Clarendon Bridge over the river bottoms was not listed, although it was eligible; and

WHEREAS, the remaining portions of the White River Bridge Structures and Approaches, including the western approach of the White River Bridge (Bridge Number 01253), the West Old River Lake Bridge (Bridge Number B1253), and the roadway on built embankment were added to the listing for the NRHP Clarendon Multiple Resource Area on September 28, 2015 and the FHWA has determined that the undertaking will have an adverse effect to these additional historic properties, necessitating the reopening of consultation with the SHPO to consider additional adverse effects pursuant to 36 CFR § 800, the regulations implementing Section 106 of the NHPA (54 U.S.C. § 306108); and

WHEREAS, FHWA has notified and invited the participation of the Osage Nation of Oklahoma, the Quapaw Tribe of Oklahoma, the Tunica-Biloxi Tribe of Louisiana, the Kickapoo Traditional Tribe of Texas, the Kialegee Tribal Town, the Ponca Tribe of Oklahoma, the Cherokee Nation of Oklahoma, United Keetoowah Band of Cherokee Indians of Oklahoma, the Chickasaw Nation of Oklahoma, the Choctaw Nation of Oklahoma, the Absentee-Shawnee Tribe, the Eastern Shawnee Tribe of Oklahoma, the Shawnee Tribe, the Otoe-Missouria Tribe of Oklahoma, the Kickapoo Tribe of Kansas, the Sac and Fox Nation of Missouri, the Sac and Fox Nation of Oklahoma, the Alabama-Quassarte Tribal Town, the Peoria Tribe, the Seminole Tribe of Florida, the Thoptlocco Tribal Town, the Mississippi Band of Choctaw Indians, the Muscogee (Creek) Nation, the Poarch Band of Creek Indians, the Pawnee Tribe, the Delaware Nation, and the Tonkawa Tribe for which the White River and Relief Structures could have religious and cultural significance. Responses to the tribal consultation letters did not object to the project, as long as construction halted if remains or other items falling under National American Graves Protection and Repatriation Act (NAGPRA) were discovered; and

WHEREAS, in accordance with 36 CFR § 800.6(a)(1), FHWA has notified the Advisory Council on Historic Preservation (ACHP) and SHPO of its amended adverse effect determination with specified documentation, and the ACHP has chosen to participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii); and

NOW, THEREFORE, the FHWA, AHTD, SHPO and the ACHP agree that the undertaking shall be implemented in accordance with the following amended stipulations in order to take into account the effect of the undertaking on historic properties:

STIPULATIONS

The FHWA shall ensure that the following measures are carried out:

I. MITIGATION OF ADVERSE EFFECT TO THE HISTORIC PROPERTY

AHTD Bridge Numbers 01253 and B1253 structures and approaches will be documented by AHTD to the Arkansas Historic Preservation Program standards and provided to the Arkansas SHPO. The documentation will also be housed at the Arkansas State Archives in Little Rock, Arkansas, and at the University of Central Arkansas Archives and Special Collections at Conway, Arkansas.

II. DURATION

This MOA amendment will expire if its terms are not carried out within five (5) years from the date of its execution, or from the completion of the proposed project. Prior to such time, FHWA may consult with the other signatories to reconsider the terms of the MOA and amend it in accordance with Stipulation V below.

III. MONITORING AND REPORTING

Each year following the execution of this MOA until it expires or is terminated, FHWA shall provide all parties to this MOA a summary report detailing work undertaken pursuant to its terms. Such report shall include any scheduling changes proposed, any problems encountered, and any disputes and objections received in FHWA's efforts to carry out the terms of this MOA.

IV. DISPUTE RESOLUTION

Should any signatory to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, FHWA shall consult with such party to resolve the objection. If FHWA determines that such objection cannot be resolved, it will request further comments from the ACHP pursuant to 36 CFR § 800.7:

1. Forward all documentation relevant to the dispute, including the FHWA's proposed resolution, to the ACHP. The ACHP shall provide FHWA with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, FHWA shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories and concurring parties, and provide them with a copy of this written response. FHWA will then proceed according to its final decision.
2. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, FHWA may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, FHWA shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the MOA, and provide them and the ACHP with a copy of such written response.

3. FHWA's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

V. AMENDMENTS

This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

VI. TERMINATION

If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other signatories to attempt to develop an amendment per Stipulation V, above. If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

Once the MOA is terminated, and prior to work continuing on the undertaking, FHWA must either (a) execute an MOA pursuant to 36 CFR § 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7. FHWA shall notify the signatories as to the course of action it will pursue.

Execution of this MOA by the FWHA, AHTD, SHPO, and the ACHP and implementation of its terms evidence that FWHA has taken into account the effects of this undertaking on historic properties and afforded the ACHP an opportunity to comment.

AHTD Job Number 110123
Amendment to Memorandum of Agreement
White River and Relief Structures and Approaches
Near Clarendon Arkansas, in Monroe County
Page 5 of 8

SIGNATORY

FEDERAL HIGHWAY ADMINISTRATION



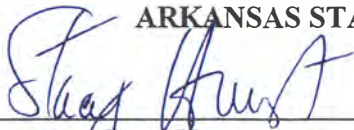
Mr. Angel Correa
Arkansas Division Administrator

5/15/2017
Date

AHTD Job Number 110123
Amendment to Memorandum of Agreement
White River and Relief Structures and Approaches
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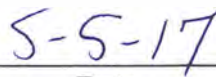
SIGNATORY

ARKANSAS STATE HISTORIC PRESERVATION OFFICER



Ms. Stacy Hurst

Arkansas State Historic Preservation Officer

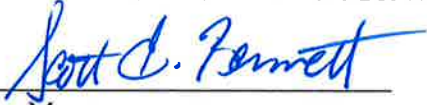


Date

AHTD Job Number 110123
Amendment to Memorandum of Agreement
White River and Relief Structures and Approaches
Near Clarendon Arkansas, in Monroe County
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SIGNATORY

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT



Mr. Scott E. Bennett, P.E.

Director of Highways and Transportation

5-19-2017

Date



AHTD Job Number 110123
Amendment to Memorandum of Agreement
White River and Relief Structures and Approaches
Near Clarendon Arkansas, in Monroe County
Page 8 of 8

SIGNATORY

ADVISORY COUNCIL ON HISTORIC PRESERVATION



Mr. John M. Fowler
Executive Director

5/28/17
Date

Attachment A

Memorandum of Agreement
White River and Relief Structures and Approaches
(AHTD Bridge Number 01253)

MEMORANDUM OF AGREEMENT
SUBMITTED TO
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
PURSUANT TO 36 CFR 800.6(A)

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
AHTD JOB NUMBER 110123
WHITE RIVER & RELIEF STRS. & APPRS.
(CLARENDON) (HWY. 79)
MONROE COUNTY, ARKANSAS
AHTD BRIDGE NUMBER 01253

WHEREAS, The Federal Highway Administration (FHWA) has determined that AHTD Job Number 110123 will have an effect on the White River & Relief Structures and Approaches, AHTD Bridge Number 01253, a property listed on the National Register of Historic Places, and has consulted with the Arkansas State Historic Preservation Officer (SHPO) pursuant to 36 CFR 800, regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470F);

NOW THEREFORE, FHWA and the Arkansas SHPO agree that the undertaking shall be implemented in accordance with following stipulations in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

The FHWA has ensured that AHTD Bridge 01253 is documented to Arkansas Historic Preservation Program standards, and that this documentation is housed at the Arkansas State Archives in Little Rock, Arkansas, and at the University of Central Arkansas Archives and Special Collections at Conway, Arkansas, and that this documentation is in the possession of the Arkansas SHPO.

Execution of this Memorandum of Agreement by FHWA and the Arkansas SHPO, its subsequent acceptance by the Council, and the implementation of its terms, evidence that FHWA has offered the Council an opportunity to comment on AHTD Job Number 110123 and its effects on historic properties, and that FHWA has taken into account the effects of the undertaking on historic properties.

Should the SHPO object within 30 days to any actions proposed pursuant to this Agreement, the FHWA shall consult with the objecting party to resolve the issue. If the FHWA determines that the objection cannot be resolved, the FHWA shall request further comments of the Council pursuant to 36 CFR 800.6 (b). Any Council comment provided in response to such a request will be taken into account by the FHWA in accordance with 36 CFR 800.6(c) (2) with reference only to the subject of the dispute; the FHWA's responsibility to carry out all actions under the Agreement that are not the subjects of the dispute will remain unchanged.

FEDERAL HIGHWAY ADMINISTRATION

Kenneth A. Perret
for Kenneth A. Perret
Division Administrator

3-13-97

Date

ARKANSAS STATE HISTORIC PRESERVATION OFFICER

Cathy Buford Slater
Cathy Buford Slater
Arkansas SHPO

3-27-97

Date

ACCEPTED FOR THE ADVISORY COUNCIL ON HISTORIC PRESERVATION

John M. Soule

4/18/97

Date

Appendix C
Rabbitsfoot Mussel Endangered Species Listing &
Critical Habitat Designation

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS-R4-ES-2012-0031;
4500030113]

RIN 1018-AX73

Endangered and Threatened Wildlife and Plants; Endangered Status for the Neosho Mucket and Threatened Status for the RabbitsfootAGENCY: Fish and Wildlife Service,
Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), determine the Neosho mucket, a freshwater mussel, as endangered, and the rabbitsfoot, a freshwater mussel, as threatened, under the Endangered Species Act. The Neosho mucket occurs in Arkansas, Kansas, Missouri, and Oklahoma. The rabbitsfoot occurs in Alabama, Arkansas, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Ohio, Oklahoma, Pennsylvania, Tennessee, and West Virginia. This final rule implements the protections provided by the Act for these species. We will issue a final determination on the designation of critical habitat for these species in the near future.

DATES: This rule becomes effective October 17, 2013.

ADDRESSES: This final rule is available on the Internet at <http://www.regulations.gov> and at the Arkansas Ecological Services Office. Comments and materials received, as well as supporting documentation used in the preparation of this rule, are available for public inspection at <http://www.regulations.gov>. All of the comments, materials, and documentation that we considered in this rulemaking are available by appointment, during normal business hours at: U.S. Fish and Wildlife Service, Arkansas Ecological Service Office, 110 South Amity Road, Suite 300, Conway, AR 72032, telephone 501-513-4470 or facsimile 501-513-4480.

FOR FURTHER INFORMATION CONTACT: James F. Boggs, Field Supervisor, Arkansas Ecological Services Office, 110 South Amity Road, Suite 300, Conway, AR 72032, by telephone 501-513-4470 or by facsimile 501-513-4480. Persons who use a telecommunications device for the deaf (TDD), may call the Federal Information Relay Service (FIRS) at 800-877-8339.

SUPPLEMENTARY INFORMATION:**Executive Summary**

Why we need to publish a rule. Under the Endangered Species Act (Act), a species may warrant protection through listing if it is endangered or threatened throughout all or a significant portion of its range. Listing a species as an endangered or threatened species can only be completed by issuing a rule. We will issue a final determination on the designation of critical habitat for the Neosho mucket and rabbitsfoot under the Act in the near future.

The basis for our action. Under the Act, we can determine that a species is an endangered or threatened species based on any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. We have determined that both species are threatened by destruction, modification, or curtailment of habitat or range (Factor A), inadequate existing regulatory mechanisms (Factor D), and other manmade factors (Factor E).

Peer review and public comment. We sought comments from three independent specialists to ensure that our designation is based on scientifically sound data, assumptions, and analyses. We invited these peer reviewers to comment on our listing proposal. The peer reviewers generally concurred with our methods and conclusions and provided additional information, clarifications, and suggestions to improve the final listing rule. We also considered all comments and information received during the comment periods.

Previous Federal Actions

Please refer to the proposed listing rule for the Neosho mucket (*Lampsilis rafinesqueana*) and rabbitsfoot (*Quadrula cylindrica cylindrica*) (October 16, 2012; 77 FR 63440) for a detailed description of previous Federal actions concerning these species.

Summary of Comments and Recommendations

We requested written comments from the public on the proposed listing rule for the Neosho mucket and rabbitsfoot during two comment periods. The first comment period, starting with the publication of the proposed rule (77 FR 63440), opened on October 16, 2012, and closed on December 17, 2012. The second comment period, starting with

the publication of the notice of availability for the draft economic analysis and draft environmental assessment (78 FR 27171) opened on May 9, 2013, and closed on June 10, 2013. We held public information meetings in Joplin, Missouri, on May 21, 2013, and Greenville, Missouri, on May 23, 2013. We did not receive any requests for a public hearing during either comment period. We also contacted appropriate Federal, State, and local agencies, scientific organizations, and other interested parties and invited them to comment on the proposed rule. In addition, we published a total of 27 legal public notices in the States affected by the listing of both species. All substantive information provided during the comment periods has either been incorporated directly into this final determination or is addressed below.

Peer Reviewer Comments

In accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited expert opinion from three knowledgeable individuals with scientific expertise on freshwater mussel conservation and biology, with familiarity of Neosho mucket and rabbitsfoot, the geographic region and river basins in which they occur, and conservation biology principles associated with the species. We received responses from all of the peer reviewers we contacted.

We reviewed all comments received from the peer reviewers for substantive issues and new information regarding the listing of Neosho mucket and rabbitsfoot. The peer reviewers generally concurred with our methods and conclusions and provided additional information, clarifications, and suggestions to improve the final listing rule. Peer reviewer comments on the listing of the mussels are addressed in the following summary and incorporated into this final rule as appropriate.

(1) *Comment:* One peer reviewer suggested that we discuss the lure used by rabbitsfoot to attract its fish hosts and redefine the marsupium as a “brooding pouch” rather than a “pouch”.

Our Response: We incorporated language to address this topic under the *Background* section of this final determination.

(2) *Comment:* One peer reviewer questioned whether the Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to threatened wildlife the same as endangered wildlife.

Our Response: The prohibitions of section 9(a)(1) of the Act, incorporated into our regulations at 50 CFR 17.21, make it illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt any of these), import, export, ship in interstate commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any species listed as endangered. Our regulations at 50 CFR 17.31 contain the same prohibitions for species listed as threatened, unless exceptions are made in a rule issued under section 4(d) of the Act.

(3) *Comment:* One peer reviewer suggested Neosho mucket and rabbitsfoot are thermally sensitive because closely related mussel species, such as pimpleback (*Quadrula pustulosa*), pistolgrip (*Quadrula verrucosa*), plain pocketbook (*Lampsilis cardium*), and yellow sandshell (*Lampsilis teres*), are known to be thermally sensitive, although no physiological thermal tolerance data is available for Neosho mucket and rabbitsfoot.

Our Response: We agree that the best available scientific information indicates that Neosho mucket and rabbitsfoot may be thermally sensitive and added language to address the topic under *Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence—Temperature* section of this final determination.

(4) *Comment:* One peer reviewer suggested there is substantial evidence the interaction of climate warming and water management is negatively affecting mussels in the south-central United States.

Our Response: We agree that a combination of climate patterns and local water management practices (e.g., reduced reservoir releases) led to shifts in the species richness and overall abundance of mussel assemblages dominated by thermally sensitive to thermally tolerant species in southeast Oklahoma. We incorporated language to address this topic under *Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence—Temperature* section of this final determination.

(5) *Comment:* One peer reviewer suggested poultry production is a potential threat to Neosho mucket and rabbitsfoot in the Little River basin.

Our Response: We agree and incorporated language to address the topic under *Factor A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range—*

Chemical Contaminants section of this final determination.

(6) *Comment:* One peer reviewer recommended we include rabbitsfoot density information for the Little River from Galbraith and Vaughn (2011). This reviewer also recommended we include information from Galbraith (2009) on the effects of water temperature to rabbitsfoot.

Our Response: We agree and incorporated language to address the topic in the *Taxonomy, Life History, and Distribution* section for Rabbitsfoot and under *Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence—Temperature* section of this final determination.

(7) *Comment:* One peer reviewer recommended we include detailed anatomy of the rabbitsfoot information provided by Williams *et al.* (2008). This peer reviewer also noted several scientific citations omitted from the proposed rule that pertain to historical and modern rabbitsfoot records in the Tennessee River, lower Duck River, Ohio River, and Monongahela River.

Our Response: While not directly cited in the proposed rule, Butler (2005) cited several of the citations provided by the peer reviewer, and, accordingly, they are incorporated in the Service's analysis and administrative record. Our assessment of the rabbitsfoot population indicates extirpation in the Monongahela River occurred circa 1890 and is consistent with Ortmann (1919). We incorporated the other citations provided by the peer reviewer (related to soft anatomy and rabbitsfoot distribution) to address the topic in the *Summary of Biological Status and Threats* section for rabbitsfoot into this final determination.

(8) *Comment:* One peer reviewer noted the rainbow darter (*Etheostoma caeruleum*) is a host fish for rabbitsfoot.

Our Response: We agree and incorporated language to address the topic in the *Summary of Biological Status and Threats* section for rabbitsfoot of this final determination.

(9) *Comment:* One peer reviewer suggested it would be prudent to add the work by Vaughn and Taylor (1999) on dams and their downstream effects to freshwater mussels.

Our Response: We agree and incorporated language to address the topic under *Factor A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range—Impoundments* section of this final determination.

Federal Agency Comments

(10) *Comment:* The U.S. Army Corps of Engineers Pittsburgh District (COEPD)

indicated listing of rabbitsfoot may affect the COEPD's navigation and maintenance dredging activities in the Allegheny River, its operation of Allegheny Reservoir, and its regulatory program. They indicate additional avoidance measures will be required to adequately protect rabbitsfoot and its habitat.

Our Response: The federally endangered clubshell (*Pleurobema clava*), northern riffleshell (*Epioblasma torulosa rangiana*), rayed bean (*Villosa fabalis*), and snuffbox (*Epioblasma triquetra*) mussels occur in the same reach of the Allegheny River as rabbitsfoot. Section 7 of the Act already requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of these listed species. Project modifications that minimize effects to these listed mussel species also would minimize effects to rabbitsfoot. Thus, we would not expect additional conservation measures and costs for the rabbitsfoot over what are already required for these other endangered mussels.

(11) *Comment:* The COEPD asked how tributary streams will be affected by the listing of rabbitsfoot.

Our Response: The listing of the rabbitsfoot will occur in 15 States. We are unable to definitively determine how many tributary streams will be covered by the final designation. Section 7 of the Act requires Federal agencies to consider direct, indirect, and cumulative effects to listed species. The Service will work with COEPD to determine whether any of the current, ongoing or planned COEPD projects may have direct, indirect, or cumulative effects on tributaries within their District. As stated previously, the Service does not expect additional project modifications to minimize effects to rabbitsfoot beyond those already required for other listed mussels in the Allegheny River basin.

(12) *Comment:* The COEPD indicated stakeholders in the sand and gravel industry rely on an Adaptive Management Group Mussel Survey Protocol and conclude the protocol will need to be revised to include rabbitsfoot.

Our Response: This protocol is for use only in the impounded Allegheny River navigation channel (river mile 0 to near 65) and Ohio River navigation channel in Pennsylvania (river mile 0 to 40). While this area is within the range of the rabbitsfoot, it has been more than 80 years since a rabbitsfoot specimen was found in this reach of the river. Nevertheless, we agree the protocol will

need to be revised to include rabbitsfoot. However, in the past using the protocol has failed to locate the federally listed northern riffleshell and clubshell mussels while others sampling the same location using a different method have detected them. In addition, these mussels tend to be more difficult to locate than rabbitsfoot. Therefore, the protocol should be revised because of its apparent lack of effectiveness regardless of whether rabbitsfoot is listed under the Act.

State Agency Comments

The listing for the Neosho mucket covers Arkansas, Kansas, Missouri, and Oklahoma and for rabbitsfoot covers Alabama, Arkansas, Georgia, Kansas, Kentucky, Illinois, Indiana, Louisiana, Mississippi, Missouri, Ohio, Oklahoma, Pennsylvania, Tennessee, and West Virginia. We received comments from the States of Louisiana, Pennsylvania, Ohio, and Oklahoma regarding the proposal.

(13) *Comment:* The Pennsylvania Fish and Boat Commission (PFBC) supports the listing. PFBC concluded that golden alga (*Prymnesium parvum*) is an invasive species that has the potential to threaten the existing Shenango River rabbitsfoot population based on work by Barkoh and Fries (2010).

Our Response: We appreciate the support and look forward to continuing work with the PFBC to recover rabbitsfoot. We agree that golden alga is a threat to rabbitsfoot in the Shenango River and incorporated language to address the topic under *Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence—Invasive Nonindigenous Species* section of this final determination.

(14) *Comment:* The Oklahoma Department of Wildlife Conservation (ODWC) asserts the decline of rabbitsfoot geographic range is not a recent phenomenon, but rather a gradual decline over a century. It provided a breakdown of extirpation dates based on table 2 in the proposed rule, with 10 percent of those extirpations occurring prior to 1900; 26 percent from 1900 to 1930; 11 percent from 1930 to 1960; and 34 percent from 1960 to 1980, or 81 percent of the total extirpations occurring prior to 1980. ODWC concludes it is uncertain which factors contributed to earlier extirpations, but some threats may have been ameliorated in the intervening decades. It further contends the relative magnitude and importance of each threat is not adequately quantified (speculative and not supported by empirical data) for extant or extirpated rabbitsfoot populations.

Our Response: In determining which of the listing factors contained in Section 4 of the Act justified listing the species, we used information on the biology, ecology, distribution, abundance, status, and trends of each species from a wide variety of sources. These sources included professional journal articles, distributional status surveys, biological assessments, and other unpublished material (that is, “gray literature”) from State natural resource agencies and natural heritage programs, Tribal governments, other Federal agencies, consulting firms, contractors, and individuals associated with professional organizations and higher educational institutions.

Although we have sporadic documentation of rabbitsfoot collections from the last century, as discussed under the *Status Assessment for Neosho Mucket and Rabbitsfoot* and *Summary of Factors Affecting the Species* sections in the proposed rule, rangewide trends indicate declining populations and, despite attempts at some locations to alleviate threats, no population is without threats significantly affecting the species. These threats are expected to be exacerbated by increased water demand, habitat degradation, and climate change in the future (Spooner and Vaughn 2008; Galbraith *et al.* 2010). We respectfully disagree that available scientific information supports the conclusion that threats have been ameliorated in many historical rivers throughout the entirety of the species range. Each threat is discussed in detail in the *Summary of Factors Affecting the Species* and is further summarized in the *Summary of Biological Status and Determination* sections of this final determination.

(15) *Comment:* The ODWC does not support listing rabbitsfoot as threatened. The ODWC asserts that listing is premature and may impede conservation strategies such as augmenting and reestablishing populations. It also contends that the rapid elevation of rabbitsfoot from candidate status in 2009 to a proposed threatened species in 2012 is premature and did not include sufficient coordination with the State of Oklahoma. The ODWC also concludes that 51 extant rabbitsfoot populations, albeit most of which are small and declining, are sufficient to preclude listing as a threatened species.

Our Response: The Act requires that we identify species of wildlife and plants that are endangered or threatened based on the best available scientific information. As defined in section 3 of the Act, a threatened species is any species which is likely to become an

endangered species within the foreseeable future throughout all or a significant portion of its range. As part of our program to add species to the list of threatened and endangered wildlife, we also maintain a list of species which are candidates for listing. A candidate species is one for which we have sufficient information on biological vulnerability and threats to support a proposal to list as endangered or threatened, but for which preparation and publication of a rule is precluded by higher priority listing actions.

The rabbitsfoot was added to our candidate list in 2009 (75 FR 69222) and has remained on the candidate list through our most recent candidate notice of review (CNOR) in 2012 (77 FR 70054). Additionally, the Service presented a rangewide status assessment and overview of the proposed listing process for rabbitsfoot at the Interior Highlands Mollusk Conservation Council (IHMCC) annual meeting in 2011 and 2012. We sent out requests in 2008, 2009, and 2010 to the Unio list serve maintained by the Freshwater Mollusk Conservation Society requesting information on the status of rabbitsfoot populations and threats. We sent a letter dated March 15, 2011, to interested parties in Oklahoma including the ODWC. The Service has received numerous responses to these inquiries and our efforts to reach out to the agencies, Tribes, organizations, and academia to solicit information and input.

While the rabbitsfoot still occurs in 51 streams, it sustains recruitment and population viability consistently in only 11 large, extant river populations. This accounts only for 8 percent of the historical or 22 percent of the extant distribution of rabbitsfoot. Further, the species also sustains limited recruitment and distribution in another 17 river populations, of which 15 (88 percent) are declining. The synergistic effects of threats discussed in the proposed rule and this final determination are often complex in aquatic environments and, while making it difficult to predict changes in mussel and fish host(s) distribution, abundance, and habitat availability, it is probable that these threats are acting simultaneously on the remaining rabbitsfoot populations with negative results and are expected to continue to do so based on the best available scientific information. Based on this information and information provided in our above response, we believe there is sufficient scientific information to support our final determination of listing rabbitsfoot as a threatened species.

(16) *Comment:* ODWC requested that the Service delay listing of the rabbitsfoot until the final year (2016) of the Multi-District Litigation (MDL) settlement and listing workplan.

Our Response: The multiyear listing workplan was developed through a settlement agreement with plaintiff groups to resolve multidistrict litigation. It is an effort to improve implementation of the Act while adhering to our court-approved obligations under the settlement agreement. The listing workplan enables the Service to systematically review and address the needs of more than 250 species listed on the 2010 CNOR and determine if they should be added to the Federal Lists of Endangered and Threatened Wildlife and Plants. The listing workplan has established deadlines for each candidate species, including the rabbitsfoot. In making this final determination at this time, the Service is adhering to the requirements of the listing workplan and settlement agreement. Additionally, the Act requires that we make a final listing determination within 1 year of a proposal. Therefore, we cannot postpone a final determination.

(17) *Comment:* ODWC contends that implementation of recovery efforts, particularly population augmentation and reintroduction, for the rabbitsfoot will be more cumbersome due to lack of public support compared to nonlisted species.

Our Response: We believe that listing either mussel will not impede progress with ongoing or future population augmentation and reintroduction efforts or hinder our ability to recover the species. We agree that some property owners are reluctant to work with the Service and our partners to conduct conservation on their lands due to fear of future property use restrictions related to the Act. To address this concern, the Service has various programs that provide regulatory assurance for property owners. For example, the Safe Harbor Agreement program provides assurances to non-Federal landowners that future property use limitations will not occur without the property owner's consent, if voluntary conservation measures they implement on their property provide a net conservation benefit to the recovery of a listed species.

Further, we believe that listing the species will make additional conservation resources available. Although we are unaware of any ongoing efforts to augment or reestablish mussel populations in Oklahoma, many States (such as, Missouri, Kansas, Kentucky, Tennessee, Alabama, and

Ohio) have successful propagation, augmentation, and reintroduction efforts ongoing for threatened and endangered mussels. In accordance with Service policy (65 FR 56916), the Service will work with our partners to develop a propagation, augmentation, and reintroduction plan for the Neosho mucket and rabbitsfoot to help ensure smooth transitions between various phases of conservation efforts. The Service is committed to these conservation efforts and looks forward to working closely with the State of Oklahoma and our other conservation partners to permit such efforts under section 10(a)(1)(A) of the Act. In addition, pursuant to section 6 of the Act, Oklahoma as well as the other States within the range of the rabbitsfoot would be eligible for Federal funds to implement management actions that promote the protection or recovery of the rabbitsfoot (<http://www.fws.gov/grants>).

(18) *Comment:* The Pennsylvania Department of Transportation (PDOT) opposes listing the rabbitsfoot as threatened due to the financial hardship it will bring to Pennsylvania taxpayers. PDOT concludes it is not a prudent use of transportation dollars to consult with the Service.

Our Response: Listing the rabbitsfoot under the Act must be based on the five listing factors (threats to the species), which do not include economic impacts. Critical habitat designation does require the Service to consider economic impacts, but that will be addressed in the rule to designate critical habitat for both mussels, which will be published at a later date.

(19) *Comment:* PDOT requested minor road work (such as rehabilitation or resurfacing) and bridge work (such as replacement and repair) on existing roads be exempt (*sic*) from formal coordination (consultation), including areas 100 feet upstream and downstream of the project footprint.

Our Response: All PDOT activities authorized or funded, in whole or part, by the Federal Highway Administration (FHWA) or permitted (such as, placement of bridge piers in a navigable stream) by a Federal agency such as the U.S. Army Corps of Engineers (Corps) are required to adhere to the consultation requirements of section 7(a)(2) of the Act, regardless of size. However, once the rabbitsfoot is listed, the Service can work with PDOT and FHWA or other Federal agencies to prepare a programmatic consultation that would address routine highway maintenance and other regular projects, thereby streamlining the consultation process and reducing associated costs.

(20) *Comment:* PDOT states that it issues road posting, bonding, and hauling permits to hauling industries for the purpose of protecting secondary roads from vehicle damage. PDOT acknowledges its potential liability under section 9 of the Act in the event that a hauling industry permittee has an accidental spill resulting in take of rabbitsfoot. They conclude that the Service operating under its mandate to err conservatively to protect species may be considering all road crossings as posing a threat of chemical contamination from spills. They conducted an analysis of their aforementioned program and provided information to refine our analysis of threats associated with chemical contaminants, but only identify one conflict of road bonding at State Road 2005 in Crawford County, Pennsylvania.

Our Response: The Service appreciates PDOT's willingness to provide an analysis of their road posting, bonding, and hauling permit program. There are instances where chemical spills have resulted in the loss of high numbers of mussels (Jones *et al.* 2001, p. 20; Brown *et al.* 2005, p. 1457; Schmerfeld 2006, pp. 12–13), and are considered a serious threat to mussel species. Therefore, chemical spills are identified as a threat to rabbitsfoot. The Service conducted an examination of land use trends, nonpoint- and point-source discharges, and determined that rabbitsfoot is subjected to the subtle, pervasive effects of chronic, low-level contamination that is ubiquitous in watersheds where it occurs. The Service has reviewed the information provided by PDOT and incorporated it into this rule where applicable. However, this information does not change our conclusion that biological and habitat effects due to chemical contaminants are a significant and ongoing threat contributing to the decline of rabbitsfoot populations.

(21) *Comment:* PDOT expressed concern with its ability to quickly issue hauling permits for oversize and overweight loads and restrict routing for materials such as fracking brine. It asserts that a need to restrict routing for a subset of haulers such as hazardous material haulers would preclude its ability to electronically permit and route these haulers, thus resulting in extensive time delays and subsequently a need for a significant increase in manpower. PDOT concludes that manual permit review to minimize section 9 liability that would result from listing rabbitsfoot represents a significant economic burden to both the State of Pennsylvania and many

industries because of needed increases in manpower to process permits.

Our Response: Listing the Neosho mucket and rabbitsfoot under the Act must be based on the five listing factors (threats to the species), which do not include economic impacts. Critical habitat designation does require the Service to consider economic impacts, but that will be addressed in the rule to designate critical habitat for both mussels which will be published at a later date.

Further, as discussed above (response to Comment 10), the federally endangered clubshell (*Pleurobema clava*), northern riffleshell (*Epioblasma torulosa rangiana*), rayed bean (*Villosa fabalis*), and snuffbox (*Epioblasma triquetra*) occur in the same reach of the Allegheny and Shenango Rivers and French and Muddy Creeks as rabbitsfoot. Project modifications and conservation efforts that minimize effects to these listed mussel species also would minimize effects to rabbitsfoot. Therefore, we do not believe the listing of rabbitsfoot would increase PDOT's section 9 liability on the State of Pennsylvania and industries transporting hazardous materials. However, as noted previously, the Service can work with PDOT to prepare standardized conservation measures that address the transportation of hazardous material and would minimize effects to rabbitsfoot and other federally protected mussels.

Public Comments

(22) *Comment:* One commenter requested that Neosho mucket and rabbitsfoot should not be removed from the Federal List of Endangered and Threatened Wildlife.

Our Response: We believe the commenter may have misunderstood the intent of the proposed rule. We wish to clarify that we proposed adding Neosho mucket and rabbitsfoot to the Federal List of Endangered and Threatened Wildlife and Plants, not removing them.

(23) *Comment:* One commenter suggested we should focus our efforts more on the Indiana bat rather than mussels.

Our Response: The Act requires that we list species that meet the definition of threatened or endangered. According to the best available science, the Neosho mucket and rabbitsfoot meet the criteria for listing and, therefore, we are required by the Act to list them. The Indiana bat (*Myotis sodalis*) was federally listed as endangered throughout its range under the Endangered Species Preservation Act of 1966 on March 11, 1967, and remains

listed as endangered under the Act. Consistent with this status, the Service is focusing efforts on the bat: the Service has approved a recovery plan for the Indiana bat, and we are currently working with our partners to implement recovery actions specified in that recovery plan.

(24) *Comment:* One commenter stated the economic benefits of large impoundments and channelization projects outweigh the adverse effects to Neosho mucket and rabbitsfoot populations.

Our Response: Listing the Neosho mucket and rabbitsfoot under the Act must be based on the five listing factors (threats to the species), which do not include economic impacts. Critical habitat designation does require the Service to consider economic impacts, but that will be addressed in the rule to designate critical habitat for both mussels, which will be published at a later date.

(25) *Comment:* One commenter was concerned that private landowner water development projects, development of or modification of livestock and irrigation water rights, normal farming and ranching activities, and development of mineral rights on private property may trigger section 7 consultations. The commenter asked whether these activities on private property represent a federal nexus and thereby are subject to section 7 consultation.

Our Response: The effects of private activities, such as normal operations for rearing of livestock, farming, and modification of water rights and development of mineral rights are not subject to the Act's section 7 consultation requirements unless they are connected to a Federal action (require Federal permits, are federally funded, or are a Federal action).

Summary of Changes From the Proposed Rule

The information below is provided as a result of the peer and public review process. In this final determination, we have made changes to the discussion of biological status and threats for both mussels from the proposed rule. We have clarified that the rabbitsfoot uses all four gills as a marsupium or "brooding pouch" rather than "pouch" for its glochidia (Fobian 2007, p. 26). Watters *et al.* (2009, p. 269) reported the rainbow darter (*E. caeruleum*) as a host fish for rabbitsfoot, but we did not cite it in the proposed rule. Also, newly included is information on the status of the rabbitsfoot in the Red River basin. In addition, new information related to the factors (threats) affecting Neosho

mucket and rabbitsfoot has been added. This includes information on thermal tolerance and effects of impoundments, chemical contaminants, climate change, and invasive nonindigenous species to mussels, discussed in the Summary of Factors Affecting the Species, *Factor A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range—Chemical Contaminants and Impoundments* and *Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence—Temperature and Climate Change.*

Background

Please refer to the proposed listing rule for the Neosho mucket and rabbitsfoot (October 16, 2013, 77 FR 63440) for a summary of species information.

Summary of Biological Status

For more information on relative abundance and trends of extant populations of Neosho mucket and rabbitsfoot by river basin please refer to the *Taxonomy, Life History, and Distribution* section of the proposed rule published in the **Federal Register** on October 16, 2012 (77 FR 63440).

Our assessment evaluated the biological status of these species and threats affecting their continued existence. It was based upon the best available scientific and commercial data and expert opinions.

The Neosho mucket is declining rangewide, with the exception of one population. Based on historical and current data, Neosho mucket has been extirpated from approximately 1,342 rkm (834 rmi) of its historical range (62 percent). Most of this extirpation has occurred within the Oklahoma and Kansas portions of its range. The extirpation of this species from numerous streams and stream reaches within its historical range signifies that substantial population losses have occurred. Extant populations are disjunct (not contiguous) in approximately 819 rkm (509 rmi). The Spring River in Missouri supports the only viable population based on the presence of a large number of individuals and evidence of recent recruitment. Given this compilation of current distribution, abundance, and status trend information, the Neosho mucket exhibits range reductions and population declines throughout its range.

Based on historical and current data, the rabbitsfoot is declining rangewide. In 10 of the 15 States comprising the rabbitsfoot's historical range, the species is considered by State law to be

endangered (Illinois, Indiana, Kansas, Mississippi, Ohio, and Pennsylvania); threatened (Kentucky and Tennessee); of special concern (Arkansas); or it is assigned an uncategorized conservation status (Alabama). The American Malacological Union and American Fisheries Society also consider the rabbitsfoot to be threatened (*in* Butler 2005, p. 21). It is presently extant in 51 of the 141 streams of historical occurrence, a 64 percent decline. Further, in the streams where it is extant, populations with few exceptions are highly fragmented and restricted to short reaches. We add this information, which was not in the proposed rule, on the rabbitsfoot in streams within the Red River basin. The Red River basin streams primarily drain the Ouachita Mountains in southeastern Oklahoma and southwestern Arkansas and northern Louisiana; extant populations of rabbitsfoot still occur in three stream reaches within the Gulf Coastal Plain ecoregion in southern Arkansas, southeastern Oklahoma, and northern Louisiana. In addition to the density information published in the proposed rule, we add this information on rabbitsfoot density in Oklahoma, which was not in the proposed rule. Rabbitsfoot density ranged from 0.3 to 2.4 individuals per square meter at three sites in Oklahoma (Galbraith and Vaughn 2011, p. 197) in the Red River basin. In addition, the species has been extirpated from West Virginia and Georgia. The extirpation of this species from numerous streams and stream reaches within its historical range signifies that substantial population losses have occurred in each of the past several decades.

Seventeen streams (33 percent of extant populations or 12 percent of historical populations) have small populations with limited levels of recruitment and are generally highly restricted in distribution, making their viability unlikely and making them extremely susceptible to extirpation in the near future. In addition, 15 of those 17 streams (88 percent) have populations that are declining. In many of these streams, rabbitsfoot is only known from one or two documented individuals in the past decade. Its viability in these streams is doubtful, and additional extirpations may occur if this downward population trend continues. Eleven populations (22 percent of extant populations or 8 percent of historical populations; Ohio, Green, Tippecanoe, Tennessee, Paint Rock, Duck, White, Black, Strawberry, and Little Rivers and French Creek) are considered viable (Butler 2005, p. 88;

Service 2010, p. 16). Given this compilation of current distribution, abundance, and status trend information, the rabbitsfoot exhibits range reductions and population declines throughout its range.

Summary of Factors Affecting the Species

Section 4 of the Act and its implementing regulations (50 CFR 424) set forth the procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1) of the Act: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. Listing actions may be warranted based on any of the above threat factors, singly or in combination. Each of these factors is discussed below.

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

The habitats of freshwater mussels are vulnerable to water quality degradation and habitat modification from a number of activities associated with modern civilization. The decline, extirpation, and extinction of mussel species are often attributed to habitat alteration and destruction (Neves *et al.* 1997, pp. 51–52). Bogan (1993, pp. 599–600 and 603–605) linked the decline and extinction of mussels to a wide variety of threats including siltation, industrial and municipal effluents, modification of stream channels, impoundments, pesticides, heavy metals, invasive species, and the loss of host fish. Chief among the causes of decline in distribution and abundance of the Neosho mucket and rabbitsfoot, and in no particular order of ranking, are impoundment, channelization, sedimentation, chemical contaminants, mining, and oil and natural gas development (Mather 1990, pp. 18–19; Obermeyer *et al.* 1997b, pp. 113–115; Neves *et al.* 1997, pp. 63–72; Davidson 2011, pers. comm.). Neosho mucket and rabbitsfoot are both found within medium to large river drainages exposed to a variety of landscape uses. These threats to mussels in general (and Neosho mucket and rabbitsfoot where specifically known) are individually discussed below.

Impoundments

Dams eliminate and alter river flow within impounded areas, trap silt leading to increased sediment deposition, alter water quality, change hydrology and channel geomorphology, decrease habitat heterogeneity, affect normal flood patterns, and block upstream and downstream movement of mussels and fish (Layzer *et al.* 1993, pp. 68–69; Neves *et al.* 1997, pp. 63–64; Watters 2000, pp. 261–264). Within impounded waters, decline of mussels has been attributed to direct loss of supporting habitat, sedimentation, decreased dissolved oxygen, temperature levels, and alteration in resident fish populations (Neves *et al.* 1997, pp. 63–64; Pringle *et al.* 2000, pp. 810–815; Watters 2000, pp. 261–264). Downstream of dams, mussel declines are associated with changes and fluctuation in flow regime, channel scouring and bank erosion, reduced dissolved oxygen levels and water temperatures, and changes in resident fish assemblages (Williams *et al.* 1992, p. 7; Layzer *et al.* 1993, p. 69; Neves *et al.* 1997, pp. 63–64; Watters 2000, pp. 265–266; Pringle *et al.* 2000, pp. 810–815). Dams that are low to the water surface, or have water passing over them (small low head or mill dams) can have some of these same effects on mussels and their fish hosts, particularly reducing species richness and evenness and blocking fish host movements (Watters 2000, pp. 261–264; Dean *et al.* 2002, pp. 235–238).

The decline of mussels within the Arkansas, Red, White, Tennessee, Cumberland, Mississippi, and Ohio River basins has been directly attributed to construction of numerous impoundments (Miller *et al.* 1984, p. 109; Williams and Schuster 1989, pp. 7–10; Layzer *et al.* 1993, pp. 68–69; Neves *et al.* 1997, pp. 63–64; Obermeyer *et al.* 1997b, pp. 113–115; Watters 2000, pp. 262–263; Sickel *et al.* 2007, pp. 71–78; Hanlon *et al.* 2009, pp. 11–12; Vaughn and Taylor 1999, pp. 915–917; Watters and Flaute 2010, pp. 3–7). Population losses due to impoundments have likely contributed more to the decline of the Neosho mucket and rabbitsfoot than any other factor. River habitat throughout the ranges of the Neosho mucket and rabbitsfoot has been impounded, leaving short, isolated patches of suitable habitat that sometimes lacks suitable fish hosts. Neither Neosho mucket nor rabbitsfoot occur in reservoirs lacking riverine characteristics. They are unable to successfully reproduce and recruit under these conditions (Obermeyer *et al.* 1997b, p. 114; Butler 2005, p. 96). On the other hand, rabbitsfoot may persist

and even exhibit some level of recruitment in some large rivers with locks and dams where appropriate habitat quality and quantity remain (Ohio and Tennessee Rivers in riverine reaches between a few locks and dams) (Butler 2005, p. 96).

The majority of the mainstem Ohio, Cumberland, Tennessee, and White Rivers and many of their largest tributaries are impounded, in many cases resulting in tailwater (downstream of dam) conditions unsuitable for rabbitsfoot (Butler 2005, p. 96). There are 36 major dams within the Tennessee River basin (Holston, Little Tennessee, Clinch, Elk, Flint, and Sequatchie Rivers, and Bear Creek) that have resulted in the impoundment of 3,680 rkm (2,300 rmi) of the Tennessee River and its largest tributaries (Butler 2005, p. 95). Only three of these rivers support viable populations—the Tennessee, Paint Rock, and Duck Rivers. Ninety percent of the Cumberland River downstream of Cumberland Falls (rkm 866, rmi 550) as well as numerous tributaries are either directly impounded or otherwise adversely affected by cold tailwater releases from dams.

Rabbitsfoot and its fish hosts are warm-water species and the change in temperature to cold water below the dams further reduces suitable habitat for the species and may eliminate fish hosts that cannot adapt to colder water temperatures (see the Temperature section below for more information). Rabbitsfoot in the Little River, Oklahoma, were found at locations farthest from impoundments (Vaughn and Taylor 1999, p. 915). Mussel species richness and total abundance downstream of dams increases as the distance from dams increases. Little River mussel populations did not recover from impoundment effects until 20 rkm (12 rmi) downstream, with a peak of species richness and abundance at 53 rkm (33 rmi) downstream of the impoundment (Vaughn and Taylor 1999, p. 915). Other tributary impoundments that negatively impact rabbitsfoot and its fish hosts within the Ohio River basin include, but are not limited to, the Walhonding, Barren, Rough, and Eel Rivers and two rivers with viable populations, Green and Tippecanoe Rivers. The majority (7 of 11 populations or 64 percent) of viable rabbitsfoot populations (Ohio, Green, Tippecanoe, Tennessee, Duck, White, and Little Rivers) occur downstream of main stem impoundments that make these populations more susceptible to altered habitat quality and quantity associated with the impoundment or dam operation, which may be

exacerbated during stochastic events such as droughts and floods.

Navigational improvements on the Ohio River began in 1830, and now include 21 lock and dam structures stretching from Pittsburgh, Pennsylvania, to Olmsted, Illinois, near its confluence with the Mississippi River. Lock and dam structures convert riverine habitat to unsuitable static habitat for the mussel and prevent movement of their fish hosts. Numerous Ohio River tributaries also have been altered by lock and dam structures. For example, a 116-rkm (72-rmi) stretch of the Allegheny River in Pennsylvania has been altered with nine locks and dams from Armstrong County to Pittsburgh. A series of six locks and dams were constructed on the lower half of the Green River decades ago that extend upstream to the western boundary of Mammoth Cave National Park, Kentucky. The declines of rabbitsfoot populations are attributable to navigational locks and dams on the Ohio, Allegheny, Monongahela, Muskingum, Kentucky, Green, Barren, and White Rivers, and are widespread throughout the species range.

Impoundments have eliminated a large portion of the Neosho mucket population and habitat in the Arkansas River basin. For example, mussel habitat in the Neosho River in Kansas has been negatively impacted by at least 15 city dams and 2 Federal dams, both with regulated flows. Almost the entire length of the river in Oklahoma is now impounded or adversely affected by tailwater releases from three major dams (Matthews *et al.* 2005, p. 308). Several reservoirs and numerous small watershed lakes have eliminated suitable mussel habitat in several larger Neosho River tributaries in Kansas and Missouri (Spring, Elk, and Cottonwood Rivers and Shoal Creek). The Verdigris River (Kansas and Oklahoma) has two large reservoirs with regulated flows, and the lower section has been channelized as part of the McClellan-Kerr Arkansas River Navigation System. All the major Verdigris River tributaries in Kansas and Oklahoma have been partially inundated by reservoirs with regulated flows and numerous flood control watershed lakes (Obermeyer *et al.* 1995, pp. 7–21). Construction of Lake Tenkiller eliminated Neosho mucket populations and habitat in the lower portion of the Illinois River, Oklahoma (Davidson 2011, pers. comm.).

Dam construction has a secondary effect of fragmenting the ranges of mussel species by leaving relict habitats and populations isolated upstream or between structures as well as creating extensive areas of deep uninhabitable,

impounded waters. These isolated populations are unable to naturally recolonize suitable habitat downstream and become more prone to further extirpation from stochastic events, such as severe drought, chemical spills, or unauthorized discharges (Layzer *et al.* 1993, pp. 68–69; Cope *et al.* 1997, pp. 235–237; Neves *et al.* 1997, pp. 63–75; Watters 2000, pp. 264–265, 268; Miller and Payne 2001, pp. 14–15; Pringle *et al.* 2000, pp. 810–815; Watters and Flaute 2010, pp. 3–7). We conclude that habitat effects due to impoundment are an ongoing threat to the Neosho mucket and rabbitsfoot.

Channelization

Dredging and channelization activities have profoundly altered riverine habitats nationwide. Hartfield (1993, pp. 131–139), Neves *et al.* (1997, pp. 71–72), and Watters (2000, pp. 268–269) reviewed the specific upstream and downstream effects of channelization on freshwater mussels. Channelization affects a stream physically (accelerates erosion, increases sediment bed load, reduces water depth, decreases habitat diversity, creates geomorphic (natural channel dimensions) instability, and eliminates riparian canopy) and biologically (decreases fish and mussel diversity, changes species composition and abundance, decreases biomass, and reduces growth rates) (Hartfield 1993, pp. 131–139). Channel modification for navigation has been shown to increase flood heights (Belt 1975, p. 684), partly as a result of an increase in stream bed slope (Hubbard *et al.* 1993, p. 137). Flood events are exacerbated, conveying large quantities of sediment, potentially with adsorbed contaminants, into streams. Channel maintenance often results in increased turbidity and sedimentation that often smothers mussels (Stansbery 1970, p. 10).

Channel maintenance operations for commercial navigation have affected habitat for the rabbitsfoot in many large rivers rangewide. Periodic navigation maintenance activities (such as dredging and snag removal) may continue to negatively impact this species in the lower portions of the Ohio, Tennessee, and White Rivers, which represent 44 percent of the viable rabbitsfoot populations. In the Tennessee River, a plan to deepen the navigation channel has been proposed (Hubbs 2009, pers. comm.). Some rabbitsfoot streams were “straightened” to decrease distances traversed by barge traffic (for example, Verdigris River). Hundreds of miles of many midwestern (Eel, North Fork Vermilion, and Embarras Rivers) and southeastern (Paint Rock and St. Francis Rivers and Bear Creek) streams with

rabbitsfoot populations were channelized decades ago to reduce the probability and frequency of flood events. Because mussels are relatively immobile, they require a stable substrate to survive and reproduce and are particularly susceptible to channel instability (Neves *et al.* 1997, p. 23) and alteration. Channel and bank degradation have led to the loss of stable substrates in numerous rivers with commercial navigation throughout the range of rabbitsfoot. While dredging and channelization have had a greater effect on rabbitsfoot, the Neosho mucket has been affected by these activities in the Verdigris River. We conclude that habitat effects due to channelization are an ongoing threat to the Neosho mucket and rabbitsfoot.

Sedimentation

Excessive sediments are believed to negatively impact riverine mussel populations requiring clean, stable streams (Ellis 1936, pp. 39–40; Brim Box and Mossa 1999, p. 99). Adverse effects resulting from sediments have been noted for many components of aquatic communities. Potential sediment sources within a watershed include virtually all activities that disturb the land surface. Most localities occupied by the Neosho mucket and rabbitsfoot, including viable populations, are currently being affected to varying degrees by sedimentation.

Sedimentation has been implicated in the decline of mussel populations nationwide, and remains a threat to Neosho mucket and rabbitsfoot (Ellis 1936, pp. 39–40; Vannote and Minshall 1982, pp. 4105–4106; Dennis 1984, p. 212; Brim Box and Mossa 1999, p. 99; Fraley and Ahlstedt 2000, pp. 193–194; Poole and Downing 2004, pp. 119–122). Specific biological effects include reduced feeding and respiratory efficiency from clogged gills, disrupted metabolic processes, reduced growth rates, limited burrowing activity, physical smothering, and disrupted host fish attraction mechanisms (Ellis 1936, pp. 39–40; Marking and Bills 1979, p. 210; Vannote and Minshall 1982, pp. 4105–4106; Waters 1995, pp. 173–175; Hartfield and Hartfield 1996, p. 373). In addition, mussels may be indirectly affected if high turbidity levels significantly reduce the amount of light available for photosynthesis, and thus, the production of certain food items (Kanehl and Lyons 1992, p. 7).

Studies tend to indicate that the primary effects of excess sediment levels on mussels are sublethal, with detrimental effects not immediately apparent (Brim Box and Mossa 1999, p. 101). The physical effects of sediment

on mussel habitat appear to be multifold, and include changes in suspended and bed material load; bed sediment composition associated with increased sediment production and runoff in the watershed; channel changes in form, position, and degree of stability; changes in depth or the width and depth ratio that affects light penetration and flow regime; actively aggrading (filling) or degrading (scouring) channels; and changes in channel position. These effects to habitat may dislodge, transport downstream, or leave mussels stranded (Vannote and Minshall 1982, p. 4106; Kanehl and Lyons 1992, pp. 4–5; Brim Box and Mossa 1999, pp. 109–112). For example, many Kansas streams (such as Verdigris and Neosho Rivers) supporting mussels have become increasingly silted in over the past century, reducing habitat for the Neosho mucket and rabbitsfoot (Obermeyer *et al.* 1997a, pp. 113–114).

Increased sedimentation and siltation may explain in part why Neosho mucket and rabbitsfoot are experiencing recruitment failure in some streams. Interstitial spaces in the substrate provide crucial habitat (shelter and nutrient uptake) for juvenile mussel survival. When interstitial spaces are clogged, interstitial flow rates and spaces are reduced (Brim Box and Mossa 1999, p. 100), and this decreases habitat for juvenile mussels. Furthermore, sediment may act as a vector for delivering contaminants, such as nutrients and pesticides, to streams, and juvenile mussels may ingest contaminants adsorbed to silt particles during normal feeding activities. Neosho mucket and rabbitsfoot reproductive strategies depend on clear water (enables fish hosts to see mussel lures) during critical reproductive periods.

Agricultural activities are responsible for much of the sediment affecting rivers in the United States (Waters 1995, p. 170). Sedimentation associated with agricultural land use is cited as one of the primary threats to 7 of the 11 (64 percent) viable rabbitsfoot populations (French Creek, Tippecanoe, Paint Rock, Duck, White, Black, and Strawberry Rivers; Smith *et al.* 2009, Table 1; USACE 2011, pp. 21–22; Indiana Department of Environmental Management (IDEM) 2001, pp. 11–12; EPA 2001, p. 10; Brueggen 2010, pp. 1–2; MDC 2012, <http://mdc.mo.gov/landwater-care/stream-and-watershed-management/>; Environmental Protection Agency Water Quality Assessment Tool, http://ofmpub.epa.gov/tmdl_waters10/attains_nation_cy.control?p_report_type=T). In addition,

numerous stream segments in the Duck, White, Black, Little, and Strawberry River watersheds are listed as impaired waters under section 303(d) of the Clean Water Act (CWA) by the Environmental Protection Agency (EPA) due to sedimentation associated with agriculture (USACE 2011, p. 21; EPA Water Quality Assessment Tool, http://ofmpub.epa.gov/tmdl_waters10/attains_nation_cy.control?p_report_type=T). An impaired water is a water body (i.e., stream reaches, lakes, water body segments) with chronic or recurring monitored violations of the applicable numeric or narrative water quality criteria. An impaired water cannot support one or more of its designated uses (e.g., swimming, the protection and propagation of aquatic life, drinking, industrial supply, etc.).

Once a stream segment is listed as an impaired water, the State must complete a plan to address the issue causing the impairment; this plan is called a Total Maximum Daily Load (TMDL). A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards (WQS). Completion of the plan is generally all that is required to remove the stream segment from the EPA's section 303(d) impaired water list and does not mean that water quality has changed. Once the TMDL is completed, the stream segment may be placed on the EPA's section 305(b) list of impaired streams with a completed TMDL (<http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/intro.cfm>). For example, some stream segments within the White, Barren, Little River Mountain Fork, and Wabash Rivers, and French Creek have completed TMDL plans and have attained WQS for low dissolved oxygen, pathogens, nutrients, polychlorinated biphenyls (PCBs), and siltation. However, some of these same stream segments still have not attained WQS for lead (Little River Mountain Fork) and mercury (Wabash River).

Impaired streams in the Duck River watershed (approximately 483 rkm (300 rmi)) are losing 5 to 55 percent more soil per year than the natural streams (USACE 2011, pp. 21–22). Unrestricted livestock access occurs on many streams and potentially threatens associated mussel populations (Fraley and Ahlstedt 2000, pp. 193–194). Grazing may reduce water infiltration rates and increase runoff; trampling and vegetation removal increases the probability of erosion (Armour *et al.* 1991, pp. 8–10; Brim Box and Mossa 1999, p. 103).

Developed land can increase sediment loads and increase runoff (Wang *et al.* 2001, pp. 261–262). Hopkins (2009, p.

952) found rabbitsfoot occurrence positively correlated with riparian areas that were 70 percent forested and averaged 15 hectares (37 acres) in the Upper Green River in Ohio. Rabbitsfoot begins to respond negatively to 0.5 percent of developed land within the riparian area (Hopkins 2009, pp. 948–952).

As discussed above, specific impacts on mussels from sediments include reduced feeding and respiratory efficiency, disrupted metabolic processes, reduced growth rates, increased substrata instability, and the physical smothering of mussels. Increased turbidity levels due to siltation can be a limiting factor that impedes the ability of sight-feeding fishes to forage. Turbidity within the rivers and streams during the times that the mussels attempt to attract host fishes may have contributed and may continue to contribute to the decline of the Neosho mucket and rabbitsfoot by reducing their efficiency at attracting the fish hosts necessary for reproduction. In addition, sediment can eliminate or reduce the recruitment of juvenile mussels, interfere with feeding activity, and act as a vector in delivering contaminants to streams. Because the Neosho mucket and rabbitsfoot are filter-feeders and may bury themselves in the substrate, they are exposed to these contaminants contained within suspended particles and deposited in bottom substrates. We conclude that biological and habitat effects due to sedimentation are an ongoing threat to the Neosho mucket and rabbitsfoot.

Chemical Contaminants

Chemical contaminants are ubiquitous in the environment and are considered a major contributor to the decline of mussel species (Richter *et al.* 1997, p. 1081; Strayer *et al.* 2004, p. 436; Wang *et al.* 2007a, p. 2029; Cope *et al.* 2008, p. 451). Chemicals enter the environment through point- and nonpoint-source discharges including spills, industrial and municipal effluents, and residential and agricultural runoff. These sources contribute organic compounds, heavy metals, nutrients, pesticides, and a wide variety of newly emerging contaminants such as pharmaceuticals to the aquatic environment. As a result, water and sediment quality can be degraded to the extent that results in adverse effects to mussel populations.

Cope *et al.* (2008, p. 451) evaluated the pathways of exposure to environmental pollutants for all four freshwater mollusk life stages (free glochidia, encysted glochidia, juveniles, adults) and found that each life stage

has both common and unique characteristics that contribute to observed differences in exposure and sensitivity. Almost nothing is known of the potential mechanisms and consequences of waterborne toxicants on sperm viability. In the female mollusk, the marsupial region of the gill is thought to be physiologically isolated from respiratory functions, and this isolation may provide some level of protection from contaminant interference with a female's ability to achieve fertilization or brood glochidia (Cope *et al.* 2008, p. 454). A major exception to this assertion is with chemicals that act directly on the neuroendocrine pathways controlling reproduction (see discussion below). Nutritional and ionic exchange is possible between a brooding female and her glochidia, providing a route for chemicals (accumulated or waterborne) to disrupt biochemical and physiological pathways (such as maternal calcium transport for construction of the glochidial shell). Glochidia can be exposed to waterborne contaminants for up to 36 hours until encystment occurs between 2 and 36 hours, and then from fish host tissue burdens (for example, atrazine), that last from weeks to months and could affect transformation success of glochidia into juveniles (Ingersoll *et al.* 2007, pp. 101–104).

Juvenile mussels typically remain burrowed beneath the sediment surface for 2 to 4 years. Residence beneath the sediment surface necessitates deposit (pedal) feeding and a reliance on interstitial water for dissolved oxygen (Watters 2007, p. 56). The relative importance of exposure of juvenile Neosho mucket and rabbitsfoot to contaminants in overlying surface water, interstitial water, whole sediment, or food has not been adequately assessed. Exposure to contaminants from each of these routes varies with certain periods and environmental conditions (Cope *et al.* 2008, pp. 453 and 457).

The primary routes of exposure to contaminants for adult Neosho mucket and rabbitsfoot are surface water, sediment, interstitial (pore) water, and diet; adults can be exposed when either partially or completely burrowed in the substrate (Cope *et al.* 2008, p. 453). Adult mussels have the ability to detect toxicants in the water and close their valves to avoid exposure (Van Hassel and Farris 2007, p. 6). Adult mussel toxicity and relative sensitivity (exposure and uptake of toxicants) may be reduced at high rather than at low toxicant concentrations because uptake is affected by the prolonged or periodic

toxicant avoidance responses (when the avoidance behavior of keeping their valves closed can no longer be sustained for physiological reasons (respiration and ability to feed) (Cope *et al.* 2008, p. 454). Toxicity results based on low-level exposure of adults are similar to estimates for glochidia and juveniles for some toxicants (for example, copper). The duration of any toxicant avoidance response by an adult mussel is likely to vary due to several variables, such as species, age, shell thickness and gape, properties of the toxicant, and water temperature. There is a lack of information on toxicant response(s) for Neosho mucket and rabbitsfoot, but results of tests using glochidia and juveniles may be valuable for protecting adults (Cope *et al.* 2008, p. 454).

Mussels are very intolerant of heavy metals (such as lead, zinc, cadmium, and copper) compared to commonly tested aquatic organisms. Metals occur in industrial and wastewater effluents and are often a result of atmospheric deposition from industrial processes and incinerators, but also are associated with mine water runoff (for example, Tri-State Mining Area in southwest Missouri) and have been attributed to mussel declines in streams such as Shoal, Center, and Turkey Creeks and Spring River in the Arkansas River basin (Angelo *et al.* 2007, pp. 485–489), which are streams with historical and extant Neosho mucket and rabbitsfoot populations. Heavy metals can cause mortality and affect biological processes, for instance, disrupting enzyme efficiency, altering filtration rates, reducing growth, and changing behavior of freshwater mussels (Keller and Zam 1991, p. 543; Naimo 1995, pp. 351–355; Jacobson *et al.* 1997, p. 2390; Valenti *et al.* 2005, p. 1244; Wang *et al.* 2007b, pp. 2039–2046; Wang *et al.* 2007c, pp. 2052–2055; Wang *et al.* 2010, p. 2053). Mussel recruitment may be reduced in habitats with low but chronic heavy metal and other toxicant inputs (Yeager *et al.* 1994, p. 217; Naimo 1995, pp. 347 and 351–352; Ahlstedt and Tuberville 1997, p. 75). Newly transformed juveniles (age at 5 days) are more sensitive to acute toxicity than glochidia or older juveniles (age at 2 to 6 months) (Wang *et al.* 2010, p. 2062).

Mercury is another heavy metal that has the potential to negatively affect mussel populations. Mercury has been detected throughout aquatic environments as a product of municipal and industrial waste and atmospheric deposition from coal-burning plants. One study on rainbow mussel (*Villosa iris*) concluded that glochidia were more sensitive to mercury than were juvenile mussels, with a median lethal

concentration value of 14 $\mu\text{g/L}$ for glochidia and 114 $\mu\text{g/L}$ for juvenile mussels (Valenti *et al.* 2005, p. 1242). The chronic toxicity is a test that usually measures sublethal effects (e.g., reduced growth or reproduction) in addition to lethality. These tests are usually longer in duration or conducted during some sensitive period of an organism's life cycle. For this species, the chronic toxicity test showed that juveniles exposed to mercury greater than or equal to 8 $\mu\text{g/L}$ exhibited reduced growth (Valenti *et al.* 2005, p. 1245). Mercury also affects oxygen consumption, byssal thread production, and filtration rates (Naimo 1995, Jacobsen *et al.* 1997, and Nelson and Calabrese 1988 in Valenti *et al.* 2005, p. 1245). Effects to mussels from mercury toxicity may be occurring in some streams due to illegal dumping, spills, and permit violations. For example, acute mercury toxicity was determined to be the cause of extirpation of diverse mussel fauna for a 112-rkm (70-rmi) reach of the North Fork Holston River (Brown *et al.* 2005, pp. 1455–1457). Of the 11 viable rabbitsfoot populations, 4 populations (French Creek, Duck River, Green River, and Ohio River) currently inhabit river reaches that are impaired by mercury and are listed as impaired waters under section 303(d) of the CWA.

One chemical that is particularly toxic to early life stages of mussels is ammonia. Sources of ammonia include agricultural wastes (animal feedlots and nitrogenous fertilizers), municipal wastewater treatment plants, and industrial waste (Augsburger *et al.* 2007, p. 2026) as well as precipitation and natural processes (decomposition of organic nitrogen) (Goudreau *et al.* 1993, p. 212; Hickey and Martin 1999, p. 44; Augspurger *et al.* 2003, p. 2569; Newton 2003, p. 1243). Therefore, ammonia is considered a limiting factor for survival and recovery of some mussel species due to its ubiquity in aquatic environments and high level of toxicity, and because the highest concentrations typically occur in mussel microhabitats (Augsburger *et al.* 2003, p. 2574). In addition, studies have shown that ammonia concentrations increase with increasing temperature, pH, and low flow conditions (Cherry *et al.* 2005, p. 378; Cooper *et al.* 2005, p. 381; Wang *et al.* 2007, p. 2045), which may be exacerbated by the effects of climate change, and may cause ammonia (unionized and ionized) to become more problematic for juvenile mussels (Wang *et al.* 2007, p. 2045). Sublethal effects include, but may not be limited to, reduced time the valves are held open for respiration and feeding; impaired

secretion of the byssal thread (used for substrate attachment), reduced ciliary action impairing feeding, depleted lipid, glycogen, and other carbohydrate stores, and altered metabolism (Goodreau *et al.* 1993, pp. 216–227; Augspurger *et al.* 2003, pp. 2571–2574; Mummert *et al.* 2003, pp. 2548–2552).

Polychlorinated biphenyls (PCBs) are ubiquitous contaminants in the environment due to their widespread use from the 1920s to 1970s as insulating material in electric equipment, such as transformers and capacitors, as well as in heat transfer fluids and in lubricants. PCBs have also been used in a wide range of products, such as plasticizers, surface coatings, inks, adhesives, flame retardants, paints, and carbonless duplicating paper. PCBs were still being introduced into the environment at many sites (such as landfills and incinerators) until the 1990s. The inherent stability and toxicity of PCBs have resulted in them being a persistent environmental problem (Safe 1994 in Lehmann *et al.* 2007, p. 356). PCBs are lipophilic (affinity to combine with fats or lipids), adsorb easily to soil and sediment, and are present in the sediment and water column in aquatic environments, making them available to bioaccumulate and induce negative effects in living organisms (Livingstone 2001 in Lehmann *et al.* 2007, p. 356). Studies have demonstrated increased PCB concentrations in native freshwater mussels (Ruessler *et al.* 2011, pp. 1, 7), marine bivalves (Krishnakumar *et al.* 1994, p. 249), and nonnative, invasive mollusks (zebra mussels and Asian clams) (Gossiaux *et al.* 1996, p. 379; Lehmann *et al.* 2007, p. 363) in areas with high levels of PCBs. Oxidative stress (imbalance in the normal redox state of cells that causes toxic effects that damage all components of the cell, including proteins, lipids, and DNA) is a direct consequence of exposure to PCBs. Relevant changes, whether directly or indirectly due to oxidative stress, may occur at the organ and organism levels and will likely result in mussel population-wide effects, including reduced fecundity and chronic maladies due to PCB exposure (Lehmann *et al.* 2007, p. 363). Two of the 11 viable rabbitsfoot populations (18 percent) inhabit waters listed as impaired due to PCBs under section 303(d) of the CWA.

Agriculture, timber harvest, and lawn management practices utilize nutrients and pesticides. These are two broad categories of chemical contaminants that have the potential to negatively impact mussel species. Nutrients, such as nitrogen and phosphorus, primarily

occur in runoff from livestock farms, feedlots, heavily fertilized row crops and pastures (Peterjohn and Correll 1984, p. 1471), post timber management activities, and urban and suburban runoff, including leaking septic tanks, and residential lawns.

Studies have shown that excessive nitrogen concentrations can be lethal to the adult freshwater pearl mussel (*Margaritifera margaritifera*) and reduce the life span and size of other mussel species (Bauer 1988, p. 244; Bauer 1992, p. 425). Nutrient enrichment can result in an increase in primary productivity, and the associated algae respiration depletes dissolved oxygen levels. This may be particularly detrimental to juvenile mussels that inhabit the interstitial spaces in the substrate where lower dissolved oxygen concentrations are more likely than on the sediment surface where adults tend to live (Sparks and Strayer 1998, pp. 132–133). For example, Galbraith *et al.* (2008, pp. 48–49) reported a massive die-off of greater than 160 rabbitsfoot specimens at a long-term monitoring site in the Little River, Oklahoma. While the exact cause for the die-off is unknown, the authors speculate that the 2005 Oklahoma drought coupled with high water temperature and extensive blooms of filamentous algae may have resulted in extreme physiological stress. Over-enriched conditions are exacerbated by low flow conditions, such as those experienced during a typical summer season and that may occur with greater frequency and severity as a result of climate change. Three of the 11 viable rabbitsfoot populations (French Creek, Duck River, and Tippecanoe River) are listed as impaired waters under section 303(d) of the CWA due to nutrient enrichment.

Elevated concentrations of pesticide frequently occur in streams due to residential or commercial pesticide runoff, overspray application to row crops, and lack of adequate riparian buffers. Agricultural pesticide applications often coincide with the reproductive and early life stages of mussels, and effects to mussels may be increased during a critical time period (Bringolf *et al.* 2007a, p. 2094). Recent studies tested the toxicity of glyphosate, its formulations, and a surfactant (MON 0818) used in several glyphosate formulations, to early life stages of the fatmucket (*Lampsilis siliquoidea*), a U.S. native freshwater mussel (Bringolf *et al.* 2007a, p. 2094). Studies conducted with juvenile mussels and glochidia determined that the surfactant (MON 0818) was the most toxic of the compounds tested and that *L. siliquoidea* glochidia were the most

sensitive organism tested to date (Bringolf *et al.* 2007a, p. 2094). Roundup[®], technical grade glyphosate isopropylamine salt, and isopropylamine were also acutely toxic to juveniles and glochidia (Bringolf *et al.* 2007a, p. 2097). The study of other pesticides, including atrazine, chlorpyrifos, and permethrin, on glochidia and juvenile life stages determined that chlorpyrifos was toxic to both *L. siliquoides* glochidia and juveniles (Bringolf *et al.* 2007b, pp. 2101 and 2104). The above results indicate the potential toxicity of commonly applied pesticides and the threat to mussel species as a result of the widespread use of these pesticides.

Chemical spills have resulted in the loss of high numbers of mussels (Jones *et al.* 2001, p. 20; Brown *et al.* 2005, p. 1457; Schmerfeld 2006, pp. 12–13) and are considered a serious threat to mussel species. The Neosho mucket and rabbitsfoot are especially threatened by chemical spills because these spills can occur anywhere that highways with tanker trucks, industries, or mines overlap with their distribution.

Other examples of the influence of point- and nonpoint-source pollutants on streams throughout the range of the Neosho mucket and rabbitsfoot include two documented mussel kills in Fish Creek (circa 1988) as a result of manure runoff from a hog farm and a diesel spill (Watters 1988, p. 18). Twelve point-source discharges occur on the Green River (Kentucky State Nature Preserves Commission and The Nature Conservancy 1998, pp. 15–19). The Illinois and Little Rivers are subject to nonpoint-source organic runoff from poultry farming and municipal wastewater. Pharmaceutical chemicals used in commonly consumed drugs are increasingly found in surface waters. A recent nationwide study sampling 139 stream sites in 30 States detected the presence of numerous pharmaceuticals, hormones, and other organic wastewater contaminants downstream from urban development and livestock production areas (Kolpin *et al.* 2002, pp. 1208–1210). Another study in northwestern Arkansas found pharmaceuticals or other organic wastewater constituents at 16 of 17 sites in 7 streams surveyed in 2004 (Galloway *et al.* 2005, pp. 4–22). Toxic levels of exposure to chemicals that act directly on the neuroendocrine pathways controlling reproduction can cause premature release of viable or nonviable glochidia. For example, the active ingredient in many human prescription antidepressant drugs belonging to the class of selective serotonin reuptake inhibitors may exert negative reproductive effects on mussels

because of the drug's action on serotonin and other neuroendocrine pathways (Cope *et al.* 2008, p. 455). Pharmaceuticals or organic wastewater constituents are generally greater downstream of wastewater treatment facilities (Galloway *et al.* 2005, p. 28). Pharmaceuticals that alter mussel behavior and influence successful attachment of glochidia on fish hosts may have population-level implications for the Neosho mucket and rabbitsfoot.

The information presented in this section represents some of the threats from chemical contaminants that have been documented both in the laboratory and field and demonstrates that chemical contaminants pose a substantial threat to Neosho mucket and rabbitsfoot. A cursory examination of land use trends, nonpoint- and point-source discharges, and the list of impaired waters under section 303(d) of the CWA suggests that all 11 rabbitsfoot populations currently considered viable may be subjected to the subtle, pervasive effects of chronic, low-level contamination that is ubiquitous in these watersheds. For example, the 8 of the 11 (73 percent) streams with viable rabbitsfoot populations are listed as impaired waters under section 303(d) of the CWA. Reasons for impairment include mercury, nutrients, organic enrichment and dissolved oxygen depletion, pathogens, turbidity (sediment), and PCBs. Potential effects from contaminant exposure may result in death, reduced growth, altered metabolic processes, or reduced reproduction. We conclude that biological and habitat effects of chemical contaminants are an ongoing threat contributing to the decline of Neosho mucket and rabbitsfoot populations.

Mining

Gravel, coal, and metal mining are activities negatively affecting water quality in Neosho mucket and rabbitsfoot habitat. Instream and alluvial gravel mining has been implicated in the destruction of mussel populations (Hartfield 1993, pp. 136–138; Brim Box and Mossa 1999, pp. 103–104). Negative effects associated with gravel mining include stream channel modifications (altered habitat, disrupted flow patterns, sediment transport), water quality modifications (increased turbidity, reduced light penetration, increased temperature), macroinvertebrate population changes (elimination), and changes in fish populations, resulting from adverse effects to spawning and nursery habitat and food web disruptions (Kanehl and Lyons 1992, pp. 4–10). Gravel mining activities

continue to be a localized threat in several streams with viable rabbitsfoot populations (Ohio, Tennessee, White, Strawberry, and Little Rivers). In the lower Tennessee River, instream mining occurs in 18 reaches totaling 77.1 rkm (47.9 rmi) between the Duck River confluence and Pickwick Landing Dam (Hubbs 2010, pers. comm.).

Coal mining activities, resulting in heavy metal-rich drainage, and associated sedimentation has adversely affected many drainages with rabbitsfoot populations, including portions of the upper Ohio River system in Kentucky, Pennsylvania, and West Virginia; the lower Ohio River system in eastern Illinois; the Rough River drainage in western Kentucky; and the upper Cumberland River system in Kentucky and Tennessee (Ortmann 1909 *in* Butler 2005, p. 102; Gordon 1991, pp. 4 and 5; Layzer and Anderson 1992 *in* Butler 2005, p. 102). Numerous mussel toxicants, such as polycyclic aromatic hydrocarbons and heavy metals (copper, manganese, and zinc) from coal mining contaminate sediments when released into streams (Ahlstedt and Tuberville 1997, p. 75). Low pH commonly associated with mine runoff can reduce glochidial attachment rates on host fish (Huebner and Pynnonen 1990, pp. 2350–2353). Thus, acid mine runoff may have local effects on mussel recruitment and may lead to mortality due to improper shell development or erosion.

Metal mining (lead, cadmium, and zinc) in the Tri-State Mining Area (15,000 square kilometers; 5,800 square miles) in Kansas, Missouri, and Oklahoma has negatively affected Center and Shoal Creeks and the Spring River. It has been implicated in the loss of Neosho mucket and rabbitsfoot from portions of these streams (Obermeyer *et al.* 1997b, p. 114). A study by the Kansas Department of Health and Environment documented a strong negative correlation between the distribution and abundance of native mussels, including Neosho mucket, and sediment concentrations of lead, zinc and cadmium in the Spring River system (Angelo *et al.* 2007, pp. 477–493). Sediment and water quality samples exceeded EPA 2006 threshold effect concentrations for cadmium, lead, and zinc at numerous sampling locations within the Tri-State Mining Area (Gunter 2007, pers. comm.). These physical habitat threats combined with poor water quality and agricultural nonpoint-source pollution are serious threats to all existing mussel fauna in the basin.

In the St. Francis River basin, past metal mining and smelting (early

eighteenth century through the 1940s) have resulted in continuing heavy metal (lead, iron, nickel, copper, cobalt, zinc, cadmium, chromium) contamination of surface waters in the area upstream of the extant rabbitsfoot population. Recent and historical metals mining and smelting produced large volumes of contaminated wastes. Most of these mining wastes are stored behind poorly constructed dams and impoundments (Roberts 2008, pers. comm.). Wappapello Reservoir and the confluence with Big Creek (with habitat degradation primarily from mining activities) may effectively limit the distribution of the rabbitsfoot in the St. Francis River. We conclude that biological and habitat effects due to mining activities are a significant and ongoing threat contributing to declining Neosho mucket and rabbitsfoot populations.

Oil and Natural Gas Development

Oil and natural gas resources are present in some of the watersheds that are known to support rabbitsfoot, including the Allegheny and Middle Fork Little Red Rivers and two watersheds with viable populations (White River and French Creek). Exploration and extraction of these energy resources can result in increased siltation, a changed hydrograph (graph showing changes in the discharge of a river over a period of time), and altered water quantity and quality even at considerable distances from the mine or well field because effects are carried downstream from the original source. Rabbitsfoot habitat in streams can be threatened by the cumulative effects of multiple mines and well fields (adapted from Service 2008, p. 11).

Recently, oil and gas exploration has been able to expand in areas of shale due to new technologies (i.e., hydraulic fracturing and horizontal drilling), making access possible to oil and gas reserves in areas that were previously inaccessible. Extraction of these resources, particularly natural gas, has increased dramatically in recent years in Arkansas, Oklahoma, Pennsylvania, and West Virginia. Although oil and natural gas extraction generally occurs away from the river, extensive road and pipeline networks are required to construct and maintain wells and transport the extracted resources. These road and pipeline networks frequently cross or occur near tributaries, contributing sediment to the receiving waterway. In addition, the construction and operation of wells may result in the discharge of chemical contaminants and subsurface minerals.

Several of the viable rabbitsfoot populations occur in active shale basins (areas of shale gas formations) (<http://www.eia.gov/analysis/studies/worldshalegas/>). In 2006, more than 3,700 permits were issued for oil and gas wells by the Pennsylvania Department of Environmental Protection, which also issued 98 citations for permit violations at 54 wells (Hohey 2007; adapted from Service 2008, p. 13). A natural gas pipeline company pled guilty to three violations of the Act in 2011 for unauthorized take of a federally endangered mussel in Arkansas as a result of a large amount of sediment being transported from pipeline right-of-ways to tributary streams in the affected watershed (Department of Justice 2011, pers. comm.). Where oil and natural gas development occurs within the range of extant Neosho mucket and rabbitsfoot populations, we conclude that the resulting biological and habitat effects are a significant and ongoing threat contributing to the decline of both species.

Conservation Measures

Nonregulatory conservation efforts that are or have addressed range curtailment include monitoring of the species distribution and status and habitat enhancement and restoration projects. Survey work encompassing the entire range of the Neosho mucket has been completed for all four States. The Service and its many State and Federal partners have funded projects to private landowners to enhance riparian habitat in many streams with Neosho mucket and rabbitsfoot populations. For instance, specific watershed-level projects that have benefited habitat for the rabbitsfoot include the critically important populations in the Green and Duck Rivers. Another example includes the State of Kentucky securing 100,000 acres of agricultural riparian lands in the upper Green River watershed. Other efforts have focused on sediment remediation work in rabbitsfoot streams. Reservoir releases from dams have been modified in recent years improving water quality and habitat conditions in many tailwaters occupied by rabbitsfoot. Flow improvements below dams have enabled partners to attempt the reintroduction of listed species such as the rabbitsfoot. TVA has modified the Tims Ford Dam operations on the Elk River that will add 30 river miles of good habitat upstream from Fayetteville and in the dam tailwaters. TVA has committed to water quality and biological monitoring for a period of 10 years.

Methods have been devised and implemented for the propagation of Neosho mucket and rabbitsfoot. The States of Kansas and Missouri have released thousands of juvenile Neosho mucket individuals in the Fall, Verdigris, and Spring Rivers. The State of Kansas reintroduced Neosho mucket at two sites in the Cottonwood River. The State of Alabama reintroduced rabbitsfoot in Limestone Creek. Similar efforts to augment rabbitsfoot populations in Kentucky are under way.

The Service is processing Safe Harbor Agreements and Candidate Conservation Agreements with Assurances with private landowners to conserve aquatic species. Rabbitsfoot is one of the species included in two programmatic Safe Harbor Agreements (SHA) in Arkansas. Implementation of the upper Little Red River SHA began in 2007, and approximately 12,000 acres have been enrolled to date. This SHA is currently undergoing permit amendment to add rabbitsfoot, but the SHA already covers another mussel (speckled pocketbook) and conservation measures currently being implemented on enrolled lands will benefit rabbitsfoot. A similar programmatic SHA is currently in the final stages of development and awaiting permit approval from the Service in the Saline, Ouachita, and Caddo Rivers (headwaters) watershed.

Summary of Factor A

The decline of mussels in the eastern United States is primarily the result of long-lasting direct and secondary effects of habitat alterations such as impoundments, channelization, sedimentation, chemical contaminants, oil and gas development, and mining, and it is reasonable to conclude that the changes in the river basins historically and currently occupied by the species are the cause of population-level (river basin) effects. Historical population losses due to impoundments have probably contributed more to the decline and range reductions of the Neosho mucket and rabbitsfoot than any other single factor. Seven of the 11 (64 percent) viable rabbitsfoot populations (Ohio, Green, Tippecanoe, Tennessee, Duck, White, and Little Rivers) occur downstream of main stem impoundments that make these populations more susceptible to altered habitat quality and quantity associated with the impoundment and dam operation, which may be exacerbated during stochastic events such as droughts and floods. Sedimentation resulting from a variety of sources such as channelization, agricultural and silvicultural practices, and construction

activities has degraded Neosho mucket and rabbitsfoot habitat and altered biological processes essential to their survival. For example, sedimentation associated with agricultural land use is cited as one of the primary threats to 7 of the 11 (64 percent) streams with viable rabbitsfoot populations.

Land use conversion, particularly urbanization that increases impervious surfaces in watersheds (impervious surface increases flood intensity and duration), channelization, and instream gravel and sand mining alter natural hydrology and stream geomorphology characteristics that also degrade mussel habitat in streams that support the Neosho mucket and rabbitsfoot. Contaminants associated with industrial and municipal effluents, agricultural practices, and mining degrade water and sediment quality leading to environmental conditions that have lethal and sublethal effects to Neosho mucket and rabbitsfoot, particularly the highly sensitive early life stages. Eight of the 11 (73 percent) streams with viable rabbitsfoot populations are listed as impaired waters under section 303(d) of the CWA, which means that the rabbitsfoot may be subjected to the subtle, pervasive effects of chronic, low-level contamination that is ubiquitous in these watersheds. Chronic contamination can affect the mussels in a variety of ways including sublethal effects (such as suppressed immune systems and effects to reproduction and fecundity from neuroendocrine disruptors) and lethal effects (such as sediment smothering and disruption of other metabolic processes).

In summary, we have determined that impoundments, channelization, sedimentation, chemical contaminants, mining, and oil and natural gas development are ongoing threats to the Neosho mucket and rabbitsfoot and their habitat that are expected to continue into the future. Although efforts have been made to restore habitat in some areas, these threats are still ongoing, as evidenced by population declines and range reduction.

Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The Neosho mucket was valuable in the pearl button industry (1800s to early 1940s), and historical episodes of overharvest in the Neosho River may have contributed to its decline (Obermeyer *et al.* 1997b, p. 115). The rabbitsfoot was never a valuable shell for the commercial pearl button industry (Meek and Clark 1912, p. 15; Murray and Leonard 1962, p. 65), nor the cultured pearl industry (Williams

and Schuster 1989, p. 23), and hence these activities were probably not significant factors in its decline. However, it was noted occasionally in commercial harvests as evidenced from mussel cull piles (Isely 1924; Parmalee *et al.* 1980, p. 101). Currently, Neosho mucket and rabbitsfoot are not commercially valuable species but may be increasingly sought by collectors as they become rarer. Although scientific collecting is not thought to represent a significant threat, unregulated collecting could adversely affect localized Neosho mucket and rabbitsfoot populations.

Commercial mussel harvest is illegal in some States (for example, Indiana and Ohio), but regulated in others (for example, Arkansas, Alabama, Kentucky, and Tennessee). These species may be inadvertently harvested by inexperienced commercial harvesters unfamiliar with species identification. Although illegal harvest of protected mussel beds occurs (Watters and Dunn 1995, pp. 225 and 247–250), commercial harvest is not known to have a significant effect on the Neosho mucket and rabbitsfoot.

Conservation Measures

We are not aware of any nonregulatory actions that are being conducted to ameliorate overutilization for commercial, recreational, scientific, or educational purposes at this time.

Summary of Factor B

Though it is possible that the intensity of inadvertent or illegal harvest may increase in the future, we have no evidence that this stressor is currently increasing in severity. On the basis of this analysis, we find that overutilization for commercial, recreational, scientific, or educational purposes is not a current threat to the Neosho mucket or rabbitsfoot in any portion of their range at this time nor is likely to become so in the future.

Factor C. Disease or Predation

Little is known about diseases in freshwater mussels (Grizzle and Brunner 2007, p. 6). However, mussel die-offs have been documented in streams inhabited by rabbitsfoot (Neves 1986, pp. 8–11), and some researchers believe that disease may be a factor contributing to the die-offs (Buchanan 1986, p. 53; Neves 1986, p. 11). Mussel parasites include water mites, trematodes, oligochaetes, leeches, copepods, bacteria, and protozoa (Grizzle and Brunner 2007, p. 4). Generally, parasites are not suspected of being a major limiting factor in the species' survival (Oesch 1984, p. 6). However, mite and trematode burdens

can affect reproductive output and physiological condition, respectively, in mussels (Gangloff *et al.* 2008, pp. 28–30). Stressors that reduce fitness may make mussels more susceptible to parasites (Butler 2007, p. 90). Furthermore, nonnative mussels may carry diseases and parasites that are potentially devastating to the native mussel fauna on an individual or population-level basis (river basin), including Neosho mucket and rabbitsfoot (Strayer 1999b, p. 88). However, while individual mussels or beds of mussels historically or currently may have been affected by disease or parasites, we have no evidence that the severity of disease or parasite infestations impact either mussel on a population level (river basin).

The muskrat (*Ondatra zibethicus*) is cited as the most prevalent mussel predator (Kunz 1898, p. 328; Convey *et al.* 1989, pp. 654–655; Hanson *et al.* 1989, pp. 15–16). Muskrat predation may limit the recovery potential of endangered or threatened mussels or contribute to local extirpations of previously stressed populations, according to Neves and Odom (1989, p. 940), who consider it, however, primarily a seasonal or localized threat. Galbraith *et al.* (2008, p. 49) hypothesized that predation may have exacerbated rabbitsfoot mortality in the Little River, Oklahoma, during the 2005 drought. Harris *et al.* (2007, p. 31) reported numerous dead rabbitsfoot from muskrat middens (mound or deposit containing shells) in the Spring River, Arkansas. Other mammals (for example, raccoon, mink, otter, hogs, and rats), turtles, and aquatic birds also occasionally feed on mussels (Kunz 1898, p. 328; Neck 1986, pp. 64–65). Recently, predation of Neosho mucket by reintroduced otters has been documented in a mussel bed also supporting rabbitsfoot in the Spring River, Kansas (Barnhart 2003, pp. 16–17), and likely occurs elsewhere. Muskrat predation has been documented for Neosho mucket and rabbitsfoot, but the overall threat is generally considered insignificant.

Some species of fish feed on mussels (for example, common carp (*Cyprinus carpio*), freshwater drum (*Aplodinotus grunniens*), and redear sunfish (*Lepomis microlophus*)) and potentially on young Neosho mucket and rabbitsfoot. Various invertebrates, such as flatworms, hydra, nonbiting midge larvae, dragonfly larvae, and crayfish, feed on juvenile mussels (Zimmerman *et al.* 2003, p. 28). Although predation by naturally occurring predators is a normal aspect of the population dynamics of a healthy mussel population, predation may

amplify declines in small populations of this species. In addition, the potential now exists for black carp (*Mylopharyngodon piceus*), a mollusk-eating Asian fish recently introduced into the waters of the United States (Strayer 1999b, p. 89), to eventually disperse throughout the range of the Neosho mucket and rabbitsfoot. However, we have no evidence that the severity of predation has reached levels where populations (river basin) of either mussel have been historically or recently impacted or should be impacted in the future based on current information.

The life cycle of freshwater mussels is intimately related to that of the freshwater fish they use as hosts for their parasitic glochidia. For this reason, diseases that affect populations of freshwater fishes also pose a significant threat to mussels in general. Viral hemorrhagic septicemia (VHS) disease has been confirmed from much of the Great Lakes and St. Lawrence River system. If the VHS virus successfully migrates out of Clearfork Reservoir or the Great Lakes and into the Ohio and Mississippi River basins, it could spread rapidly and cause fish kills throughout the river basins. Few Neosho mucket and rabbitsfoot populations are currently recruiting at sustainable levels, and fish kills, particularly if VHS infects suitable fish hosts, could further reduce glochidia encounters with fish hosts and exacerbate mussel recruitment reductions. However, we have no evidence that fish kills affecting potential fish hosts of these two mussel species have had population effects historically or recently.

Conservation Measures

Nonregulatory conservation measures implemented include control of the Asian carp and black carp. Both species are listed under the Injurious Wildlife Provision of the Lacey Act, which prohibits the import, export, and transport between States. Numerous States within the range of Neosho mucket and rabbitsfoot are engaging in efforts (such as, eradication) to minimize the effects of Asian carp on native fishery resources.

Summary of Factor C

Disease in mussels is poorly known and not currently considered a threat rising to a level such that it would have an effect on the Neosho mucket, nor the rabbitsfoot, as a whole. Studies indicate that, in some localized areas, disease and predation may have negative effects on mussel populations. Though it is possible that the intensity of disease or predation may increase in the future, we

have no evidence that this stressor is currently increasing in severity.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

The objective of the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA) (33 U.S.C. 1251 *et seq.*), is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources. The CWA has a stated goal that ". . . wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983." States are responsible for setting and implementing water quality standards that align with the requirements of the CWA. Overall, implementation of the CWA could benefit both mussel species through the point and nonpoint programs.

Nonpoint source (NPS) pollution comes from many diverse sources, unlike pollution from industrial and sewage treatment plants. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it transports natural and human-made pollutants. While some pollutants may be "deposited," some may remain in suspension (dissolved) as they are transported through various waterbodies. States report that nonpoint source pollution is the leading remaining cause of water quality problems. The effects of nonpoint-source pollutants on specific waters vary and may not always be fully assessed. However, these pollutants have harmful effects on fisheries and wildlife (http://www.epa.gov/owow_keep/NPS/whatis.html).

Sources of NPS pollution within the watersheds occupied by both mussels include timber clearcutting, clearing of riparian vegetation, urbanization, road construction, and other practices that allow bare earth to enter streams (The Nature Conservancy 2004, p. 13). Numerous stream segments in the Duck, White, Black, Little, and Strawberry River watersheds are listed as impaired waters under section 303(d) of the CWA by EPA due to sedimentation associated with agriculture (USACE 2011, p. 21; EPA Water Quality Assessment Tool, http://ofmpub.epa.gov/tmdl_waters10/attains_nation_cy.control?p_report_type=T). For example, impaired streams in the Duck River watershed (483 rkm (300 rmi)) are losing 5 to 55 percent more soil per year than streams not labeled as impaired (USACE 2011, pp.

21–22). Currently, the CWA may not adequately protect Neosho mucket and rabbitsfoot habitat from NPS pollution. The Service has no information concerning the implementation of the CWA regarding NPS pollution specific to protection of both mussels. However, insufficient implementation could become a threat to both mussel species if they continue to decline in numbers or if new information becomes available.

Point-source discharges within the range of the Neosho mucket and rabbitsfoot have been reduced since the enactment of the CWA. Despite some reductions in point-source discharges, adequate protection may not be provided by the CWA for filter-feeding organisms that can be affected by extremely low levels of contaminants (see *Chemical Contaminants* discussion under Factor A). The Neosho mucket and rabbitsfoot continue to decline due to the effects of habitat destruction, poor water quality, contaminants, and other factors. Eight of the 11 (73 percent) streams with viable rabbitsfoot populations are listed as impaired waters under section 303(d) of the CWA. Reasons for impairment include mercury, nutrients, organic enrichment, dissolved oxygen depletion, pathogens, turbidity (sediment), and PCBs. In addition, numerous tributaries within watersheds supporting viable Neosho mucket and rabbitsfoot populations also are listed as impaired waters under section 303(d) of the CWA, which means that both species may be subjected to greater, albeit subtle, pervasive effects of chronic, low-level contamination that is ubiquitous in these watersheds. However, we are aware of no specific information about the sensitivity of the Neosho mucket and rabbitsfoot to common point-source pollutants like industrial and municipal pollutants and very little information on other freshwater mussels. Because little information is available about water quality parameters necessary to fully protect freshwater mussels, such as the Neosho mucket and rabbitsfoot, it is difficult to determine whether the CWA is adequately addressing the threats to these species. However, given that a goal of the CWA is to establish water quality standards that protect shellfish and given that documented declines of these mussel species still continue due to poor water quality and other factors, we take a conservative approach in favor of the species and conclude that the CWA has been insufficient to reduce or remove the threats to the Neosho mucket and rabbitsfoot.

Summary of Factor D

In summary, the CWA has a stated goal to establish water quality standards that protect aquatic species, including the Neosho mucket and rabbitsfoot. However, the CWA has generally been insufficient at protecting mussels, and adequate water quality criteria that are protective of all life stages, particularly glochidia and juveniles, may not have been established. Little information is known about specific sensitivities of mussels to various pollutants, but both species continue to decline due to the effects of habitat destruction, poor water quality, contaminants, and other factors.

Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence

Population Fragmentation and Isolation

Population fragmentation and isolation prohibit the natural interchange of genetic material between populations. Most of the remaining Neosho mucket and rabbitsfoot populations are small and geographically isolated, and, thus, are susceptible to genetic drift, inbreeding depression, and stochastic changes to the environment, such as toxic chemical spills (Smith 1990, pp. 311–321; Watters and Dunn 1995, pp. 257–258; Avise and Hamrick 1996, pp. 463–466). For example, the Spring River (White River basin) and Muddy Creek (Ohio River basin) rabbitsfoot populations are the only small populations not isolated from a viable population. Three marginal populations (Alleghany River and LeBoeuf and Conneauttee Creeks), considered metapopulations with French Creek, also are not isolated from a viable rabbitsfoot population (French Creek). However, 41 of 51 extant rabbitsfoot populations (80 percent) are isolated from other extant populations, excluding those discussed above and the Strawberry, Tennessee, and Ohio Rivers, which are viable populations that are not isolated from another viable population (Black River) or each other (lower Tennessee and Ohio Rivers).

Inbreeding depression can result in early mortality, decreased fertility, smaller body size, loss of vigor, reduced fitness, and various chromosome abnormalities (Smith 1990, pp. 311–321). A species' vulnerability to extinction is increased when they are patchily distributed due to habitat loss and degradation (Noss and Cooperrider 1994, pp. 58–62; Thomas 1994, p. 373). Although changes in the environment may cause populations to fluctuate naturally, small and low-density populations are more likely to fluctuate below a minimum viable population

size (the minimum or threshold number of individuals needed in a population to persist in a viable state for a given interval) (Shaffer 1981, p. 131; Shaffer and Samson 1985, pp. 148–150; Gilpin and Soulé 1986, pp. 25–33).

Furthermore, this level of isolation makes natural repopulation of any extirpated population unlikely without human intervention. Population isolation prohibits the natural interchange of genetic material between populations, and small population size reduces the reservoir of genetic diversity within populations, which can lead to inbreeding depression (Avise and Hamrick 1996, p. 461).

Neosho mucket and rabbitsfoot were once widespread throughout their respective ranges with few natural barriers to prevent migration (via fish host species) among suitable habitats. However, construction of dams extirpated many Neosho mucket and rabbitsfoot populations and isolated others. Recruitment reduction or failure is a potential problem for many small Neosho mucket and rabbitsfoot populations rangewide, a potential condition exacerbated by their reduced range, increasingly small populations, and increasingly isolated populations. If these trends continue, further significant declines in total population size and subsequent reduction in long-term survivability may be observed in the future.

The likelihood is high that some rabbitsfoot and Neosho mucket populations are below the effective population size (EPS—the number of individuals in a population who contribute offspring to the next generation), based on restricted distribution and populations only represented by a few individuals, and achieving the EPS is necessary for a population to adapt to environmental change and maintain long-term viability. Isolated populations eventually are extirpated when population size drops below the EPS or threshold level of sustainability (Soulé 1980, pp. 162–164). Evidence of recruitment in many populations of these two species is scant, making recruitment reduction or outright failure suspect. These populations may be experiencing the bottleneck effect of not attaining the EPS. Small, isolated, below the EPS-threshold populations of short-lived species (most fish hosts) theoretically die out within a decade or so, while below-threshold populations of long-lived species, such as the Neosho mucket and rabbitsfoot, might take decades to die out even given years of total recruitment failure. Without genetic interchange, small, isolated

populations could be slowly expiring, a phenomenon termed the extinction debt (Tilman *et al.* 1994, pp. 65–66). Even given the absence of existing or new anthropogenic threats, disjunct populations may be lost as a result of current below-threshold effective population size. Additionally, evidence indicates that general habitat degradation continues to decrease habitat patch size, further contributing to the decline of Neosho mucket and rabbitsfoot populations.

We find that fragmentation and isolation of small remaining populations of the Neosho mucket and rabbitsfoot are current and ongoing threats to both species throughout all of their ranges and will continue into the future. Further, stochastic events may play a magnified role in population extirpation when small, isolated populations are involved.

Invasive Nonindigenous Species

Various invasive or nonnative species of aquatic organisms are firmly established in the range of the Neosho mucket and rabbitsfoot. The nonnative, invasive species that poses the most significant threat is the zebra mussel, *Dreissena polymorpha*, introduced from Europe. Its invasion poses a threat to mussel faunas in many regions, and species extinctions are expected as a result of its continued spread in the eastern United States (Ricciardi *et al.* 1998, p. 613). Strayer (1999b, pp. 75–80) reviewed in detail the mechanisms by which zebra mussels affect native mussels. Zebra mussels attach in large numbers to the shells of live native mussels and are implicated in the loss of entire native mussel beds. Fouling effects include impeding locomotion (both laterally and vertically), interfering with normal valve movements, deforming valve margins, and locally depleting food resources and increasing waste products. Heavy infestations of zebra mussels on native mussels may overly stress the animals by reducing their energy stores. They may also reduce food concentrations to levels too low to support reproduction, or even survival in extreme cases. Zebra mussels also may affect Neosho mucket and rabbitsfoot through filtering and removing their sperm and possibly glochidia from the water column, thus reducing reproductive potential. Habitat for native mussels also may be degraded by large deposits of zebra mussel pseudofeces (undigested waste material passed out of the incumbent siphon) (Vaughan 1997, p. 11).

Overlapping much of the current range of the Neosho mucket and rabbitsfoot, zebra mussels have been

detected or are established in Neosho mucket (Neosho and Verdigris Rivers) and rabbitsfoot streams (Ohio, Allegheny, Green, Tennessee, White, and Verdigris Rivers, and French and Bear Creeks). Zebra mussel populations appear to be maintained primarily in streams with barge navigation (Stoeckel *et al.* 2003, p. 334). As zebra mussels may maintain high densities in big rivers, large tributaries, and below infested reservoirs, rabbitsfoot populations in these affected areas have the potential to be significantly affected. In addition, there is long-term potential for zebra mussel invasions into other systems that currently harbor Neosho mucket and rabbitsfoot populations. However, evidence is mounting in some northern streams where there is no barge navigation (French Creek and Tippecanoe River) and southern ones with barge traffic (Tennessee River) that the zebra mussel threat to native mussels may be minimal because native freshwater mussel populations are able to survive when zebra mussel abundance is low (Butler 2005, p.116; Fisher 2009, pers. comm.).

The Asian clam (*Corbicula fluminea*) has spread throughout the range of Neosho mucket and rabbitsfoot since its introduction in the early twentieth century. It competes with native mussels, particularly juveniles, for resources such as food, nutrients, and space (Neves and Widlak 1987, p. 6; Leff *et al.* 1990, p. 414), and may ingest sperm, glochidia, and newly metamorphosed juveniles of native mussels (Strayer 1999b, p. 82; Yeager *et al.* 2000, p. 255). Periodic die-offs of Asian clams may produce enough ammonia and consume enough dissolved oxygen to kill native mussels (Strayer 1999b, p. 82). Yeager *et al.* (2000, pp. 257–258) determined that high densities of Asian clams negatively affect the survival and growth of newly metamorphosed juvenile mussels and thus reduced recruitment. Dense Asian clam populations actively disturb sediments that may reduce habitat for juveniles of native mussels (Strayer 1999b, p. 82).

Asian clam densities vary widely in the absence of native mussels or in patches with sparse mussel concentrations, but Asian clam density is never high in dense mussel beds, indicating that the clam is unable to successfully invade small-scale habitat patches with high unionid biomass (Vaughn and Spooner 2006, pp. 334–335). The invading clam, therefore, appears to preferentially invade sites where mussels are already in decline (Strayer 1999b, pp. 82–83; Vaughn and Spooner 2006, pp. 332–336) and does

not appear to be a causative factor in the decline of mussels in dense beds. However, an Asian clam population that thrives in previously stressed, sparse mussel populations might exacerbate mussel decline through competition and by impeding mussel population expansion (Vaughn and Spooner 2006, pp. 335–336).

A molluscivore (mollusk eater), the introduced black carp (*Mylopharyngodon piceus*), is a potential threat to Neosho mucket and rabbitsfoot (Strayer 1999b, p. 89). It has been proposed for widespread use by aquaculturists to control snails, the intermediate host of a trematode (flatworm) parasite affecting catfish in ponds in the southeast and lower midwest. They are known to feed on various mollusks, including mussels and snails, in China. They are the largest of the Asiatic carp species, reaching more than 1.2 meters (4 feet) in length (Nico and Williams 1996, p. 6). Foraging rates for a 4-year-old fish average 1.4–1.8 kg (3 or 4 pounds) a day, indicating that a single individual could consume 9,072 kilograms (10 tons) of native mollusks during its lifetime (MICRA 2005, p. 1). In 1994, 30 black carp escaped from an aquaculture facility in Missouri during a flood. The escape of nonsterile black carp is considered imminent by conservation biologists (Butler 2007, pp. 95–96). The black carp was officially added to the Federal list of injurious wildlife species on October 18, 2007 (72 FR 59019).

The round goby (*Neogobius melanostomus*) is another nonnative, invasive fish species released in the 1980s that is well established and likely to spread through the Mississippi River system (Strayer 1999b, pp. 87–88). This species is an aggressive competitor of similar-sized benthic fishes (sculpins and darters), as well as a voracious carnivore, despite its size (less than 25.4 centimeters (10 inches) in length), preying on a variety of foods, including small mussels and fishes that could serve as glochidial hosts (Strayer 1999b, p. 88; Janssen and Jude 2001, p. 325). Round gobies may, therefore, pose a threat to Neosho mucket and rabbitsfoot reproduction.

The golden alga (*Prymnesium parvum*) is an invasive marine or estuarine algae that likely originated in Europe (Barkoh and Fries 2010, p. 2). Golden alga is found throughout 20 States in the United States. Algae blooms and fish kills have been reported in the following States that overlap the range of Neosho mucket and rabbitsfoot: Arkansas, Oklahoma, Alabama, Louisiana, Mississippi, Georgia, West Virginia, and Kentucky (Hambright

2012, p. 33). Golden alga blooms have been associated with mine and gas outfalls, specifically high chlorides (Sextone 2012, p. 1). Golden alga can give off toxins, when inorganic nitrogen and phosphorous are scarce, that are lethal to gill-breathing organisms, such as mussels and fishes. The toxins also can kill other invertebrates, planktonic algae, and bacteria (Barkoh and Fries 2010, p. 1). A golden alga bloom can be detrimental to Neosho mucket and rabbitsfoot by directly killing individuals and fish hosts and destroying their food base. Nonnative, invasive species, such as those described above, are an ongoing threat to the Neosho mucket and rabbitsfoot. This threat is likely to increase as these and potentially other invasive species expand their occupancy within the ranges of the Neosho mucket and rabbitsfoot through displacement, recruitment interference, and direct predation of the mussels and their fish hosts.

Temperature

Natural temperature regimes can be altered by impoundments, tailwater releases from dams, industrial and municipal effluents, and changes in riparian habitat. Low temperatures can significantly delay or prevent metamorphosis in mussels (Watters and O'Dee 1999, pp. 454–455). Cold water effluent below dams may negatively impact populations; rabbitsfoot were less abundant and in poor condition below a cold water outflow on the Little River, compared to two other sites upstream (Galbraith and Vaughn 2011, p. 198). Low water temperatures caused by dam releases also may disrupt seasonal patterns in reproduction on the Little River (Galbraith and Vaughn 2009, pp. 43–44).

Exact critical thermal limits for survival and normal functioning of many freshwater mussel species are unknown. However, high temperatures can reduce dissolved oxygen concentrations in the water, which slows growth, reduces glycogen stores, impairs respiration, and may inhibit reproduction (Fuller 1974, pp. 240–241). Thermally sensitive species decrease their water filtering and oxygen consumption at higher temperatures (Spooner and Vaughn 2008, p. 314). Although we do not have physiological data on rabbitsfoot and Neosho mucket, closely related species, the plain pocketbook (*Lampsilis cardium*) and the pimpleback (*Quadrula pustulosa*), are thermally sensitive (Spooner and Vaughn 2008, p. 313). Water temperature increases have been documented to shorten the period of

glochidial encystment, reduce righting speed (various reflexes that tend to bring the body into normal position in space and resist forces acting to displace it out of normal position), and slow burrowing and movement responses (Bartsch *et al.* 2000, p. 237; Watters *et al.* 2001, p. 546; Schwalb and Pusch 2007, pp. 264–265). Several studies have documented the influence of temperature on the timing aspects of mussel reproduction (Gray *et al.* 2002, p. 156; Allen *et al.* 2007, p. 85; Steingraeber *et al.* 2007, pp. 303–309). Peak glochidial releases are associated with water temperature thresholds that can be thermal minimums or maximums, depending on the species (Watters and O’Dee 2000, p. 136).

Alterations in temperature regimes in streams, such as those described above, are an ongoing threat to the Neosho mucket and rabbitsfoot. This threat is likely to continue and increase in the future due to additional navigation or water supply projects and as land use conversion to urban uses increases within the entire ranges of the Neosho mucket and rabbitsfoot.

Climate Change

Our analyses under the Act include consideration of ongoing and projected changes in climate. The terms “climate” and “climate change” are defined by the Intergovernmental Panel on Climate Change (IPCC). “Climate” refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2007, p. 78). The term “climate change” thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007, p. 78). Various types of changes in climate can have direct or indirect effects on species. These effects may be positive, neutral, or negative and they may change over time, depending on the species and other relevant considerations, such as the effects of interactions of climate with other variables (e.g., habitat fragmentation) (IPCC 2007, pp. 8–14, 18–19). In our analyses, we use our expert judgment to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change.

Projected changes in climate and related effects can vary substantially across and within different regions of the world (e.g., IPCC 2007a, pp. 8–12). Thus, although global climate

projections are informative and in some cases are the only or the best scientific information available, to the extent possible we use “downscaled” climate projections which provide higher resolution information that is more relevant to the spatial scales used to assess effects to a given species (see Glick *et al.* 2011, pp. 58–61 for a discussion of downscaling). With regard to our analysis for the Neosho mucket and the rabbitsfoot, downscaled projections of climate change are available, but projecting precise effects on these two species from downscaled models is difficult because of the large geographic areas inhabited by both species. However, projections for the change in annual air temperature by the year 2080 for the Neosho mucket ranges between an increase of 7 to 8 degrees Fahrenheit (°F) and for the rabbitsfoot, an increase of 4.5 to 8 °F in annual air temperature (Maura *et al.* 2007, as displayed on <http://www.climatewizard.org/#> 2012).

Mussels can be placed into thermal guilds, thermally sensitive and thermally tolerant species, according to their response to warm summer water temperatures greater than 35 °C (95 °F) (Spooner and Vaughn 2008, p. 313). Although we do not have physiological data on rabbitsfoot and Neosho mucket, closely related species, *Lampsilis cardium* and *Quadrula pustulosa*, are thermally sensitive (Spooner and Vaughn 2008, p. 313). Data for the Kiamichi River in Oklahoma suggests that, over the past 17 years as water and air temperatures have increased, mussel beds once dominated by thermally sensitive species are now dominated by thermally tolerant species (Galbraith *et al.* 2010, p. 1179; Spooner and Vaughn 2008, p. 316). As temperature increases due to climate change throughout the range of Neosho mucket and rabbitsfoot, both species may experience population declines as warmer rivers are more suitable for thermally tolerant species.

Ficke *et al.* (2005, pp. 67–69; 2007, pp. 603–605) described the general potential effects of climate change on freshwater fish populations worldwide. Overall, the distribution of fish species is expected to change, including range shifts and local extirpations. Because freshwater mussels are entirely dependent upon a fish host for successful reproduction and dispersal, any changes in local fish populations would also affect freshwater mussel populations. Therefore, mussel populations will reflect local extirpations or decreases in abundance of fish species.

Conservation Measures

Nonregulatory conservation measures that address these threats include implementing artificial propagation programs (see Summary of Factor A). The Interior Highlands Mollusk Conservation Council, Ohio River Ecosystem Team—Mollusk Subcommittee and similar working groups targeting mussel conservation efforts, has been created and includes the Service, State and Federal agencies, nongovernmental organizations, academia, and Tribes.

Summary of Factor E

A variety of natural and manmade factors threatens the continued existence of Neosho mucket and rabbitsfoot. Forty-one of the 51 (80 percent) extant rabbitsfoot populations are isolated from viable populations. A lack of recruitment and genetic isolation pose a threat to the continued existence of these species. Invasive, nonindigenous species, such as zebra mussel, black carp, and Asian clam, have potentially adversely affected populations of the Neosho mucket and rabbitsfoot and their fish hosts, and these effects are expected to persist into the future. Evidence exists that the interaction of climate change and water management negatively impacts mussels (Galbraith *et al.* 2010, pp. 1179–1180). Drought combined with water management practices has led to high mortality in thermally sensitive species (Galbraith *et al.* 2010, pp. 1180–1181). Based on the best available information, we are unable to predict the timing and scope of any changes to these mussel species that may occur as a result of climate change effects, particularly when combined with effects from water management practices.

Cumulative Effects of Threats

The life-history traits and habitat requirements of the Neosho mucket and rabbitsfoot, and other freshwater mussels in general, make them extremely susceptible to environmental change. Unlike other aquatic organisms (e.g., aquatic insects and fish), mussels have limited refugia from stream disturbances (e.g., droughts, sedimentation, chemical contaminants). Mechanisms leading to the decline of Neosho mucket and rabbitsfoot, as discussed above, range from local (e.g., riparian clearing, chemical contaminants, etc.) to regional influences (e.g., altered flow regimes, channelization, etc.), to global climate change. The synergistic (interaction of two or more components) effects of threats are often complex in aquatic

environments, making it difficult to predict changes in mussel and fish host(s) distribution, abundance, and habitat availability that may result from these effects. While these stressors may act in isolation, it is more probable that many stressors are acting simultaneously (or in combination) (Galbraith *et al.* 2010, p. 1176) on Neosho mucket and rabbitsfoot populations.

Summary of Threats

The decline of the Neosho mucket and rabbitsfoot (described by Butler 2005, entire; described by Service 2010, entire) is primarily the result of habitat loss and degradation (Neves 1991, p. 252). Chief among the causes of decline, but in no particular ranking order, are impoundments, sedimentation, channelization, chemical contaminants, oil and natural gas development, and mining (Neves 1991, p. 252; Neves 1993, pp. 4–6; Williams *et al.* 1993, pp. 7–9; Neves *et al.* 1997, pp. 60 and 63–75; Watters 2000, pp. 262–267). These stressors have had profound adverse effects on Neosho mucket and rabbitsfoot populations, their habitats, and fish hosts.

Regulations at the Federal level may not be providing the protection needed for the Neosho mucket and rabbitsfoot. For example, 8 of the 11 (73 percent) viable rabbitsfoot populations are located in waters listed as impaired under section 303(d) of the CWA. In addition, numerous tributaries within watersheds with viable Neosho mucket and rabbitsfoot populations also are listed as impaired waters under section 303(d) of the CWA. The CWA has a stated goal to establish water quality standards that protect aquatic species, including mussel species. However, the CWA has generally been insufficient at protecting mussels, and adequate water quality criteria that are protective of all mussel life stages, particularly glochidia and juveniles, may not be established. Little information is known about specific sensitivities of mussels to various pollutants, but both species continue to decline due to the effects of poor water quality, contaminants, and other factors.

The majority of extant Neosho mucket populations are small and isolated, with only one viable population remaining. The majority of extant rabbitsfoot populations are marginal and small (78 percent) and isolated (80 percent), with only two small (5 percent) and 4 viable populations (36 percent) not isolated from another viable population (Butler 2005, p. 22; Service 2010, pp. 3–8). The patchy distributional pattern of populations in short river reaches makes

them more susceptible to extirpation from single catastrophic events, such as toxic chemical spills (Watters and Dunn 1995, p. 257). Furthermore, this level of isolation makes natural recolonization of extirpated populations virtually impossible without human intervention. Various nonnative species of aquatic organisms are firmly established in the range of the Neosho mucket and rabbitsfoot. The nonnative species that poses the most significant threat to the Neosho mucket and rabbitsfoot is the zebra mussel. Although attempts to alleviate some of these threats are ongoing at some locations, no populations appear to be without threats that are negatively impacting the species.

Determination

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the Neosho mucket and the rabbitsfoot. Section 3(6) of the Act defines an endangered species as “any species that is in danger of extinction throughout all or a significant portion of its range” and defines a threatened species as “any species that is likely to become endangered throughout all or a significant portion of its range within the foreseeable future.” As described in detail above, these two species are currently at risk throughout all of their respective ranges due to the immediacy, severity, and scope of threats from habitat destruction and modification (Factor A) and other natural or manmade factors affecting their continued existence (Factor E). Existing regulatory mechanisms applicable to these species, such as the CWA, appear to be inadequate to reduce these threats from water quality degradation, in particular, chemical contaminants (Factor D). Although there are ongoing actions to alleviate some threats, no populations appear to be without current threats. These isolated species have a limited ability to recolonize historically occupied stream and river reaches and are vulnerable to natural or human-caused changes in their stream and river habitats.

Their range curtailment, small population size, and isolation make the Neosho mucket and rabbitsfoot more vulnerable to threats such as sedimentation, disturbance of riparian corridors, changes in channel morphology, point- and nonpoint-source contaminants, urbanization, and invasive species and to stochastic events (such as chemical spills).

Neosho Mucket

The Neosho mucket has been extirpated (no longer in existence) from approximately 62 percent of its historical range with only 9 of 16 historical populations remaining (extant). This mussel is declining rangewide (eight of the nine extant populations), with only one remaining large, viable population. Based on the best available scientific and commercial information, we have determined that the Neosho mucket is in danger of extinction throughout all of its range. Therefore, we are listing it as an endangered species. In other words, we find that a threatened species status is not appropriate for the Neosho mucket due to its contracted range and only one remaining stable and viable population.

Rabbitsfoot

The rabbitsfoot has been extirpated from approximately 64 percent of its historical range. While this species is declining rangewide, it sustains recruitment and population viability consistently in 11 (8 percent of historical or 22 percent of extant distribution) large, extant river populations and, while reduced in numbers, it also sustains limited recruitment and distribution in another 17 river populations. Of the 17 river populations with limited recruitment and distribution, 15 of these populations (88 percent) are declining.

All remaining rabbitsfoot populations continue to be reduced in size or quality by habitat degradation as a result of impoundments and dams, navigation projects, commercial and residential development, agriculture, chemical contaminants, mining, and oil and natural gas development (Factor A). Climate change could affect in-stream water temperatures, seasonal water flows, and mussel and fish host reproductive activities, including the availability of mussel fish host species (Factor E). Invasive species occupying rabbitsfoot habitat will likely cause additional displacement and recruitment interference (Factor E). Eight of the 11 (73 percent) viable rabbitsfoot populations are in watersheds that have numerous tributaries that are listed as impaired waters under section 303(d) of the CWA. Regulatory mechanisms such as the CWA have been insufficient to significantly reduce or remove these types of threats to rabbitsfoot (Factor D). The synergistic effects of threats such as these are often complex in aquatic environments and make it difficult to predict changes in mussel and fish host(s) distribution, abundance, and

habitat availability. These threats are probably acting simultaneously on the remaining rabbitsfoot populations with negative results and are expected to continue to do so. Thus, while rabbitsfoot sustains 11 viable populations, these populations continue to be at risk, and the remaining extant populations are affected by isolation, fragmentation, limited recruitment and distribution, and population declines, which make the species particularly susceptible to extinction in the near future if threats continue or increase.

While we have determined that the rabbitsfoot is not currently in danger of extinction, because of the threats facing the species and impacts to its life history, we find that the species is likely to become endangered in the foreseeable future throughout all of its range. Therefore, we are listing it as a threatened species. In other words, we find that endangered status is not appropriate for the rabbitsfoot because 8 percent of the historical populations or 22 percent of extant populations remaining in its historical streams can be considered viable, but are facing subtle, pervasive threats that are ubiquitous in each watershed.

Significant Portion of the Range

Under the Act and our implementing regulations, a species may warrant listing if it is endangered or threatened throughout all or a significant portion of its range. The Act defines “endangered species” as any species which is “in danger of extinction throughout all or a significant portion of its range,” and “threatened species” as any species which is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The definition of “species” is also relevant to this discussion. The Act defines “species” as follows: “The term ‘species’ includes any subspecies of fish or wildlife or plants, and any distinct population segment (DPS) of any species of vertebrate fish or wildlife which interbreeds when mature.”

Two recent district court decisions have addressed whether the SPR language allows the Service to list or protect less than all members of a defined “species”: *Defenders of Wildlife v. Salazar*, 729 F. Supp. 2d 1207 (D. Mont. 2010), concerning the Service’s delisting of the Northern Rocky Mountains gray wolf (74 FR 15123, April 2, 2009); and *WildEarth Guardians v. Salazar*, 2010 U.S. Dist. LEXIS 105253 (D. Ariz. September 30, 2010), concerning the Service’s 2008 finding on a petition to list the Gunnison’s prairie dog (73 FR 6660,

February 5, 2008). The Service had asserted in both of these determinations that it had authority, in effect, to protect only some members of a “species,” as defined by the Act (i.e., species, subspecies, or DPS), under the Act. Both courts ruled that the determinations were arbitrary and capricious on the grounds that this approach violated the plain and unambiguous language of the Act. The courts concluded that reading the SPR language to allow protecting only a portion of a species’ range is inconsistent with the Act’s definition of “species.” The courts concluded that once a determination is made that a species (i.e., species, subspecies, or DPS) meets the definition of “endangered species” or “threatened species,” it must be placed on the list in its entirety and the Act’s protections applied consistently to all members of that species (subject to modification of protections through special rules under sections 4(d) and 10(j) of the Act).

We evaluated the current range of the Neosho mucket and rabbitsfoot to determine if there is any apparent geographic concentration of potential threats for either species. The Neosho mucket and rabbitsfoot are highly restricted in their ranges, and the threats occur throughout their ranges. We considered the potential threats due to impoundments, sedimentation, channelization, chemical contaminants, oil and gas development, mining, and climate change. We found no concentration of threats because of the species’ limited and curtailed ranges, and uniformity of the threats throughout their entire range. Having determined that the Neosho mucket is endangered throughout its entire range, it is not necessary to evaluate whether there are any significant portions of its range. Having determined that the rabbitsfoot is threatened throughout its entire range, we must next consider whether there are any significant portions of the range where the rabbitsfoot is in danger of extinction or is likely to become endangered in the foreseeable future.

We found no portion of the rabbitsfoot’s range where potential threats are significantly concentrated or substantially greater than in other portions of its range. Therefore, we find that factors affecting the species are essentially uniform throughout its range, indicating no portion of the range of the species warrants further consideration of possible endangered or threatened status under the Act. Therefore, we find there is no significant portion of the rabbitsfoot range that may warrant a different status.

Critical Habitat

In the October 16, 2012, proposed rule to list the species (77 FR 63440), we also determined that designation of critical habitat was prudent, and critical habitat was determinable, for both the Neosho mucket and rabbitsfoot, and we proposed critical habitat for both species. We will issue a final determination on critical habitat for Neosho mucket and rabbitsfoot under the Act in the near future.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened species under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness and conservation by Federal, State, Tribal, and local agencies, private organizations, and individuals. The Act encourages cooperation with the States and requires that recovery actions be carried out for all listed species. The protection required by Federal agencies and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. Subsection 4(f) of the Act requires the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery planning process involves the identification of actions that are necessary to halt or reverse the species’ decline by addressing the threats to its survival and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning includes the development of a recovery outline shortly after a species is listed and preparation of a draft and final recovery plan. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery plan identifies site-specific management actions that set a trigger for review of the five factors that control whether a species remains endangered

or may be downlisted or delisted, and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (comprising species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available on our Web site (<http://www.fws.gov/ endangered>), or from our Arkansas Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (e.g., restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

Once these species are listed, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost-share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the States of Alabama, Arkansas, Indiana, Illinois, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Ohio, Oklahoma, Pennsylvania, Tennessee, and West Virginia would be eligible for Federal funds to implement management actions that promote the protection or recovery of the Neosho mucket and rabbitsfoot. Information on our grant programs that are available to aid species recovery can be found at: <http://www.fws.gov/grants>.

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a

species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service.

Federal agency actions within these species' habitat that may require conference or consultation or both as described in the preceding paragraph include, but are not limited to, the funding of, carrying out, or the issuance of permits for reservoir construction, navigation, natural gas extraction, stream alterations, discharges, wastewater facility development, water withdrawal projects, pesticide registration, mining, and road and bridge construction. This may include, but is not limited to, management and any other landscape-altering activities on Federal lands administered by the Department of Defense, and U.S. Department of Agriculture Forest Service; issuance of CWA permits by the Army Corps of Engineers and EPA; construction and maintenance of interstate power and natural gas transmission line right-of-ways by the Federal Energy Regulatory Commission; and construction and maintenance of roads or highways by the FHWA.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to all endangered and threatened wildlife. The prohibitions of section 9(a)(1) of the Act, codified at 50 CFR 17.21 and 17.31 for endangered and threatened wildlife make it illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these), import, export, ship in interstate commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. Under the Lacey Act (18 U.S.C. 42–43; 16 U.S.C. 3371–3378), it is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

We may issue permits to carry out otherwise prohibited activities involving endangered and threatened wildlife species under certain circumstances. Regulations governing

permits are codified at 50 CFR 17.22 for endangered species, and at 17.32 for threatened species. With regard to endangered wildlife, a permit must be issued for the following purposes: For scientific purposes, to enhance the propagation or survival of the species, and for incidental take in connection with otherwise lawful activities.

Our policy, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), is to identify, to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a proposed listing on planned and ongoing activities within the range of species proposed for listing. The following activities could potentially result in a violation of section 9 of the Act for the Neosho mucket and rabbitsfoot; this list is not comprehensive:

(1) Collecting, handling, possessing, selling, delivering, carrying, or transporting of the species, including import or export across State lines and international boundaries that are unauthorized, except for properly documented antique specimens of these taxa at least 100 years old, as defined by section 10(h)(1) of the Act;

(2) Introduction of nonnative species that compete with or prey upon the Neosho mucket and rabbitsfoot, such as the introduction of a predator of mussels like the nonnative black carp, to any water body where these species occur;

(3) The release of biological control agents that attack any life stage of Neosho mucket and rabbitsfoot that is unauthorized;

(4) Modification of the channel or water flow of any stream in which the Neosho mucket and rabbitsfoot are known to occur that is unauthorized or not covered under the Act for impacts to these species; and

(5) Discharge of chemicals or fill material into any waters supporting the Neosho mucket and rabbitsfoot that are unauthorized or not covered under the Act for impacts to these species.

Questions regarding whether specific activities would constitute a violation of section 9 of the Act should be directed to the Service's Ecological Services Field Office in the State where the proposed activities will occur. Requests for copies of the regulations concerning listed animals and general inquiries regarding prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Endangered Species Permits, 1875 Century Boulevard, Suite

Dated: August 26, 2013.

Rowan W. Gould,

Acting Director, U.S. Fish and Wildlife Service.

[FR Doc. 2013-22245 Filed 9-16-13; 8:45 am]

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 679

[Docket No. 120918468-3111-02]

RIN 0648-XC873

Fisheries of the Exclusive Economic Zone Off Alaska; Pollock in Statistical Area 620 in the Gulf of Alaska

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Temporary rule; closure.

SUMMARY: NMFS is prohibiting directed fishing for pollock in Statistical Area 620 in the Gulf of Alaska (GOA). This action is necessary to prevent exceeding the C season allowance of the 2013 total allowable catch of pollock for Statistical Area 620 in the GOA.

DATES: Effective 1200 hours, Alaska local time (A.l.t.), September 13, 2013, through 1200 hours, A.l.t., October 1, 2013.

FOR FURTHER INFORMATION CONTACT: Josh Keaton, 907-586-7228.

SUPPLEMENTARY INFORMATION: NMFS manages the groundfish fishery in the GOA exclusive economic zone according to the Fishery Management Plan for Groundfish of the Gulf of Alaska (FMP) prepared by the North Pacific Fishery Management Council under authority of the Magnuson-Stevens Fishery Conservation and Management Act. Regulations governing fishing by U.S. vessels in accordance with the FMP appear at subpart H of 50 CFR part 600 and 50 CFR part 679.

The C season allowance of the 2013 total allowable catch (TAC) of pollock in Statistical Area 620 of the GOA is 7,600 metric tons (mt) as established by the final 2013 and 2014 harvest specifications for groundfish of the GOA (78 FR 13162, February 26, 2013). In accordance with § 679.20(a)(5)(iv)(B), the Administrator, Alaska Region, NMFS (Regional Administrator), hereby increases the C season pollock allowance by 166 mt to reflect the total underharvest of the B season allowance in Statistical Area 620. Therefore, the revised C season allowance of the

pollock TAC in Statistical Area 620 is 7,766 mt (7,600 mt plus 166 mt).

In accordance with § 679.20(d)(1)(i), the Regional Administrator has determined that the C season allowance of the 2013 TAC of pollock in Statistical Area 620 of the GOA has been reached. Therefore, the Regional Administrator is establishing a directed fishing allowance of 7,566 mt and is setting aside the remaining 200 mt as bycatch to support other anticipated groundfish fisheries. In accordance with § 679.20(d)(1)(iii), the Regional Administrator finds that this directed fishing allowance has been reached. Consequently, NMFS is prohibiting directed fishing for pollock in Statistical Area 620 of the GOA.

After the effective date of this closure the maximum retainable amounts at § 679.20(e) and (f) apply at any time during a trip.

Classification

This action responds to the best available information recently obtained from the fishery. The Acting Assistant Administrator for Fisheries, NOAA (AA), finds good cause to waive the requirement to provide prior notice and opportunity for public comment pursuant to the authority set forth at 5 U.S.C. 553(b)(B) and as such requirement is impracticable and contrary to the public interest. This requirement is impracticable and contrary to the public interest as it would prevent NMFS from responding to the most recent fisheries data in a timely fashion and would delay the closure of directed fishing for pollock in Statistical Area 620 of the GOA. NMFS was unable to publish a notice providing time for public comment because the most recent, relevant data only became available as of September 10, 2013.

The AA also finds good cause to waive the 30-day delay in the effective date of this action under 5 U.S.C. 553(d)(3). This finding is based upon the reasons provided above for waiver of prior notice and opportunity for public comment.

This action is required by § 679.20 and is exempt from review under Executive Order 12866.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: September 11, 2013.

James P. Burgess,

Acting Deputy Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. 2013-22588 Filed 9-12-13; 4:15 pm]

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 679

[Docket No. 121018563-3418-02]

RIN 0648-XC872

Fisheries of the Exclusive Economic Zone Off Alaska; Sharks in the Bering Sea and Aleutian Islands Management Area

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Temporary rule; closure.

SUMMARY: NMFS is prohibiting retention of sharks in the Bering Sea and Aleutian Islands management area (BSAI). This action is necessary because the 2013 total allowable catch (TAC) of sharks in the BSAI has been reached.

DATES: Effective 1200 hrs, Alaska local time (A.l.t.), September 12, 2013, through 2400 hrs, A.l.t., December 31, 2013.

FOR FURTHER INFORMATION CONTACT: Josh Keaton, 907-586-7269.

SUPPLEMENTARY INFORMATION: NMFS manages the groundfish fishery in the GOA exclusive economic zone according to the Fishery Management Plan for Groundfish of the Gulf of Alaska (FMP) prepared by the North Pacific Fishery Management Council under authority of the Magnuson-Stevens Fishery Conservation and Management Act. Regulations governing fishing by U.S. vessels in accordance with the FMP appear at subpart H of 50 CFR part 600 and 50 CFR part 679.

The 2013 TAC sharks in the BSAI is 100 metric tons (mt) as established by the final 2013 and 2014 final harvest specifications for groundfish of the GOA (78 FR 13813, March 1, 2013).

In accordance with § 679.20(d)(2), the Administrator, Alaska Region, NMFS (Regional Administrator), has determined that the 2013 TAC of sharks in the BSAI has been reached. Therefore, NMFS is requiring that sharks caught in the BSAI be treated as prohibited species in accordance with § 679.21(b).

Classification

This action responds to the best available information recently obtained from the fishery. The Assistant Administrator for Fisheries, NOAA (AA), finds good cause to waive the requirement to provide prior notice and opportunity for public comment



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Part III

Department of the Interior

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Neosho Mucket and Rabbitsfoot; Final Rule

DEPARTMENT OF THE INTERIOR**Fish and Wildlife Service****50 CFR Part 17**

[Docket No. FWS-R4-ES-2013-0007;
4500030114]

RIN 1018-AZ30

Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Neosho Mucket and Rabbitsfoot

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), designate critical habitat for two species of mussels, the Neosho mucket (*Lampsilis rafinesqueana*) and rabbitsfoot (*Quadrula cylindrica cylindrica*), under the Endangered Species Act of 1973, as amended (Act). In total, approximately 777 river kilometers (483 river miles) in Arkansas, Kansas, Missouri, and Oklahoma fall within the boundaries of the critical habitat designation for the Neosho mucket and approximately 2,312 river kilometers (1,437 river miles) in Alabama, Arkansas, Illinois, Indiana, Kansas, Kentucky, Mississippi, Missouri, Ohio, Oklahoma, Pennsylvania, and Tennessee, fall within the boundaries of the critical habitat designation for the rabbitsfoot. The effect of this rule is to extend the Act's protections to these mussels' critical habitats.

DATES: This rule is effective on June 1, 2015.

ADDRESSES: This final rule is available on the Internet at <http://www.regulations.gov> and the Arkansas Ecological Services Field Office's Web site at <http://www.fws.gov/arkansas-es/>. Comments and materials received, as well as some supporting documentation we used in preparing this rule, are available for public inspection at <http://www.regulations.gov>. All of the comments, materials, and documentation we considered in this rulemaking are available by appointment, during normal business hours, at: U.S. Fish and Wildlife Service, Arkansas Ecological Service Field Office, 110 South Amity Road, Suite 300, Conway, AR 72032; telephone 501-513-4470; facsimile 501-513-4480.

The coordinates, plot points, or both from which the maps are generated are included in the administrative record for this critical habitat designation and are available at <http://www.fws.gov/>

www.regulations.gov, at <http://www.regulations.gov> at Docket No. FWS-R4-ES-2013-0007, and at the Arkansas Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**). Any additional tools or supporting information we developed for this critical habitat designation will also be available at the U.S. Fish and Wildlife Service Web site and Field Office outlined above, and also may be included in the preamble, at <http://www.regulations.gov>, or both.

FOR FURTHER INFORMATION CONTACT: For general information about this rule, and information about the final designation in Arkansas, contact Melvin Tobin, Acting Field Supervisor, U.S. Fish and Wildlife Service, Arkansas Ecological Services Field Office, 110 South Amity Road, Suite 300, Conway, AR 72032; telephone 501-513-4470; facsimile 501-513-4480. If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service (FIRS) at 800-877-8339.

For information about the final designation in Alabama, contact Bill Pearson, Field Supervisor, U.S. Fish and Wildlife Service, Alabama Ecological Services Field Office, 1208 Main Street, Daphne, AL 36526; telephone 251-441-5181; facsimile 251-441-6222.

For information about the final designation in Illinois, contact Richard C. Nelson, Field Supervisor, U.S. Fish and Wildlife Service, Rock Island Ecological Services Field Office, 1511 47th Avenue, Moline, IL 61265; telephone 309-757-5800; facsimile 309-757-5807.

For information about the final designation in Indiana, contact Scott Pruitt, Field Supervisor, U.S. Fish and Wildlife Service, Bloomington Ecological Services Field Office, 602 South Walker Street, Bloomington, IN 47403-2121; telephone 812-334-4261; facsimile 812-334-4273.

For information about the final designation in Kansas, contact Heather Whitlaw, Field Supervisor, U.S. Fish and Wildlife Service, Kansas Ecological Services Field Office, 2609 Anderson Avenue, Manhattan, KS 66502; telephone 785-539-3474; facsimile 785-839-8567.

For information about the final designation in Kentucky, contact Lee Andrews, Field Supervisor, U.S. Fish and Wildlife Service, Kentucky Ecological Services Field Office, 330 West Broadway, Suite 265, Frankfort, KY 40601; telephone 502-695-0468; facsimile 502-695-1024.

For information about the final designation in Mississippi, contact Stephen Ricks, Field Supervisor, U.S.

Fish and Wildlife Service, Mississippi Ecological Services Field Office, 6578 Dogwood View Parkway, Suite A, Jackson, MS 39123; telephone 601-965-4900; facsimile 601-965-4340.

For information about the final designation in Missouri, contact Amy Salveter, Field Supervisor, U.S. Fish and Wildlife Service, Columbia Ecological Services Field Office, 101 Park DeVille Drive, Suite A, Columbia, MO 65203-0057; telephone 573-234-2132; facsimile 573-234-2181.

For information about the final designation in Ohio, contact Dan Everson, Field Supervisor, U.S. Fish and Wildlife Service, 4625 Morse Road, Suite 104, Columbus, OH 43230; telephone 614-416-8993; facsimile 614-416-8994.

For information about the final designation in Oklahoma, contact Jontie Aldrich, Acting Field Supervisor, U.S. Fish and Wildlife Service, Oklahoma Ecological Services Field Office, 9014 East 21st Street, Tulsa, OK 74129-1428; telephone 918-382-4500; facsimile 918-581-7467.

For information about the final designation in Pennsylvania, contact Lora Zimmerman, Field Supervisor, U.S. Fish and Wildlife Service, Pennsylvania Ecological Services Field Office, 315 South Allen Street, Suite 322, State College, PA 16801; telephone 814-234-4090; facsimile 814-234-0748.

For information about the final designation in Tennessee, contact Mary Jennings, Field Supervisor, U.S. Fish and Wildlife Service, Tennessee Ecological Services Field Office, 446 Neal Street, Cookeville, TN 38501; telephone 931-528-6481; facsimile 931-528-7075.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Endangered Species Act of 1973, as amended (Act), when we determine that a species is an endangered or threatened species, we are required to designate critical habitat, to the maximum extent prudent and determinable. Designations of critical habitat can only be completed by issuing a rule.

On October 16, 2012, we published in the **Federal Register** a proposed rule to list the Neosho mucket and rabbitsfoot and designate critical habitat (77 FR 63440). We issued the final rule listing the Neosho mucket as endangered and the rabbitsfoot as threatened on September 17, 2013 (78 FR 57076).

The critical habitat units we are designating in this rule constitute our current best assessment of the areas that meet the definition of critical habitat for

Neosho mucket and rabbitsfoot. We are designating:

- For the Neosho mucket, in total, approximately 777 river kilometers (rkm) (483 river miles (rmi)) in 7 units in the Elk, Fall, Illinois, Neosho, Shoal, Spring, North Fork Spring, and Verdigris Rivers as critical habitat in Benton and Washington Counties, Arkansas; Allen, Cherokee, Coffey, Elk, Greenwood, Labette, Montgomery, Neosho, Wilson, and Woodson Counties, Kansas; Jasper, Lawrence, McDonald, and Newton Counties, Missouri; and Adair, Cherokee, and Delaware Counties, Oklahoma.

- For the rabbitsfoot, in total, approximately 2,312 rkm (1,437 rmi) in 31 units (3 with 2 subunits each) in the Neosho, Spring (Arkansas River system), Verdigris, Black, Buffalo, Little, Ouachita, Saline, Middle Fork Little Red, Spring (White River system), South Fork Spring, Strawberry, White, St. Francis, Big Sunflower, Big Black, Paint Rock, Duck, Tennessee, Red, Ohio, Allegheny, Green, Tippecanoe, Walhonding, Middle Branch North Fork Vermilion, and North Fork Vermilion Rivers and Bear, French, Muddy, Little Darby, and Fish Creeks as critical habitat in Colbert, Jackson, Madison, and Marshall Counties, Alabama; Arkansas, Ashley, Bradley, Clark, Cleburne, Cleveland, Drew, Fulton, Hot Spring, Independence, Izard, Jackson, Lawrence, Little River, Marion, Monroe, Newton, Ouachita, Randolph, Searcy, Sevier, Sharp, Van Buren, White, and Woodruff Counties, Arkansas; Massac, Pulaski, and Vermilion Counties, Illinois; Carroll, Pulaski, Tippecanoe, and White Counties, Indiana; Allen and Cherokee Counties, Kansas; Ballard, Edmonson, Green, Hart, Livingston, Logan, Marshall, McCracken, and Taylor Counties, Kentucky; Hinds, Sunflower, Tishomingo, and Warren Counties, Mississippi; Jasper, Madison, and Wayne Counties, Missouri; Coshocton, Madison, Union, and Williams Counties, Ohio; McCurtain and Rogers Counties, Oklahoma; Crawford, Erie, Mercer, and Venango Counties, Pennsylvania; and Hardin, Hickman, Humphreys, Marshall, Maury, Montgomery, Perry, and Robertson Counties, Tennessee.

- Compared to the proposed rule, this rule results in a net decrease of approximately 3 rkm (2 rmi) for the Neosho mucket and a net decrease of approximately 349 rkm (217 rmi) for the rabbitsfoot.

What this rule contains: This rule designates critical habitat for the Neosho mucket and rabbitsfoot.

We have prepared an economic analysis and environmental assessment

for the designation of critical habitat. In accordance with Section 4(b)(2) of the Act, we prepared an analysis of the economic impacts of the critical habitat designations and related factors. We announced the availability of the draft economic analysis (DEA) and draft environmental assessment in the **Federal Register** on May 9, 2013 (78 FR 27171), allowing the public to provide comments on these documents. In response to requests we received, we reopened the comment period for the proposed critical habitat rule, DEA, and draft environmental assessment from August 27, 2013, to October 28, 2013 (78 FR 52894), and again from May 14, 2014, to July 14, 2014 (79 FR 27547). We have incorporated the comments and completed the final economic analysis (FEA) and associated summary memorandum describing our revised forecast calculations concurrently with this final determination.

Additionally, we have prepared an environmental assessment pursuant to the National Environmental Policy Act (NEPA). Based on the review and evaluation of the information contained in the environmental assessment, we determined that the designation of critical habitat for the Neosho mucket and rabbitsfoot does not constitute a major Federal action having a significant impact on the human environment under the meaning of section 102(2)(c) of NEPA.

Peer review and public comment. We sought comments from three independent specialists to ensure our designation is based on scientifically sound data and analyses. We obtained opinions from one knowledgeable individual with scientific expertise to review our technical assumptions and analysis, and to determine whether or not we had used the best available information. The peer reviewer generally concurred with our methods and conclusions and provided additional information, clarifications, and suggestions to improve this final rule. Information we received from peer review is incorporated in this final designation. We also considered all comments and information we received from the public during the comment period.

Previous Federal Actions

Please refer to the proposed listing and critical habitat rule for the Neosho mucket and rabbitsfoot published in the **Federal Register** on October 16, 2012 (77 FR 63440), for a detailed description of previous Federal actions concerning these species and protection under the Act (16 U.S.C. 1531 *et seq.*). The final rule listing the Neosho mucket as an

endangered species and rabbitsfoot as a threatened species under the Act was published in the **Federal Register** on September 17, 2013 (78 FR 57076).

Summary of Comments and Recommendations

We requested written comments from the public on the proposed designation of critical habitat for the Neosho mucket and rabbitsfoot during four comment periods. The first comment period opened with the publication of the proposed rule on October 16, 2012, and closed on December 17, 2012 (77 FR 63440). Second, we requested comments on the proposed critical habitat designation and associated DEA and draft environmental assessment during a comment period that opened May 9, 2013, and closed on June 10, 2013 (78 FR 27171). Third, we re-opened the comment period for another 60 days from August 27, 2013, through October 28, 2013 (78 FR 52894). Based on continued significant interest in Arkansas regarding the proposed rule, we announced an additional reopening of the comment period for 60 days from May 14, 2014, through July 14, 2014 (79 FR 27547). We held public information meetings in Joplin, Missouri, on May 21, 2013; Greenville, Missouri, on May 23, 2013; Batesville, Arkansas, on June 4, 2014; and Benton, Arkansas, on June 5, 2014. The dates, times, and locations of these meetings were coordinated with interested stakeholders and noticed in newspapers and other media outlets. We also contacted appropriate Federal, State, and local agencies; tribes; scientific organizations; and other interested parties and invited them to comment on the proposed rule, DEA, and draft environmental assessment. In addition, we published a total of 27 legal public notices in the affected States at the beginning of the comment period for the proposed rule published on October 16, 2012.

During the first comment period, we received 10 comment letters directly addressing the proposed listing and critical habitat designation. During the second, third, and fourth comment periods, we received 11, 6, and 68 comment letters, respectively, addressing the proposed critical habitat designation, DEA, or draft environmental assessment. All substantive information provided during the comment periods has either been incorporated directly into this final determination or is addressed below. Comments are addressed in the following summary and incorporated into the final rule as appropriate.

Peer Review

In accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited expert opinions from three knowledgeable individuals with scientific expertise on freshwater mussel conservation and biology, with familiarity of Neosho mucket and rabbitsfoot, the geographic region and river basins in which they occur, and conservation biology principles associated with these species. We received responses from all of the peer reviewers we contacted, but only one peer reviewer commented on the proposed critical habitat designation.

We reviewed all comments we received from the peer reviewer for substantive issues and new information regarding critical habitat for the Neosho mucket and rabbitsfoot. The peer reviewer generally concurred with our methods and conclusions, and provided additional information, clarifications, and suggestions to improve the final critical habitat rule. The peer reviewer's comments on the designation of critical habitat for these mussels are addressed in the following summary and incorporated into the final rule as appropriate.

Peer Reviewer Comments

(1) *Comment:* The peer reviewer noted the proposed critical habitat designation for rabbitsfoot references the oyster mussel (*Epioblasma capsaeformis*) as a listed species with overlapping critical habitat in the Duck River unit. The reviewer noted the oyster mussel in this river has been renamed the Duck River dartersnapper (*Epioblasma ahlstedti*) and is separate and distinct from the oyster mussel.

Our Response: We agree with the reviewer and acknowledge the oyster mussel and Duck River dartersnapper are distinct and separate species. However, the Service has not yet made a listing and critical habitat determination for the new entity, the Duck River dartersnapper. We incorporated language in this final determination to clarify the species distinction and name change, but at this time, the Duck River dartersnapper and oyster mussel are considered synonymous according to our regulations. Until such time as the regulations are revised, the critical habitat that overlaps rabbitsfoot critical habitat in the Duck River will be identified as that of the oyster mussel.

General Comments

(2) *Comment:* Multiple commenters expressed concern about interagency consultation under section 7 of the Act,

particularly any differences in process between consultation on impacts to the listed species and consultation on the species' designated critical habitat. They also expressed concern about impacts on non-Federal property owners and other entities from the new restrictions resulting from the designation of critical habitat.

Our Response: Section 7(a)(2) of the Act, and its implementing regulations at 50 CFR part 402, subpart B, requires Federal agencies to consult with the Service to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Only projects that have a Federal nexus (projects that are funded, authorized, or carried out by Federal agencies) are subject to this requirement under section 7 consultation. In fulfilling these consultation requirements, each Federal action agency and the Service must use the best scientific and commercial data available.

In occupied critical habitat, consultation for potential impacts to the species and potential impacts to critical habitat occur at the same time. The health of both mussels is closely tied to the health of their habitat. Therefore, the Service does not expect to recommend additional conservation efforts for projects to avoid adverse modification of critical habitat above and beyond what would already be required to avoid jeopardizing the continued existence of the listed species. In addition, other federally listed mussels occur in the same reaches as certain areas of designated critical habitat for Neosho mucket or rabbitsfoot; the conservation efforts already required for these listed mussels through consultation will provide the same conservation for Neosho mucket or rabbitsfoot.

As a result, we conclude that additional (incremental) project modification costs are unlikely from this designation of critical habitat. Any incremental costs, as predicted in our final economic analysis (FEA), are primarily a result of the additional requirement of considering impacts to critical habitat during these section 7 consultations. These costs are borne by the Service, the Federal action agency, and the third-party participants (generally the project proponents), including State and local governments and private parties. For a summary of the parties involved in section 7 consultations and their respective unit costs, see Exhibit 2-1 of the FEA. Chapter 3 of the FEA provides a detailed

discussion of the types of third parties participating in consultations.

Federal Agency Comments

(3) *Comment:* The U.S. Army Corps of Engineers (ACOE) Pittsburgh District (COEPD) expressed concern that designating critical habitat for the rabbitsfoot may affect the COEPD's navigation and maintenance dredging activities in the Allegheny River, its operation of Allegheny Reservoir, and its regulatory program. ACOE stated that additional avoidance measures will be required to adequately protect habitat for rabbitsfoot.

Our Response: The federally endangered clubshell (*Pleurobema clava*), northern riffleshell (*Epioblasma torulosa rangiana*), rayed bean (*Villosa fabalis*), and snuffbox (*Epioblasma triquetra*) mussels occur in the same reach of the Allegheny River as rabbitsfoot. Therefore, section 7 requires consultation by Federal agencies for these listed species (see our response to Comment 2). Project modifications that minimize effects to these species would also minimize effects to rabbitsfoot.

Thus, we do not expect any conservation measures or project modifications and costs for rabbitsfoot critical habitat beyond those already required for these other endangered mussels.

(4) *Comment:* The COEPD asked how tributary streams to the Allegheny River will be affected by designation of critical habitat for rabbitsfoot.

Our Response: French Creek (proposed Unit RF23; Unit RF22 in this rule) and Muddy Creek (proposed Unit RF25; Unit 24 in this rule) are the only two tributaries of the Allegheny River designated as critical habitat for rabbitsfoot. The Service will work with COEPD to determine whether any of the current, ongoing, or planned COEPD projects may have an effect on other tributaries within their district. As stated previously, the Service does not expect to recommend any project modifications in order to minimize effects to rabbitsfoot beyond those already required for other listed mussels in the Allegheny River basin.

(5) *Comment:* The ACOE Huntington District stated that the designation of critical habitat for rabbitsfoot in the Walhonding River (proposed Unit RF27) is not consistent with the definition of critical habitat (that lakes and impoundments are not included). They stated that 40 percent of the Walhonding River upstream of Mohawk Dam in Ohio is impounded for flood control.

Our Response: Mohawk Dam is a dry dam, meaning during normal flows,

water passes through the dam unimpeded and there are no permanent pools of water (areas of inundation) upstream resulting from the structure. During high flow events, the dam temporarily reduces flows downstream of the structure to maintain flows within the river banks. Hoggarth (1995–1996, pp. 163–164) found a stable and diverse mussel assemblage, including adult and juvenile rabbitsfoot, upstream of Mohawk Dam. Because Mohawk Dam does not inundate riverine habitat by forming a lake or reservoir and a diverse and abundant mussel assemblage inhabits upstream reaches behind the dam, we believe the habitat there contains the primary constituent elements for rabbitsfoot critical habitat (see *Primary Constituent Elements for Neosho Mucket and Rabbitsfoot*, below).

Section 3.3.1 of the FEA has been amended to add information about the presence of the dam in the study area of proposed Unit RF27; however, the Service does not expect to recommend additional conservation efforts for the dam, above and beyond what would be required to protect against jeopardy of the species, to protect against adverse modification of critical habitat.

(6) *Comment:* The ACOE Little Rock District stated that the designation will result in increased costs for energy development and that the estimated cost of timing restrictions and limiting project scope are too low, as projects may be delayed or denied due to permitting and modification issues.

Our Response: The discussion of potential baseline impacts in the FEA has been updated to reflect additional information provided by the ACOE regarding impacts to energy development associated with avoidance and delays related to the presence of the species. Exhibit 4–2 of the FEA (“Ranges of Costs of Common Conservation Efforts for Mussel Species”) notes that the cost of conservation efforts may be higher than the estimates shown. A key conclusion of the analysis is that the listing of the species may lead to many conservation efforts (such as those presented in Exhibit 4–2) that would not have been required previously. However, as outlined in our response to Comment 2, designation of critical habitat is not anticipated to generate additional conservation measures for these two mussels beyond those generated by the species’ listing.

State Agency Comments

Section 4(i) of the Act states, “the Secretary shall submit to the State agency a written justification for [her] failure to adopt regulations consistent

with the agency’s comments or petition.” The designation of critical habitat for Neosho mucket includes streams in Arkansas, Kansas, Missouri, and Oklahoma, and for rabbitsfoot includes streams in Alabama, Arkansas, Illinois, Indiana, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Ohio, Oklahoma, Pennsylvania, and Tennessee. We received comments from the States of Illinois, Kansas, Pennsylvania, Ohio, and Oklahoma regarding the proposal and address them below.

(7) *Comment:* The Pennsylvania Fish and Boat Commission (PFBC) supported the designation of critical habitat for rabbitsfoot. PFBC recommended extending the critical habitat designation for rabbitsfoot upstream from Kidds Mill Road to Pymatuning Dam on the Shenango River. Western Pennsylvania Conservancy (WPC) submitted a public comment with the same recommendation. PFBC provided a report by Bursey (1987) documenting the presence of rabbitsfoot at Porter Road, 8.5 rkm (5.3 rmi) upstream of Kidds Mill Road. PFBC stated that without critical habitat designation in this location, any newly discovered rabbitsfoot populations in this river reach would not be protected by the Act.

Our Response: We appreciate PFBC’s support and look forward to continuing work with the PFBC and WPC to recover rabbitsfoot. Considering the information in Bursey (1987), we agree the extent of critical habitat designation in the Shenango River should be extended 8.8 rkm (5.4 rmi) upstream to Porter Road. This modification is reflected in this final determination. As described under *Criteria Used to Identify Critical Habitat*, we reviewed available information pertaining to the habitat requirements of rabbitsfoot. In accordance with the Act and its implementing regulation at 50 CFR 424.12(e), we considered whether designating additional areas—outside those currently occupied as well as those occupied at the time of listing—are necessary to ensure the conservation of the species. However, we respectfully disagree that there is sufficient scientific information from which to conclude that the reach from Pymatuning Dam to Porter Road is occupied by rabbitsfoot. While this reach appears to contain sufficient physical or biological features to support the life history of mussels, possibly including rabbitsfoot, we determined that designating unoccupied critical habitat for rabbitsfoot was not essential for the conservation of the species in this reach due to the altered natural stream hydrology and

geomorphology. Unoccupied areas exhibit limited habitat availability, degraded habitat, or low potential value for management, and there are no historical records of occurrence within the stream reach for rabbitsfoot (see also *Criteria Used to Identify Critical Habitat*).

This does not mean, however, that this reach will be without protection if the rabbitsfoot is later found to occupy that reach. The protections of the Act brought about by the species’ listing are in effect wherever the species is found. In addition, the reach upstream of Porter Road will continue to be protected through the conservation actions implemented for the other listed mussels (e.g., clubshell) that currently occur in that area.

(8) *Comment:* PFBC suggested that by restricting critical habitat to occupied areas, the Service appears to be unintentionally inhibiting recovery of rabbitsfoot, as habitat loss outside of critical habitat areas cannot be avoided under a section 7 jeopardy analysis.

Our Response: It is correct that section 7 consultation would not be triggered for potential rabbitsfoot habitat that is not occupied by the species or designated as critical habitat (although some areas may be occupied by other listed species and/or critical habitat for other listed species that would trigger section 7 consultations on Federal actions). However, we disagree that recovery of either species will be inhibited because we are not designating unoccupied habitat. We have found that unoccupied stream reaches are not essential for the conservation of either species for one or more of the following reasons:

(a) Unoccupied habitats are isolated from occupied habitats due to reservoir construction and dam operations;

(b) Unoccupied areas exhibit limited habitat availability, degraded habitat, or low potential value for management;

(c) Collection records for both species indicate that these species have been extirpated from unoccupied areas for several decades or more, and, in some cases, reintroduction efforts have not been successful at re-establishing populations; or

(d) There are no historical records of occurrence within the stream reach for Neosho mucket, rabbitsfoot, or both.

While we recognize the importance of unoccupied habitat to recovery of listed species, in this case unoccupied habitat does not at this time provide habitat for reintroduction or reduce the level of stochastic and human-induced threats (see *Criteria Used to Identify Critical Habitat* for more detailed information).

(9) *Comment:* The Ohio Department of Transportation (ODOT) inquired about costs for highway departments and other public infrastructure entities and whether normal consultation time would increase due to the designation of critical habitat. ODOT believes the estimated economic impact of \$1.4 million to the transportation and utility sectors over the next 20 years is an underestimate. This conclusion is based on the assumption that no instream work will be allowed for any project over or near critical habitat. ODOT provides an example of replacing a multiple span bridge with a single span structure increases cost by an average of 260 percent, or from \$2.2 million to \$5.6 million, exceeding the Service's estimate of economic impacts. The agency also expressed the belief that replacement or maintenance costs to improve or maintain 23 bridge structures over designated critical habitat areas will increase and the economic impact to ODOT alone will exceed the estimated \$1.4 million forecast in the economic analysis for transportation and utility activities without considering increased costs associated with coordination, survey, reporting, mitigation, and monitoring.

Our Response: Future section 7 consultations concerning transportation and utilities are expected to occur in 35 critical habitat units, including the Walhonding River and Little Darby and Fish Creeks (proposed Units RF27, RF28, and RF30; Units RF26, RF27, and RF29 in the final rule) in Ohio. Collectively, transportation and utilities consultations in these three critical habitat units are forecast to cost \$15,000 over the next 20 years or \$980 annually (one percent of total transportation and utilities costs). For comparison, the total transportation and utilities cost for all critical habitat units are forecast to cost \$1,400,000 over the next 20 years or \$93,000 annually (Exhibit 3–9 in the FEA). The designation of critical habitat will not preclude the construction of instream bridge support structures or maintenance to existing piers.

The designation of critical habitat does not change the time frames required to complete consultation under section 7 of the Act and its implementing regulations at 50 CFR part 402, subpart B. As previously stated, conservation measures required to avoid jeopardizing the continued existence of the species are expected to be similar to those required to avoid adversely modifying critical habitat (that is, we foresee no conservation actions specifically due to critical habitat). We do not expect the designation of critical habitat to lengthen the consultation

process. Thus, the best available economic data do not support ODOT's assertion.

(10) *Comment:* The ODOT inquired about how the Service ensures consistent consultation on critical habitat throughout the range of rabbitsfoot. ODOT concluded that the term "adverse modification" is vague and interpretations, policies, and level of effort could vary among Service offices.

Our Response: In 1986, the Service and the National Marine Fisheries Service (collectively referred to as the Services) established a definition for "destruction or adverse modification" (50 CFR 402.02) that was later found to be invalid by the U.S. Court of Appeals for the Fifth (2001) and Ninth (2004) Circuits. The Services each issued guidance to discontinue the use of the 1986 adverse modification regulation. Specifically, in evaluating an action's effects on critical habitat as part of interagency consultation, the Services began applying the definition of "conservation" as set out in the Act, which defines conservation (and conserve and conserving) to mean "to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary" (16 U.S.C. 1532(3)). Further, after examining the baseline and effects of the action, the Services began analyzing whether the implementation of the Federal action under consultation, together with any cumulative effects, would result in the critical habitat remaining "functional" (or retain the current ability for the primary constituent elements to be functionally established) to serve the intended conservation role for the species.

Section 7(a)(2) of the Act defines the consultation process, which is further developed in regulations set forth at 50 CFR part 402 and in the Service's section 7 handbook (guidance). The handbook ensures consistent implementation of consultation procedures by Service field offices responsible for carrying out section 7 activities throughout the range of rabbitsfoot. Furthermore, the Service and the Federal action agency are required to use the best available science in conducting the consultations (see our response to Comment 2).

On May 12, 2014, we published a proposed rule in the **Federal Register** (79 FR 27060) to adopt the following definition of destruction or adverse modification: "Destruction or adverse modification means a direct or indirect

alteration that appreciably diminishes the conservation value of critical habitat for listed species. Such alterations may include, but are not limited to, effects that preclude or significantly delay the development of physical or biological features that support the life-history needs of the species for recovery." On June 26, 2014 (79 FR 36284) we extended the public comment period on the proposal to October 9, 2014. We have not yet published a final rule for this action, but expect to do so in the spring of 2015.

(11) *Comment:* The ODOT requested an exclusion from critical habitat designation for portions of the river underneath and directly adjacent to roadway bridges in the Walhonding River and Little Darby and Fish Creeks. ODOT concluded that since bridge structures already exist and areas under the bridge are subject to regular maintenance activities that section 7 consultation for other listed mussels in these streams would be adequate to protect rabbitsfoot while streamlining consultation.

Our Response: Under section 4(b)(2) of the Act and its implementing regulations at 50 CFR 424.19, we may exclude an area from designated critical habitat based on economic impacts, impacts on national security, or any other relevant impacts. In considering whether to exclude a particular area from the designation, we identify the benefits of including the area in the designation, identify the benefits of excluding the area from the designation, and evaluate whether the benefits of exclusion outweigh the benefits of inclusion. If the analysis indicates that the benefits of exclusion outweigh the benefits of inclusion, the Secretary may exercise her discretion to exclude the area only if such exclusion would not result in the extinction of the species.

This area is not subject to exclusion based on impacts to national security or other relevant impacts, such as the presence of a conservation plan (for example, a habitat conservation plan (HCP)), status as a tribal land, or an existing partnership. In evaluating whether it should be excluded due to economic impacts, we concluded that no change in economic activity levels or the management of economic activities is expected to result from the critical habitat designation (see our response to Comment 2). Some additional costs reflect additional administrative effort as part of future section 7 consultations in order to consider the potential for activities to result in adverse modification of critical habitat. Section 7 consultation is required in occupied habitat with or without a critical habitat

designation. We acknowledge it is unlikely additional conservation measures beyond those identified to avoid jeopardy for the species would be required to avoid adverse modification. Accordingly, the Secretary is not exerting her discretion to exclude any areas in the Wallhonding River and Little Darby and Fish Creeks from the designation based on economic impact, national security impact, or other relevant impacts.

(12) *Comment:* The Oklahoma Department of Wildlife Conservation (ODWC) stated that it does not support designation of critical habitat for Neosho mucket and rabbitsfoot. ODWC questioned potential benefits of critical habitat designation cited in the proposed rule (77 FR 63472), which ODWC stated are not compelling arguments in favor of designation. ODWC concluded:

(a) The presence of Neosho mucket or rabbitsfoot in a stream segment already is a trigger for section 7 consultation and the designation of critical habitat does not change this requirement;

(b) The focusing of conservation activities on the most essential features and area for each mussel species should be addressed through development and implementation of a recovery plan, and the designation of critical habitat is not essential to this prioritization process and can be articulated just as effectively in the recovery plan;

(c) The educational benefits derived from critical habitat can be conveyed through Federal, State, and private entities more effectively with an informative, detailed, and publicly accessible Web site; and

(d) It is not clear how designation of critical habitat prevents “people from causing inadvertent harm to the species” as the designation only applies to Federal actions and not those of the general public.

ODWC further concluded, based on these four arguments, that there is no unique added value to the designation of critical habitat.

Our Response: Section 4(a)(3)(A) of the Act requires that, to the maximum extent prudent and determinable, we designate critical habitat at the time a species is determined to be endangered or threatened. Our regulations at 50 CFR 424.12(a)(1) state that designation of critical habitat is not prudent when one or both of the following situations exist: (1) The species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of threat to the species, or (2) such designation of critical habitat would not be beneficial to the species. The Service determined

that there is no threat of take attributed to collection or vandalism under Factor B for either species, and identification and mapping of critical is not expected to initiate any such threat. We also believe that designating critical habitat will be beneficial to the species, as described in the proposed rule (77 FR 63440, p. 63472) (see also our response to Comment 52, below). We address ODWC’s specific conclusions below.

(a) We acknowledge that presence of Neosho mucket or rabbitsfoot is a trigger for section 7 consultation with or without the designation of occupied critical habitat. We also acknowledge occupied areas outside the final critical habitat designation will continue to be subject to conservation actions implemented under section 7(a)(1) of the Act, regulatory protections afforded by the section 7(a)(2) jeopardy standard, and the prohibitions of section 9 of the Act. However, if designated critical habitat should become unoccupied at some point in the future, the designation of critical habitat ensures regulatory protections afforded by section 7(a)(2).

(b) We acknowledge that critical habitat designation is not essential to establish recovery criteria and prioritize recovery actions during development and implementation of recovery plans. However, critical habitat designations identify, to the extent known using the best scientific data available, those physical or biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat), which can be very beneficial both in focusing conservation efforts on specific activities, areas, or features and in establishing future recovery efforts. Designation can often help to focus recovery efforts and ensure these features, areas, and activities receive priority during section 7 consultations and the planning efforts of both the Service and its partners.

(c) We agree that the Internet and social media are effective venues to convey the benefits of designating critical habitat. We also agree there are many misperceptions by entities and individuals regarding designation of critical habitat. The Service maintains a publicly accessible Internet site, social media, and other educational materials related to critical habitat and the Act, in general, to inform the public and abate concerns. In outlining benefits of designating critical habitat for Neosho mucket and rabbitsfoot, our intent was not to imply that designation of critical habitat is only an educational tool for the recovery of Neosho mucket and rabbitsfoot. To the contrary, critical habitat is a tool within the Act which

identifies areas essential to the conservation of endangered and threatened species and that may require special management considerations. Through identification of physical or biological features essential to the conservation of Neosho mucket and rabbitsfoot, critical habitat informs agencies, entities, and individuals about habitats and specific features of these habitats essential to the conservation of Neosho mucket and rabbitsfoot and helps focus efforts. Accordingly, even though designation is not the sole educational tool in the recovery process, it may still provide educational benefits.

(d) Federal agencies must consult with the Service to ensure that any action authorized, funded, or carried out will not destroy or adversely modify critical habitat for listed species. This rule identifies the primary constituent elements of the physical or biological features essential to the conservation of Neosho mucket and rabbitsfoot. These primary constituent elements will help Federal agencies (and those for which they are providing funding, providing authorization, or completing activities) in planning or evaluating projects. In addition, it may be beneficial to those who wish to conserve this species to know which areas have been determined to be essential to the conservation of the species through this designation. The maps in the designation spatially depict the areas we have identified as critical habitat, assisting with these efforts.

(13) *Comment:* ODWC stated that the Service (a) did not identify and quantify the relative importance of potential threats in each critical habitat unit, and (b) cannot determine whether Federal actions are important to the recovery of Neosho mucket and rabbitsfoot. ODWC further concluded that if Federal actions are not relevant then designation of critical habitat has no recovery value.

Our Response: In each unit description in the proposed designation, the Service identified physical or biological features that may require special management considerations or protections to address threats such as land use conversion; alteration of water chemistry and water and sediment quality; changes in stream bed material composition and quality from activities that release sediments and nutrients into the water, such as urban development and associated construction projects; livestock grazing; and releases from municipal effluents. In addition, in the Effects of Critical Habitat Designation, *Section 7 Consultation and Application of the “Adverse Modification” Standard* (77

FR 63440), we discuss the Federal process concerning section 7 consultations and review of projects for adverse modification of designated critical habitat. We provide a description of the actions and activities that may result in adverse effects to occupied Neosho mucket and rabbitsfoot critical habitat. This is not an exhaustive list, and we note that the activities listed may be able to be modified by measures which would sufficiently offset the potential adverse effects so that the value of the habitat for its intended conservation function is not appreciably reduced. The occurrence of the actions we described will not always result in adverse modification of critical habitat if the available compensation can reduce the effects of these actions on the habitat.

These types of activities would require section 7 consultation only in cases where there is Federal involvement (see response to Comment 2). The FEA examined the Service's section 7 consultation record as a means to project future consultations. The FEA also accounts for projected increases in section 7 consultations, by activity category, based on communication with Service field offices and Federal agencies. Additional supporting information and documentation for the FEA is contained within our administrative record. The ACOE, Bureau of Land Management, U.S. Department of Energy, Federal Energy Regulatory Commission, U.S. Department of Transportation (DOT), U.S. Department of Agriculture (USDA) Forest Service, Environmental Protection Agency (EPA), and Tennessee Valley Authority are Federal agencies who may fund, permit, or conduct actions that may potentially affect designated critical habitat for Neosho mucket or rabbitsfoot and are expected to consult with the Service under section 7 of the Act. Recovery of these mussels will not be attained without the valuable contribution of our Federal partners, in accordance with section 7(a)(1) of the Act, as well as our State and nongovernmental partners.

(14) *Comment:* The ODWC recommended modification to Unit RF2 (Verdigris River) for rabbitsfoot. ODWC indicated that the critical habitat unit includes a portion of the Verdigris River downstream of Oklahoma Highway 266, which has been substantially modified by dredging and channel modification to create the upper end of the McClellan-Kerr Arkansas River Navigation System.

Our Response: In response to this comment, we have re-evaluated Unit RF2, and, based on the best available

scientific information, we are modifying it in this final rule. For further information, see Summary of Changes from Proposed Rule, below.

(15) *Comment:* The ODWC questioned the biological benefit of including Unit NM1 for Neosho mucket due to existing State water quality standards. ODWC also suggested that the designation of critical habitat may hinder recreational activity in the Illinois River.

Our Response: Please refer to our responses for Comments 12 and 13. Since recreational activities on the Illinois River are not regulated by a Federal agency, we do not anticipate any effects to recreational activities due to the designation of critical habitat in Unit NM1.

(16) *Comment:* The Pennsylvania Department of Transportation (PDOT) opposed the designation of critical habitat for the rabbitsfoot due to the financial hardship it believes the designation will bring to Pennsylvania taxpayers. PDOT concluded it would not be a prudent expense of transportation dollars to engage in all the coordination and expense associated with the critical habitat designation.

Our Response: All PDOT activities authorized or funded, in whole or part, by the Federal Highway Administration (FHA) or permitted by a Federal agency such as the ACOE (such as, placement of bridge piers in a navigable stream) are required to adhere to section 7(a)(2) of the Act (see our response to Comment 2). PDOT projects that have no Federal nexus are not subject to section 7 consultation. However, as previously stated, four other federally endangered mussels occur in the same reaches of the Allegheny and Shenango Rivers and French and Muddy Creeks as the rabbitsfoot. Although no critical habitat has been designated for these mussels, we believe that project modifications that have been implemented to minimize effects to these listed mussel species are the same types of measures that would be implemented to minimize effects to rabbitsfoot and its critical habitat. Therefore, we expect the additional cost to taxpayers to be minimal.

(17) *Comment:* The PDOT stated there will be additional costs associated with section 7 consultation with FHA due to the requirement to prepare a biological assessment in designated critical habitat regardless of species presence. PDOT requested evaluation of all financial impacts to the agency associated with designating critical habitat. PDOT also suggested adverse modification has not occurred previously at completed bridge projects as evidenced by the Service's

willingness to utilize these sites for reintroduction of endangered mussels.

Our Response: FHA is required under section 7(a)(2) of the Act to evaluate beneficial and adverse effects associated with their actions in areas containing listed species. While the Service agrees some completed bridge project sites may serve as suitable sites for mussel augmentation and reintroduction, potential effects of future bridge projects to listed species and their critical habitat will vary depending on a variety of factors, including, but not limited to, the location and type of structure being proposed, as well as the extent to which rabbitsfoot occurs in the project area. Under section 7(a)(2) of the Act and its implementing regulations at 50 CFR part 402, subpart B, Federal agencies are not required to prepare biological assessments for actions that they determine will have no effect, or that may affect but are not likely to adversely affect, a species and its designated critical habitat. Therefore, if a bridge project is deemed not likely to adversely affect this species or other listed species or their critical habitat, no biological assessment would be required by the agency.

One of the main conclusions of the FEA is that the Service does not expect critical habitat designation to result in project modification costs beyond what would be requested to avoid jeopardy to the species. As a result, we expect incremental economic impacts of considering critical habitat as part of the forecast section 7 consultations will be limited to additional administrative costs to the Service, Federal agencies, and third parties. Future section 7 consultations concerning transportation and utilities are expected to occur in 34 critical habitat units, including French Creek, the Allegheny River, and Muddy Creek (Units RF22, RF23, and RF24 in this rule) that occur in Pennsylvania. Collectively, transportation and utilities consultations in these three critical habitat units are forecast to cost \$196,000 over the next 20 years or \$12,500 annually. For comparison, the total transportation and utilities cost for all critical habitat units are forecast to cost \$1,400,000 over the next 20 years or \$93,000 annually (Exhibit 3–9 in the FEA; IEc 2014a, p. 1). As outlined in the FEA, these costs are the incremental costs of the critical habitat designation (that is, those costs, such as expenditures related to consultation, which can be attributed solely to critical habitat).

(18) *Comment:* PDOT asked the Service “that if the Rabbitsfoot Mussel is listed and critical habitats are designated, that there is solid scientific

evidence that the species for which the critical habitat is being designated is present and/or uses the habitat.” PDOT asserted that it committed significant monetary resources in the past to mitigate effects to endangered and threatened species in areas with no evidence of species presence.

Our Response: The Act and its implementing regulations require the Service to use the best available scientific and commercial data during consultation (see response to Comment 2). The Service will continue to work with PDOT and other partners to ensure procedures to document presence or absence of the mussels is scientifically supported and to avoid and minimize effects to the rabbitsfoot in areas where this and other listed species are present and critical habitat is designated.

(19) *Comment:* PDOT requested minor road work (such as rehabilitation or resurfacing) and bridge work (such as replacement and repair) on existing roads be exempt from formal coordination (consultation), including areas 100 feet (ft) upstream and downstream of the project foot print.

Our Response: Only PDOT projects that have a Federal nexus are subject to consultation (see our response to Comment 2). There is no *de minimis* exception from the consultation requirement. However, to streamline the consultation process, a Federal agency’s determination of “no effect” or “no adverse modification” does not require concurrence by the Service.

(20) *Comment:* PDOT expressed concern with its ability to quickly issue hauling permits for oversize and overweight loads and to restrict routing for materials such as fracking brine. The need to restrict routing for a subset of haulers such as hazardous material haulers would preclude PDOT’s ability to electronically permit and route these haulers, resulting in extensive time delays and subsequently a need for a significant increase in manpower. PDOT concluded that manual permit review to assure limited section 9 liability represents significant economic burden to both the State of Pennsylvania (due to increases in manpower) and to many other industries (due to permit delays).

PDOT also identified the DOT’s Federal Motor Carrier Safety Administration and Pipeline and Hazardous Material Safety Administration as the regulatory agencies with oversight for transportation of hazardous materials on main traffic routes. PDOT concluded that a section 7 consultation is required for each load in response to the designation of critical habitat and each tanker truck is subject to those

consultation procedures or detour routes around critical habitat (for example, to avoid crossing designated critical habitat in French Creek).

Our Response: The Service appreciates PDOT’s input. We respectfully disagree that the designation of critical habitat for rabbitsfoot would increase PDOT’s section 9 liability and create or increase an economic burden on the State of Pennsylvania and industries transporting hazardous materials. A key conclusion of the FEA for rabbitsfoot critical habitat designation is that the Service does not expect critical habitat designation to generate additional requests for project modification in any of the critical habitat units, including the Allegheny and Shenango Rivers and French and Muddy Creeks. Our conclusion is based on the FEA and that the creeks and rivers where rabbitsfoot occurs are already inhabited by other federally listed mussels. Project modifications that minimize effects to other listed mussel species within these reaches also would minimize effects to rabbitsfoot (see our response to Comment 2).

(21) *Comment:* PDOT indicated it has pre- and post-Marcellus and Utica shale drilling truck accident reports that may be useful in identifying whether increased oil and gas exploration has or has not translated to an increased threat of crashes that may release contaminants.

Our Response: The Service appreciates PDOT’s cooperation to further identify potential threats to rabbitsfoot and designated critical habitat. Your comments have been forwarded to our Pennsylvania Ecological Services Field Office so that they may review the information and, if appropriate, work cooperatively with PDOT to minimize any potential threats to rabbitsfoot and its designated critical habitat and other listed mussels from contamination that may result from these accidents.

(22) *Comment:* PDOT stated that the information and data it provided refines the Service’s analysis regarding the proposed designation of critical habitat for rabbitsfoot in proposed Units RF23, RF24, RF25, and RF32 and provided evidence that diminishes, to a significant extent, the threat from chemical contamination as a result of spills at bridge crossings over critical habitat. PDOT requested a detailed list of hazardous materials that pose a threat of adverse modification in order to plan and prepare for actions PDOT must take to reduce their potential liability under section 9 of the Act.

Our Response: Due to the vast number of hazardous materials hauled on the nation’s roads and limited toxicity data available for different life stages of freshwater mussels and their potential sensitivity to many of these compounds and effects to their habitat, the Service is unable to provide a comprehensive list of hazardous materials that may affect rabbitsfoot designated critical habitat. However, please refer to the Chemical Contaminants section of the proposed listing and designation of critical habitat rule (77 FR 63440) for further detail on compounds known to adversely affect freshwater mussels and their habitats.

(23) *Comment:* ODOT and PDOT expressed concern that the DEA underestimated impacts to the transportation sector associated with the proposed designation. They asserted that the DEA does not account for the additional consultation, coordination, surveying, reporting, assessment, mitigation, and monitoring costs that will result from the rule. According to one comment, there are 23 existing structures crossing critical habitat in Ohio that will be affected by the rule due to project modifications that will discontinue in-water work. Another comment asserted that permits for roadwork in Pennsylvania will be interrupted as a result of the rule, and that this will result in time delays and traffic diversions.

Our Response: Section 3.3.6 of the FEA provides information on the likely incremental impacts of the designation to transportation and utility-related activities. The analysis forecasts future section 7 consultations on these activities using both historical consultation data and information from the Service’s field offices that have jurisdiction in the study area regarding likely future consultations. As the commenters did not provide specific information regarding the number or rate of future consultations in the study area (including Ohio) over the next 20 years, the analysis relies on the estimates provided in section 3.3.6 of the FEA. Specifically, the FEA estimates that over the next 20 years, approximately 13.3 consultations are likely to occur for transportation projects in proposed critical habitat units RF27 and RF28, which are located in Ohio, in addition to approximately 3.3 consultations in proposed critical habitat unit RF30, which is located in Indiana and Ohio.

The designation of critical habitat is not anticipated to generate additional conservation measures for the two mussels beyond those that would be generated by the species being listed.

Regardless of whether critical habitat is designated, the time period for consultation does not change. Therefore, the designation is unlikely to result in incremental project delays due to the consultation process. As a result, we expect the quantified direct incremental impacts of the designation will be limited to additional administrative costs to the Service, Federal agencies, and third parties of considering critical habitat as part of future section 7 consultations (see our response to Comment 2).

(24) *Comment:* The Kansas Department of Wildlife, Parks and Tourism (KDWP) expressed concern regarding the proposed designation of critical habitat for Neosho mucket in the Cottonwood River (Unit NM8). KDWP provided data from 2013 surveys of two Neosho mucket reintroduction sites. Only one live Neosho mucket was located from the original reintroduction effort. KDWP contended that this river reach does not support a self-sustaining population and that there are no data available to suggest reintroduction efforts have been successful; therefore, this habitat should not be considered occupied.

Our Response: We agree that the Cottonwood River should not be considered occupied, and we are not designating critical habitat for Neosho mucket in the Cottonwood River. We have clarified our definition of occupied for the Neosho mucket (see Summary of Changes from Proposed Rule).

(25) *Comment:* KDWP suggested that the Cottonwood River population of Neosho mucket be considered an experimental population and propagated individuals be exempted from take under the Act. KDWP also suggested that safe harbor agreements should be made available to any landowner agreeing to release Neosho mucket individuals in the Cottonwood River.

Our Response: We are not designating critical habitat for Neosho mucket in the Cottonwood River (proposed Unit NM8), Chase County, Kansas. Recent KDWP data from 2013 (Tabor 2013, pers. comm.) do not support that released individual mussels into the Cottonwood River were able to survive and become established (thriving and sufficiently viable to suggest continuation or permanence without human intervention), and the future success of the reintroduction efforts are unknown at this time (see Summary of Changes from Proposed Rule, below).

The Secretary may authorize the establishment of an experimental population (including offspring arising solely therefrom) by regulation under

section 10(j) of the Act if the location of that population is wholly separate geographically from nonexperimental populations of the same species. However, the Cottonwood River is not outside the current range of Neosho mucket, so such a regulation is not appropriate. If any of the released Neosho mucket individuals are found to have survived, they are protected by the provisions of the Act as an endangered species.

If determined to be appropriate for the landowner and conservation of the mussel, the Service will work with interested property owners to develop a safe harbor agreement and to apply for an enhancement of survival permit pursuant to section 10(a)(1)(A) of the Act. The Service will also assist property owners in identifying actions they can voluntarily undertake or forego to benefit species covered by the safe harbor agreement and permit.

Public Comments

(26) *Comment:* Several commenters expressed concern that the designation of critical habitat in Arkansas and Kansas gives the Service authority to restrict activities on privately owned land. The commenters specifically expressed concern regarding landowner water development projects, development or modification of livestock and irrigation water rights, normal aquaculture, farming and ranching activities, timber harvests, housing development projects, and development of mineral rights. They wanted to know whether these activities would trigger section 7 consultation and, if so, what the costs would be to private landowners for these consultations.

Our Response: The designation of critical habitat will not increase government regulation of private land. Private activities are not subject to the Act's section 7 consultation requirements unless the activities are authorized, funded, or carried out by a Federal agency. Most normal operations for rearing of livestock or fish, or for other land uses common in Arkansas and Kansas, do not require Federal permits or funding and are not carried out by a Federal agency. Therefore, we do not anticipate this designation will impose any additional direct regulatory burdens to private landowners in Arkansas and Kansas (see our response to Comment 2).

(27) *Comment:* One commenter requested that the Service designate critical habitat only in stream reaches with recent live specimen collections and that the designation extend no more than 3 miles upstream and downstream

of collection sites. Similarly, other commenters suggested that the Service should limit the designation to areas that are or have historically been inhabited by the species and that the designation should not include the entire geographical region where a species can or may reside.

Our Response: We are designating as critical habitat areas that we have determined to be occupied at the time of listing and contain sufficient elements of physical or biological features to support life-history processes essential to the conservation of the Neosho mucket and rabbitsfoot. River habitats are highly dependent upon upstream and downstream channel habitat conditions for their maintenance. Therefore, where one occurrence record was known from a river reach, we considered the entire reach between the uppermost and lowermost locations of the mussel as occupied habitat, except in lakes and reservoirs. The nearest stream confluence or highway crossing to known localities was used to delineate the upstream and downstream extent of critical habitat. For the Neosho mucket, we have defined occupied habitat as those stream reaches known to be currently extant. For the rabbitsfoot, we have defined occupied habitat as those stream reaches that contain sizeable and small populations as defined by Butler (2005, pp. 88–89), and the marginal populations of Fish Creek and Red River that are the last extant populations in their respective basins (Great Lakes and Cumberland) and Allegheny River as a metapopulation (interconnected populations where there is gene flow). All other areas where populations are classified as marginal are not considered as occupied habitat (see *Criteria Used to Identify Critical Habitat*, below).

(28) *Comment:* One commenter stated a belief that the protections afforded Neosho mucket and rabbitsfoot under Kansas Nongame and Endangered Species Conservation Act (K.S.A. 32–957 through 32–963, 32–1009 through 32–1003) preclude the need to designate critical habitat for these mussels under the Act.

Our Response: The Act requires that critical habitat be designated to the maximum extent prudent and determinable for any species that is determined to be an endangered or threatened species under the Act. We acknowledge Kansas State law affords State level protections similar to those afforded by the Act, but there are differences. For example, Kansas State law does not require Federal action agencies to consult with the Service.

Further, Federal listing and designation of critical habitat affords opportunity for funding of recovery actions from Federal sources, and may include cost share grants for non-Federal landowners, the academic community, and nongovernmental organizations.

(29) *Comment:* One commenter asserted there is no information, other than personal communication from the KDWP, to support the presence of a stable, reproductive Neosho mucket population in the Cottonwood River, Kansas. The commenter contended the 1.6-rmi (2.6-rkm) reach of proposed critical habitat in the Cottonwood River is not occupied by Neosho mucket or is only occupied due to reintroduction and, therefore, should not be designated as critical habitat.

Our Response: We are not designating critical habitat for the Neosho mucket in the Cottonwood River (see also our response to Comment 24, above, and Summary of Changes from Proposed Rule, below).

(30) *Comment:* One commenter stated our estimate of \$4.4 million for informal and formal section 7 consultations is high, and questioned how these consultations can generate this cost.

Our Response: The final total estimated economic impact of the designation related to consultation under the Act is \$4.4 million over the 20-year period of analysis, or \$290,000 on an annualized basis. These figures represent the estimated costs of consultation associated with eight categories of economic activity across the 12 States where critical habitat was proposed. Chapter 3 of the FEA provides detailed information regarding the portion of total cost associated with each category of activity and how many consultation actions are projected to occur over the 20-year period.

(31) *Comment:* Two commenters from Kansas and Missouri stated that the Service did little, if any, outreach to the agricultural community.

Our Response: The Service published legal notices during the first comment period in the *Southeastern Missourian* and *Joplin Globe* in Missouri, and *The Morning Sun* (Pittsburgh, Kansas), *Wichita Eagle*, and *Topeka Capitol Journal* in Kansas. The Service sent news releases to 17 additional Missouri and 18 additional Kansas newspapers with readership in the areas affected by the proposed rule, including farmers. Advance notification of the proposed rule and the document making available the draft economic analysis and extending the proposal's comment period was provided to the Kansas Forestry Commission and Missouri

Conservation Commission—Forest Management.

The Service's Missouri field office held two public informational meetings in the area affected by this rule during the second comment period. The first meeting was held in Joplin, Missouri, on May 21, 2013, and the second meeting was held in Greenville, Missouri, on May 23, 2013. Information pertaining to both meetings was disseminated through typical media outlets in the region where the meetings were held, which is predominately agricultural.

At the request of the Kansas Farm Bureau, the Service's Kansas field office scheduled public informational meetings for October 9 and 10, 2013, in Parsons and Strong City, Kansas, respectively, during the third comment period. These meetings were cancelled due to a lapse in appropriations and partial government shutdown. The Service's Kansas field office attempted to reschedule the meetings with the Kansas Farm Bureau during the week of October 22, 2013, but was unable to reschedule the meetings prior to the comment period closing. As an alternative, the Service responded via email on October 22, 2013, to a list of Kansas Farm Bureau questions related to the proposed rule and draft economic analysis.

(32) *Comment:* One commenter expressed concern that the designation of critical habitat in Unit RF4a (Ouachita River) will interfere with many of Camp Ozark's river activities, including expansion in coming years. The commenter asserted the camp is a significant local economic driver, and the inability to both use the river for recreation and to pursue development plans will stymie its ability to provide jobs and wealth to the local economy.

Our Response: The originally proposed RF4b has been separated into two units (RF4a and RF4b) in this final designation. The Service has removed the originally proposed critical habitat Unit RF4a from the final designation based on recent survey efforts suggesting the rabbitsfoot population in this area should be classified as marginal based on Butler's (2005) classification (see Summary of Changes from Proposed Rule, below). As a result, the area the commenter expressed concerns about is not included in the final designation of critical habitat.

(33) *Comment:* One commenter stated that the designation of critical habitat will significantly increase the number of consultations required for permitted and non-permitted activities.

Our Response: As other listed species already occur in all designated critical habitat units for Neosho mucket and

rabbitsfoot, we do not expect the number of consultations to increase due to this designation.

(34) *Comment:* One group of commenters stated that the Service fails to meet the Act's requirements for lawful designation of critical habitat in two respects: (a) By designating areas occupied by the rabbitsfoot in Arkansas as critical habitat absent an appropriate determination that such areas include features essential to the conservation of the species and which require special management considerations or protection, and (b) by designating areas unoccupied by rabbitsfoot in Arkansas as critical habitat absent an appropriate determination those areas are essential for the conservation of the species.

Our Response: In accordance with 50 CFR 424.12(d), the Service concluded designating critical habitat in river reaches between, or in close proximity to, the uppermost and lowermost occupied areas represent an inclusive area essential to the conservation of Neosho mucket and rabbitsfoot. In accordance with 50 CFR 424.12(b), the Service determined all or some primary constituent elements were present in each unit as evidenced by occupied space (that is, stable habitat) for individual growth, feeding, and reproduction, presence of gravid females, availability of fish hosts, and water quality. While all water quality needs may not be completely understood, we estimate some numeric standards have been adopted under the Clean Water Act (33 U.S.C. 1251 *et seq.*) that represent levels essential to the conservation of these mussels (such as dissolved oxygen, ammonia, pH, metals) (see *Physical or Biological Features*). In this final determination and in accordance with 50 CFR 424.12(b), we have identified nine categories of primary threats affecting Neosho mucket and rabbitsfoot habitat that may necessitate special management or protection (see *Special Management Considerations or Protection*). We did not designate as critical habitat any areas that are unoccupied by either species.

(35) *Comment:* One group of commenters stated that the Service's record for the rule does not include sufficient information for the Service to determine critical habitat features essential to the conservation of the species based on descriptions of the physical or biological features, which state "little is known of the specific habitat requirements for the Neosho mucket and rabbitsfoot" and "the ranges of many water quality parameters that define suitable habitat conditions for Neosho mucket and rabbitsfoot have not

been investigated or are poorly understood.” Accordingly, the commenters expressed the belief that the critical habitat units are overly broad and unnecessary for preservation and propagation of these mussels.

Our Response: Generally, the Neosho mucket is found embedded in stable substrates associated with shallow riffles (areas where shallow, generally less than 1 meter (m) (3.3 ft) in depth, turbulent water passes through and over stones or gravel of somewhat similar size) and runs (intermediate areas between pools and riffles with moderate current) with gravel and sand substrate and moderate to swift currents (Oesch 1984, p. 221; Harris 1998, p. 5; Obermeyer 2000, pp. 15–16). However, in Shoal Creek and the Illinois River, the Neosho mucket prefers near-shore areas or areas out of the main current (Harris 1998, p. 5). The rabbitsfoot usually occurs in shallow areas along the bank and adjacent runs and riffles with gravel and sand substrates where the water velocity is reduced, but it also may occur in deep runs (Parmalee and Bogan 1998, pp. 211–212). Unlike the Neosho mucket (Barnhart 2003, p. 17), the rabbitsfoot seldom burrows in the substrate, but lies on its side (Watters 1988, p. 13; Fobian 2007, p. 24). Neosho mucket and rabbitsfoot, similar to other mussels, are dependent on areas with flow refuges where shear stress (the stream’s ability to entrain and transport bed material created by the flow acting on the bed material) is low and sediments remain stable during flood events (Layzer and Madison 1995, p. 341; Strayer 1999, pp. 468 and 472; Hastie *et al.* 2001, pp. 111–114). Habitat conditions described above provide space, cover, shelter, and sites for breeding, reproduction, and growth of offspring for the Neosho mucket and rabbitsfoot; are essential to their conservation; and may require special management considerations or protection. These habitat conditions have been accurately captured in the physical or biological features that we have identified to be essential to the conservation of the species. Based on the best available scientific information, we conclude the designation of critical habitat for Neosho mucket and rabbitsfoot meets the criteria set forth in 50 CFR 424.12.

(36) *Comment:* One group of commenters suggested that the Service should limit critical habitat designations for rabbitsfoot in Arkansas to areas where successful host species and rabbitsfoot coexist.

Our Response: Based on the best available information, suitable fish hosts for the rabbitsfoot occur in all areas that

we are designating as critical habitat. The Arkansas Game and Fish Commission (AGFC) fish database (2014) includes numerous records for rabbitsfoot fish hosts in the critical habitat units designated in Arkansas. Our administrative record documents the coexistence of rabbitsfoot and its fish hosts in these critical habitat units.

(37) *Comment:* One group of commenters suggested that the Service should remove streams impacted and/or controlled by hypolimnetic (lower thermally stratified portion of a lake) or other cold water releases (such as Mammoth Spring in Arkansas) because those streams are not preferred habitat for rabbitsfoot. Specifically, they referenced the Spring River (proposed Unit RF12) from Hardy downstream to Ravenden, Arkansas, and Ouachita River (proposed Unit RF4b) from Interstate 30 downstream to the Little Missouri River confluence. They stated that the rabbitsfoot cannot survive in these two cold water reaches.

Our Response: Our decision record documents the presence of a diverse and abundant mussel assemblage in the Spring River from Hardy, Arkansas, downstream to Ravenden, Arkansas (Rust 1993, Appendix 1.2 and 1.4; Harris *et al.* 2007; AGFC Mussel Database 2014; various museum records). The Ouachita River mussel and fish fauna from Rempel Dam downstream to Interstate 30 is affected by cold water releases (Harris 1999, p. 4–2). Mussel species richness and abundance increases downstream of Interstate 30 (Harris 1999, p. 3–8). Harris (1999, p. 4–2) reported double-digit species richness and higher relative abundance of mussels downstream of the Tenmile Creek confluence compared to sites upstream. Live rabbitsfoot occur in the Spring River between Hardy and Ravenden, Arkansas, and in the Ouachita River downstream of Tenmile Creek to the confluence of the Caddo River (Harris *et al.* 2007, pp. 14–16; AGFC Mussel Database 2014; Harris 1999, p. 3–8). Therefore, the best available scientific information supports that mussels, including rabbitsfoot, can survive in these reaches.

(38) *Comment:* One group of commenters recommended modifications to six critical habitat units for rabbitsfoot. They asserted that the critical habitat units should be restricted to stream reaches where live rabbitsfoot individuals are known to occur. The units are as follows:

(a) Ouachita River (proposed Unit RF4a): Remove entire designation because occurrence of rabbitsfoot is only

reported from Arkansas Highway 379 and 298.

(b) Ouachita River (proposed Unit RF4b): Restrict designation to the confluence of Little Missouri River downstream to U.S. Highway 79.

(c) Saline River (proposed Unit RF5): Restrict designation to 2 miles upstream of Arkansas Highway 15 to the Snake Creek confluence north of the Felsenthal National Wildlife Refuge boundary.

(d) Black River (proposed Unit RF9): Restrict designation to Pocahontas, Arkansas, downstream to Black Rock, Arkansas.

(e) Spring River (proposed Unit RF10): Restrict designation to Ravenden, Arkansas, downstream to confluence with Black River. They also believe water temperatures from Hardy to Ravenden, Arkansas, do not support propagation of rabbitsfoot and, thus, are not essential to the conservation of the species.

(f) South Fork Spring River (proposed Unit RF11): Remove entire designation based on the lack of documentation of live rabbitsfoot despite multiple surveys.

Our Response: We have re-evaluated the critical habitat units in question and, based on the best available scientific information, we are removing or modifying the following units in this final rule. For further information, see Summary of Changes from Proposed Rule, below.

(a) Ouachita River (proposed Unit RF4a): We agree, in part, with the commenters and in this final designation have removed the originally proposed Unit RF4a.

(b) Ouachita River (Unit RF4b): We agree, in part, with the commenters and have revised proposed Unit RF4b into two units. The Ouachita River from Arkadelphia downstream to the Little Missouri River confluence has not been comprehensively surveyed for mussels. While the absence of rabbitsfoot from this reach is likely a result of no survey data and not actual absence, the best available scientific information supports designating critical habitat in two Ouachita River units, revised Unit RF4a and revised Unit RF4b (see Summary of Changes from Proposed Rule, below).

(c) Saline River (Unit RF5): We agree, in part, with the commenters and have modified Unit RF5 in this final designation so that the upstream boundary is at the Frazier Creek confluence near Mt. Elba, Arkansas, and the downstream boundary is at the Mill Creek confluence near Stillions, Arkansas.

(d) Black River (Unit RF9): We agree, in part, with the commenters and have modified Unit RF9 in this final

designation so that the downstream boundary is at the Flat Creek confluence downstream of Powhatan, Arkansas.

(e) Spring River (Unit RF10): The best available scientific information supports the designation with a slight adjustment to the upstream boundary of Unit RF10 downstream approximately 3.72 rkm (6 rmi) to the Ott Creek confluence. We have made this change in this final designation.

(f) South Fork Spring River (proposed Unit RF11): The best available scientific information supports categorizing the South Fork Spring River rabbitsfoot population as marginal. Therefore, the Service has removed proposed Unit RF11 (the South Fork Spring River) from this final designation. (Note that units have been renumbered for this final rule and final Unit RF11 is not the same location as proposed Unit RF11).

(39) *Comment:* One group of commenters stated that the Service failed to acknowledge protections afforded to proposed Units RF10 and RF4a under Arkansas Pollution Control and Ecology Commission (APCEC) Regulation 2 (waters designated as Extraordinary Resource Waters (ERW) and Ecologically Sensitive Waterbodies (ESW)), which they stated provide sufficient protection to preserve the physical or biological features essential to the conservation of rabbitsfoot.

Our Response: The Service acknowledges there are some protections afforded to ERW and ESW under APCEC's Regulation 2, which was developed pursuant to the Arkansas Water and Air Pollution Control Act and the Clean Water Act (CWA). Significant physical alterations of habitat are not allowed unless: (a) The proposed physical alteration of habitat will not impair water quality, natural flow regime, and the habitat of fish, shellfish, or aquatic life; and (b) there is no feasible alternative to the proposed project. Regulation 2 also allows the short-term activity authorization for a variety of activities that are permitted to exceed water quality standards provided there is no permanent or long-term impairment. However, despite provisions in Regulation 2 that explicitly prohibit short-term activity authorization for activities that result in adverse effects to federally endangered and threatened species or their critical habitat, short-term activity authorizations in ERW and ESW watersheds have been linked to documented take of endangered species (see *U.S. v. Hawk Field Services, LLC* 2011). Furthermore, Regulation 2 allows for the removal of an ERW or ESW designation for the purpose of constructing a reservoir to provide

domestic drinking water, if it can be demonstrated: (a) The sole purpose is to provide domestic drinking water supply; and (b) there is no feasible alternative to constructing a reservoir to meet the domestic water needs of the citizens of Arkansas. Given that a goal of the CWA is to establish water quality standards that protect shellfish and given documented declines of these mussel species still continue due to poor water quality and other factors, we take a conservative approach in favor of the species and conclude that Regulation 2 has been insufficient to significantly reduce or remove threats to the Neosho mucket and rabbitsfoot in Units RF4a and RF10.

(40) *Comment:* One group of commenters commissioned its own study of the economic impacts of the critical habitat designation. Their study compared their results to the Service's DEA and concluded that the DEA "vastly understates" costs of the regulatory action because it does not take into account direct and indirect costs to businesses, State and local governments, and other private property owners resulting from section 7 consultation requirements. Furthermore, these impacts would lead to additional damages to the regional economy in the form of lost tax revenue, increased unemployment claims, damage from unrepaired roads and bridges, increases in transportation costs, and tax increases. Specifically, the evaluation estimated, based on a sample of affected projects, the total cost to affected Arkansas counties would exceed \$19 million, approximately 5 times the cost of \$4.4 million estimated in the DEA for the entire 12-State region of the designation.

Our Response: The commenter's evaluation describes the economic impacts that would occur if a variety of hypothetical scenarios were to result from critical habitat designation (for example, if visitation at Camp Ozark declined by 25 percent; visitation at the Pond Creek National Wildlife Refuge decreased by 20 percent; an oil well is not drilled; a poultry farm is closed; the construction of a planned county-road bridge over the Osage River is delayed; or city or county discharges under the National Pollution Discharge Elimination System (NPDES) are restricted). However, the evaluation does not provide evidence to suggest such restrictions will actually occur as a result of the critical habitat designation.

The Service considered whether restrictions are likely to result from the designation of critical habitat and found this to be unlikely. Specifically, the

Service prepared a memorandum describing the likely outcome of future section 7 consultations (see Appendix D of the FEA). The Service is designating critical habitat in river segments that are occupied by the mussels. Section 7 consultation requirements take effect once the mussels are listed under the Act, even if critical habitat is not designated (see response to Comment 2). Thus, the incremental costs of additional regulation designating critical habitat are limited to the administrative costs to the Service, the Federal action agencies, and third parties involved in consultations. The FEA's estimate of \$4.4 million (present value impacts assuming a 7 percent discount rate) results from this additional administrative burden.

(41) *Comment:* Multiple commenters stated that the DEA underestimates the impacts of the proposed critical habitat designation because it utilizes an incremental approach that "only estimates the likely costs of agencies consulting with each other" and does not consider the actual opportunity costs to businesses, State and local governments, and other private property owners related to the required consultations.

Our Response: The Service's focus on the incremental impacts of the critical habitat rule is consistent with the U.S. Office of Management and Budget's (OMB's) guidelines for best practices concerning the conduct of economic analysis of Federal regulations. As described in section 2.1 of the FEA, OMB guidelines direct Federal agencies to measure the costs of a regulatory action against a baseline, which it defines as the "best assessment of the way the world would look absent the proposed action." The baseline utilized in the FEA is the existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat *absent* the designation of critical habitat. The baseline includes protections afforded the species under the Act, as well as under other Federal, State, and local laws and guidelines.

In recognition of the divergent opinions of the courts and to address the Presidential memorandum dated February 28, 2012, the Service promulgated final regulations specifying that it is appropriate for the Secretary to consider impacts of a critical habitat designation on an incremental basis (78 FR 53058, August 28, 2013). This rule discusses the impact analysis for proposed critical habitat through completion of an "incremental analysis." This method of determining

the probable impacts of the designation seeks to identify and focus solely on the impacts over and above those resulting from existing protections.

Accordingly, the FEA employs “without critical habitat” (baseline) and “with critical habitat” (incremental) scenarios. The analysis qualitatively describes how baseline conservation efforts for the two mussels may be implemented across the proposed designation, and, where possible, provides examples of the potential magnitude of costs of these baseline conservation efforts (Chapter 4). The FEA focuses, however, on the incremental analysis, describing and monetizing the incremental impacts due specifically to the designation of critical habitat for the species (Chapter 3). Sections 2.2 and 2.3 of the FEA describe in detail how the analysis defines and identifies incremental effects of the proposed designation.

The incremental approach employed by the Service in its analyses of proposed critical habitat designations does not necessarily limit impacts to administrative costs of consultation. In some cases, designation of critical habitat does result in new project modifications that need to be implemented to avoid possible adverse modification of the habitat. The costs of these project modifications would then be counted in the incremental analysis, regardless of who incurs the cost. In the case of the Neosho mucket and rabbitsfoot, all of the designated critical habitat is occupied by the species, and therefore any project modifications will be required even absent critical habitat (in the baseline) to avoid possibly jeopardizing the species’ existence (see response to Comment 2).

(42) *Comment:* Multiple commenters expressed concern that the proposed critical habitat designation will have an economic impact on Arkansas counties, cities, communities, businesses, and industry sectors through effects on employment, tax revenues, business and industrial operations, and overall quality of life. Commenters suggested that these impacts will occur as a result of new critical habitat-related restrictions, prohibitions, delays, cancellations of activities, and/or additional requirements for conservation and consultation.

Our Response: The commenters do not provide information regarding how or why they believe critical habitat will result in new restrictions, prohibitions, delays, cancellations, or conservation requirements. Within the FEA, the Service specifically considered whether additional or different conservation measures would be needed to avoid

destruction or adverse modification of critical habitat above and beyond those measures needed to avoid jeopardizing the continued existence of the species, and found this to be unlikely (see our response to Comment 2). Because all of the units are occupied by at least one of the mussel species, any measures needed to protect habitat would be requested by the Service, even if critical habitat was not designated, to avoid jeopardizing the continued existence of the species.

(43) *Comment:* Multiple commenters expressed concern that the DEA does not address impacts to private landowners (such as farmers and ranchers), and in particular, those impacts associated with property value or third party lawsuits resulting from critical habitat designation. One commenter expressed concern that no small landowners were contacted in accordance with the provisions of the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 *et seq.*).

Our Response: Incremental impacts of the designation are expected to be limited to additional administrative costs to the Service, Federal agencies, and third parties of considering critical habitat as part of future section 7 consultations (see our response to Comment 2). The FEA incorporates potential impacts to private landowners as third parties in forecasted consultations on water quality; timber, agriculture, and grazing; and development activities. In addition, Appendix A of the FEA includes an analysis of the distributional impacts of the proposed critical habitat designation on small entities. As described in Appendix A, the only costs expected to be borne by third parties as a result of the proposed designation are portions of the total cost of forecasted section 7 consultations. These costs are relatively minor, ranging from \$260 to \$2,080 per consultation.

Section 2.3.2 of the FEA discusses how the designation of critical habitat may, under certain circumstances, result in indirect impacts such as time delays, regulatory uncertainty, and stigma effects (such as property value impacts). The Service does not expect indirect impacts to result from critical habitat designation for the two mussels. However, as a result of the concern expressed in these comments, we have added new language to the FEA concerning the potential for indirect costs associated with third party lawsuits or property value impacts. Because the nature, timing, and likelihood of future litigation or property value impacts are highly uncertain, the FEA does not quantify

these impacts but instead describes them qualitatively and notes that these are uncertainties in the analysis.

(44) *Comment:* One commenter asserted that the DEA is flawed because it limits the physical scope of its enquiry to the riparian watersheds and census tracts included in those watersheds. The commenter argued that standard practice for an economic impact analysis has been to use county boundaries or a defined local market area as the basis for any comprehensive evaluation of costs and benefits. The use of such narrow boundaries is an attempt to limit the estimated effects by omitting consideration of the interconnectedness of modern economies.

Our Response: The commenter is correct that the DEA defines its “study area” as including the watersheds encompassing proposed critical habitat (either the fourth level (8-digit) or sixth level (12-digit) Hydrologic Unit Code (HUC) watersheds defined by the U.S. Geological Survey (USGS)). The study area is used to identify projects (such as oil wells, roads, bridges, etc.) that could have a hydrologic connection to critical habitat. For example, these projects may be sufficiently close to a critical habitat river segment that runoff from the construction site would increase sediment loads to the river, potentially affecting the mussels. If such a hydrologic connection exists, these projects are more likely to require consultation. Defining the study area more broadly would result in the inclusion of projects with no hydrologic connection to critical habitat, and thus no reason for consultation.

Importantly, while the identification of projects requiring consultation is limited to the study area, the consideration of economic impacts that might result if these projects are modified is not limited to this geographic area. However, in the case of Neosho mucket and rabbitsfoot, incremental project modifications are unlikely. Incremental costs are limited to administrative costs, which would be incurred by the agencies or private entities pursuing the projects, regardless of where those entities are headquartered.

(45) *Comment:* One commenter provided an analysis of the economic impacts of the proposed critical habitat designation based on hypothetical project modifications using IMPLAN (an input-output modeling system) multipliers. Such an analysis measures the change in economic output resulting from a policy change. The authors argued that such multiplier analysis is the appropriate framework for answering impact analysis questions,

noting the DOT recommends this approach for construction planning.

Our Response: The commenter is correct that economic impact analyses generally rely on input-output or multiplier analysis using tools such as IMPLAN. Examples of such analyses include estimates of the changes in economic output generated by the construction of a new stadium or the loss of a manufacturing facility.

In contrast, the method of economic analysis of proposed Federal regulations is subject to the direction provided by Executive Order 12866 and associated guidance provided by OMB in Circular A-4. As described in Circular A-4, "opportunity cost" is the appropriate concept for valuing benefits and costs of regulatory actions. Costs are incurred when resources are used for one purpose and hence cannot be used for another purpose. The opportunity cost is the value of the benefit that could have been provided by devoting the resources to their best alternative use. Estimates of the change in opportunity cost are sometimes referred to as economic efficiency effects or changes in social welfare.

For example, assume section 7 consultations are required prior to drilling at oil and gas sites potentially affecting the mussels. If delays caused by section 7 consultation cause oil and gas operators to forego the activity without pursuing production at substitute sites, net change in oil and gas production at a national level would represent the opportunity cost of the regulation. If operators pursue production at substitute sites, resulting in no net change in production but redistributing activity away from sites near the mussels, then the marginal cost of reduced profitability associated with the next best alternative location represents the opportunity cost. In either case, the resources used to produce the oil and gas (for example, materials and labor necessary to drill for and transport the oil and gas) are not lost to society. Rather, these resources are still available for other productive uses. As a result, estimates of changes in efficiency effects, or social welfare, are fundamentally different than the estimate of the distributional effects using tools like IMPLAN, and the results are not directly comparable.

Given that the designation of critical habitat for the mussels is unlikely to result in additional project modifications beyond those related to the listing of these species, the types of distributional effects measured using IMPLAN multipliers are likely to be minimal. The opportunity cost of the regulation is limited to the resources

(primarily labor) needed to address the administrative requirements of the section 7 process. Thus, the DEA appropriately captured the incremental opportunity costs of the proposed regulation.

(46) *Comment:* One commenter noted that the DEA predicts an increase in future section 7 consultations on Natural Resources Conservation Service (NRCS) Farm Bill activities in Arkansas. The commenter expressed concern because these consultations are new, and the Service has no way to predict the incremental costs to private landowners associated with new conditions (such as a 180-foot buffer along stream, discharge zones, and karst features and methods to prevent soil erosion and runoff) that will be recommended during section 7 consultation on Farm Bill-related activities.

Our Response: Section 3.3.3 of the DEA includes the likely increase in section 7 consultations in Arkansas due to new NRCS Farm Bill program work under the Agricultural Act of 2014 (H.R. 2642, Pub. L. 113-79, which is also known as the 2014 Farm Bill), an act that authorizes nutrition and agriculture programs in the United States for 2014 through 2018, and this section of the DEA provides an estimate of the administrative costs associated with the forecasted consultations. Additionally, the discussion provides information on the likely incremental impacts of the proposed critical habitat designation on timber, agriculture, and grazing activities. As described in section 2.3.2 of the DEA, the designation of critical habitat is not anticipated to generate additional conservation measures for the two mussels beyond those that would be generated by the listing.

We note that the conditions identified by the commenter from the DEA as "specific conservation recommendations identified by the Service" (*i.e.*, a minimum 180-foot buffer and methods to prevent soil erosion and runoff) are mischaracterized in the economic analysis as having been made by the Service, which is incorrect. We have included an Addendum to the FEA (IEc 2014b) to correct information regarding the programmatic consultation with NRCS. It is important to note, however, that although the information was not correctly presented in the economic analysis, it had no bearing on the results of the incremental effects analysis, as that information was incorporated in the baseline.

(47) *Comment:* One commenter stated that the costs presented in the DEA are based on "an unrealistic discount rate of seven percent" and costs should be

presented instead using a discount rate of 5 percent or less.

Our Response: The DEA demonstrated the sensitivity of the results of the analysis to the choice of discount rate by presenting costs using discounts rates of both 7 and 3 percent. Specifically, results estimated using both rates are presented in the Executive Summary (see Exhibit ES-3). For presentation purposes, the remainder of the report presents detailed cost estimates using a 7 percent discount rate; however, Appendix B replicates all detailed tables using a 3 percent discount rate for comparison.

The choice of discount rates is consistent with OMB's Circular A-4, which states: "As a default position, OMB Circular A-4 states a real discount rate of seven percent should be used as a base-case for regulatory analysis. The seven percent rate is an estimate of the average before-tax rate of return to private capital in the U.S. economy. The effects of regulation do not always fall exclusively or primarily on the allocation of capital. When regulation primarily and directly affects private consumption (for example, through higher consumer prices for goods and services), a lower discount rate is appropriate. For regulatory analysis, you should provide estimates of net benefits using both three percent and seven percent." The rate of 5 percent recommended by the commenter is captured in this range.

(48) *Comment:* One commenter asserted the RFA analysis does not consider whether or not the proposed critical habitat designation would have a substantial impact on local government jurisdictions because, as stated in the DEA, "potential financial impacts to local government agencies and private landowners are not estimated as a proportion of annual revenues due to lack of data."

Our Response: The purpose of the Small Business Regulatory Enforcement Fairness Act (5 U.S.C. 801 *et seq.*) analysis, provided in Appendix A of the DEA, is to assess whether or not the proposed critical habitat designation will have a significant economic impact on a substantial number of small entities. As described in section A.1, the analysis provides information regarding the potential number of third parties participating in consultations on an annual basis in order to ensure a robust examination of the effects of the proposed rule. In addition, the analysis provides information to assist the Service in determining whether these entities are likely to be "small" and whether the number of potentially affected small entities is "substantial."

Importantly, the impacts of the rule must be both significant and substantial to prevent certification of the rule under the RFA and to require the preparation of an initial regulatory flexibility analysis.

As shown in Exhibit A-2 of the DEA, the proportion of small entities in the study area that may be affected in one year by the proposed designation ranges from 0.1 percent to 3.1 percent, which is not considered to be a substantial number. Despite this conclusion, the analysis also provides information on whether the economic impact on these entities is likely to be significant. Specifically, the analysis estimates the likely annualized impact per entity as a proportion of estimated annual revenue. Due to lack of data on the annual revenues of each entity that may be involved in section 7 consultations across the designation, we perform a “threshold analysis”; that is, we determine that for impacts to exceed one percent of an entity’s annual revenues, those annual revenues would have to be less than \$47,000. We assume this is very unlikely to be the case for local government agencies in the study area. For example, one of the least populous counties in the study area in Arkansas is Calhoun County, whose total revenues for 2011 were reported at \$8,863,000 (Center for Governmental Research Inc., 2013: <http://www.govistics.com/AR/CALHOUN>).

(49) *Comment:* One commenter stated that for private timber, agricultural, and grazing entities, the RFA analysis relies on the flawed assumptions in chapter 3 of the DEA. The Service concludes there will be no significant impact to small entities when the DEA clearly states the Service has no data with which to predict future incremental costs to such private landowners because there is no history of consultation between the Service and NRCS.

Our Response: In Appendix A of the DEA, we note that we are unable to estimate potential financial impacts to local government agencies and private landowners as a proportion of annual revenues due to a lack of data. However, for any entity with greater than \$47,000 in annual revenue, the financial burden of undertaking a project requiring consultation on the mussels would constitute less than one percent of annual revenue because the designation of critical habitat is not anticipated to generate additional conservation measures for the two mussels beyond those that would be generated by the species being listed. Less than one percent of annual revenue would not be considered a significant impact. Therefore, we have determined there

would not be a significant impact to a substantial number of small entities.

(50) *Comment:* One commenter provided information about NPDES permits for direct and indirect discharges into rivers containing proposed critical habitat. The commenter asserted that “serious economic and fiscal impacts will accompany any water-system adjustments that would have to be instituted to divert or avoid discharges into the host rivers.” In addition, the commenter stated that the NPDES permits will “be subjected to an increased level of regulation, including potential need for formal and/or informal consultation with [the Service].”

Our Response: The commenter does not provide any information regarding the likelihood or nature of “water-system adjustments” resulting from critical habitat designation that would aid in providing greater clarification to address the concern. As outlined in our response to Comment 2 and elsewhere in this document, the designation of critical habitat is not anticipated to generate additional conservation measures for the two mussels beyond those that would be generated by the species being listed. In addition, section 3.3.2 of the DEA provided an estimated number of future water quality-related section 7 consultations, including those on NPDES permit programs. The DEA forecast costs related to water quality activities for all units in which future section 7 consultations concerning water quality management activities are expected to occur.

(51) *Comment:* One commenter stated that although the DEA does address benefits of designating critical habitat, the analysis should account for benefits to other species from the designation of critical habitat for the mussels. Studies have shown these protections promote stream health by preventing erosion, filtering runoff, and providing shade and microhabitats. Other benefits include areas for scientific study and aesthetic value to residents.

Our Response: The primary goal of critical habitat designation for the mussels is to support their long-term conservation. Theoretically, conservation and recovery of the species may result in benefits, including use benefits (wildlife-viewing), non-use benefits (existence values), and ancillary ecosystem service benefits (such as public safety benefits of reduced wildfire risks). Section 5.3 of the DEA contained a discussion of potential ancillary benefits of mussel conservation, including improved water quality and aesthetic benefits.

(52) *Comment:* One commenter asked why the critical habitat designation is necessary when no additional conservation measures are required beyond those associated with the listing.

Our Response: The Act requires that critical habitat be designated to the maximum extent prudent and determinable for any species that is determined to be an endangered or threatened species under the Act. In the October 16, 2012, proposed rule to list these species and designate critical habitat (77 FR 63440), we identified “the potential benefits” of designating critical habitat to “include: (1) Triggering consultation under section 7 of the Act in new areas for actions in which there may be a Federal nexus where it would not otherwise occur because, for example, it is or has become unoccupied or the occupancy is in question; (2) focusing conservation activities on the most essential features and areas; (3) providing educational benefits to State or county governments or private entities; and (4) preventing people from causing inadvertent harm to the species” (see *Prudence Determination*, 77 FR 63472).

(53) *Comment:* Several commenters contended that the designation of critical habitat in Arkansas is an attempt by the Service or Federal government to “take” privately owned property.

Our Response: The designation of critical habitat does not authorize the Service or Federal government to purchase, condemn, take through eminent domain, or otherwise confiscate private property through the use of legislation, regulation, or other legal means. In accordance with Executive Order 12630 (“Government Actions and Interference with Constitutionally Protected Private Property Rights”), we have analyzed the potential takings implications of designating critical habitat for Neosho mucket and rabbitsfoot in a takings implications assessment. As discussed above, the designation of critical habitat affects only Federal actions. Although private parties that receive Federal funding, assistance, or require approval or authorization from a Federal agency for an action may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests on the Federal agency.

(54) *Comment:* Multiple commenters requested that the Service conduct a “complete impact study” to include all property owners and businesses.

Our Response: Based on a review and evaluation of the information contained in the environmental assessment, we

determined the designation of critical habitat for the Neosho mucket and rabbitsfoot does not constitute a major Federal action significantly affecting the quality of the human environment under the meaning of section 102(2)(c) of NEPA. Accordingly, an environmental impact statement is not required. See our responses to Comments 41 and 42 regarding economic impacts to private landowners and businesses.

(55) *Comment:* One commenter stated that the designation of critical habitat in Arkansas will close rivers to fishing.

Our Response: As discussed above, designating critical habitat has no impact on landowner or citizen activities that do not require Federal funding or permits.

(56) *Comment:* One commenter expressed concern that oral comments were not recorded during public meetings held in Arkansas. Furthermore, the commenter requested policy changes to require public meetings be recorded and entered into the public record.

Our Response: The commenter appears to be confusing the requirements for a “public hearing” with those for the “public information meeting” that was actually held. A public hearing, which may be requested on any proposed rule within 45 days after the opening of the comment period, includes oral testimony from participants which is recorded by a court reporter and entered into the public record. With regard to the proposed critical habitat designation for the two mussels, no public hearings were requested during any of the four open comment periods. Instead, the Service was asked to reopen the comment periods to allow additional time for interested parties to review the proposed rule, DEA, and draft environmental assessment. The Service agreed to hold public information meetings during the open comment periods to facilitate a better understanding of the proposed action. In a public information meeting, which is a less formal process than a public hearing, there is no requirement for recording oral testimony. However, the Service voluntarily provided comment cards that participants could fill out during the meetings and submit as formal comments to be entered into the record. These comments have been uploaded onto <http://www.regulations.gov> along with all other comments we received during the comment periods.

(57) *Comment:* One commenter stated predation by raccoon, otter, beaver, and other predators is a greater threat to

Neosho mucket and rabbitsfoot than habitat loss or degradation.

Our Response: The Service determined predation was not a significant threat to the overall status of Neosho mucket and rabbitsfoot. A more detailed discussion of this threat is presented in the final listing rule under Summary of Factors Affecting the Species (78 FR 57076, September 17, 2013).

(58) *Comment:* One commenter expressed concern about additional restrictions on the aquaculture industry in Arkansas, specifically on water withdraw or diversion, pond cleanout, pond effluent discharge, and inspection requirements, due to the designation of critical habitat.

Our Response: As discussed above, designating critical habitat has no impact on landowner activities that do not require Federal funding and permits. For aquaculture activities that require a Federal permit or assistance, the Service may recommend conservation actions in a section 7 consultation for the affected species that protect not only the species, but also its habitats, regardless of whether or not there is designated critical habitat. Currently, such conservation measures to protect the species and their habitats are in place for other listed mussel species that occur within the Arkansas critical habitat units such that no additional conservation measures or regulatory restrictions are expected to result from this critical habitat designation.

(59) *Comment:* One commenter stated that the Service should release data used to determine critical habitat for Neosho mucket and rabbitsfoot.

Our Response: All of the comments, materials, and documentation we considered in this rulemaking are available at the Arkansas Ecological Services Field Office (see **ADDRESSES**, above). Comments and materials received, as well as some supporting documentation we used in preparing this rule, are also available for public inspection at <http://www.regulations.gov>.

(60) *Comment:* Several commenters expressed concern about fluoride as a chemical contaminant affecting Neosho mucket and rabbitsfoot.

Our Response: While all the water quality needs for these two mussels may not be completely understood, we estimate some numeric standards have been adopted under the CWA that represent levels essential to conservation of these mussels (such as dissolved oxygen, ammonia, pH, metals) (see *Physical or Biological Features*). In a North Carolina study, effective

concentrations for growth effects were found to be 17 and 8 times as high as the State’s and EPA’s water quality criteria for fluoride, respectively (Keller and Augspurger 2005 in Farris and Van Hassel 2007, p. 162). Fluoride, at concentrations typical of most streams meeting state and EPA water quality criteria, is not toxic to glochidia (freshwater mussel larvae) and juveniles of Unionidae mussels such as the Neosho mucket and rabbitsfoot. In this final designation, and in accordance with 50 CFR 424.12(b), we have identified nine categories of primary threats affecting Neosho mucket and rabbitsfoot habitat that may necessitate special management or protection (see *Special Management Considerations or Protection—Chemical Contaminants*).

(61) *Comment:* Multiple commenters expressed concern regarding “sue and settle” agreements between Federal agencies and nongovernmental organizations. They contend this process is a binding out-of-court settlement that prohibits farmers, small businesses, and private property owners from participating in discussions and providing meaningful input prior to the publication of a proposed rule.

Our Response: The multiyear listing workplan under which this critical habitat rule was proposed was developed through settlement agreements with Wild Earth Guardians and the Center for Biological Diversity to resolve multidistrict litigation. It established deadlines for completing listing determinations for each candidate species, including the Neosho mucket (first included in the 2001 CNOR; 66 FR 54808, October 30, 2001) and rabbitsfoot (first included in the 2009 CNOR; 74 FR 57804, November 9, 2009). The Service published a final listing rule for these mussels on September 17, 2013 (78 FR 57076), in accordance with these deadlines. Section 4(a)(3)(A) of the Act requires that we designate critical habitat, when prudent and determinable, concurrently with making a determination to list a species as endangered or threatened. Therefore, in making this final designation at this time, the Service is adhering to the requirements of the listing workplan and settlement agreement and the Act.

(62) *Comment:* One commenter contended that the greatest threat to the Neosho mucket and rabbitsfoot is White River (Arkansas) minimum flows regulated by the ACOE.

Our Response: Neosho mucket does not occur in the White River. The construction of a series of six flood control reservoirs on the upper White River in the 1940s and 1950s, including

Bull Shoals and Norfolk Lakes, led to the extirpation of rabbitsfoot from a large section of the White River upstream of Batesville, Arkansas. White River minimum flows provide adequate low flow releases from Bull Shoals and Norfolk Lakes dams to enhance trout habitat and survival in cold tailwater reaches of the White River located upstream of Unit RF8a. There is no evidence to support minimum flows contributing to declines in rabbitsfoot. Minimum flows may be beneficial to the species by providing higher and more consistent flow during low flow periods when mussels may become stranded and be subjected to desiccation (drying).

Summary of Changes From Proposed Rule

The information below is provided as a result of the peer and public review process. In this final designation, we have made changes to maps, units, and the rule itself. A change in mapping methodology resulted in a revision to the total number of river kilometers (river miles) for the designation of rabbitsfoot critical habitat. The beginning and ending points of the proposed critical habitat designation, as well as the unit descriptions (as described in the proposed critical habitat rule) will remain the same except where modified for other reasons.

(1) We have made changes to Unit RF7 to correct an oversight in mapping methodology, specifically in methods used for estimating the unit length. The new method uses a better technique for following the curve and meander of the river channel, which results in an additional 1.5 rkm (0.9 rmi) designated as critical habitat for the rabbitsfoot. In addition, this correction resulted in a corresponding increase to the private ownership lands (expressed as river km/mi) adjacent to Unit RF7.

(2) We are not designating critical habitat for Neosho mucket in the Cottonwood River (Unit NM8), Chase County, Kansas, as originally proposed. Recent KDWPT data from 2013 (Tabor 2013, pers. comm.) do not indicate that released individual mussels into the Cottonwood River were able to survive and become established, and the future success of the reintroduction efforts are unknown at this time. We have clarified our definition of extant Neosho mucket populations in this final designation to address reintroduced populations and selection criteria for critical habitat for this mussel (see the *Criteria Used to Identify Critical Habitat*).

(3) We are not designating critical habitat for rabbitsfoot in the Ouachita River (Unit RF4a), Montgomery County,

Arkansas, as originally proposed. Rabbitsfoot was collected live at two sites in 1988 (AGFC Mussel Database 2014). However, an AGFC and Service comprehensive survey in 2007 failed to find any live rabbitsfoot in this reach. In 2013, AGFC resurveyed the two 1988 sites and failed to locate any live or fresh dead (shells still have flesh attached to the valves, retain a luster to their nacre (pearly, innermost layer of the shell), and their periostracum (outermost layer of the shell) is not peeling, indicating relatively recent death (within months)) rabbitsfoot (Harris 2013, pers. comm.). Based on recent survey efforts, the rabbitsfoot population in the Ouachita River upstream of Lake Ouachita should be classified as marginal based on Butler's (2005) classification.

(4) We are not designating critical habitat for rabbitsfoot in the South Fork Spring River (Unit RF11), Fulton County, Arkansas, as originally proposed. Butler (2005, pp. 75–76) categorized the South Fork Spring River as a small population based on a 2002 collection of seven fresh dead specimens upstream of Arkansas Highway 289. Harris *et al.* (2007, p. 22) collected the only live rabbitsfoot from this same reach in 2006. The best available scientific information supports categorizing the South Fork Spring River rabbitsfoot population as marginal based on Butler's (2005) classification.

(5) We have modified or revised six critical habitat units for rabbitsfoot (originally proposed Units RF2, RF4b, RF5, RF9, RF10, and RF32) due to new biological information.

- Verdigris River (Unit RF2): We have revised the downstream extent of Unit RF2. A portion of the Verdigris River from near the Bird Creek confluence downstream to Interstate 44 has been altered by the upper extent of the McClellan-Kerr Arkansas River Navigation System and continues to be dredged. There are no rabbitsfoot records from this reach. Therefore, the Service has modified Unit RF2 in this final designation so that the downstream boundary is at Oklahoma Highway 266 northwest of Catoosa, Oklahoma. This change represents a net reduction of 7.6 rkm (4.7 rmi) from the originally proposed Unit RF2.

- Ouachita River (Unit RF4b): We have divided Unit RF4b into two units (Units RF4a and RF4b in this rule). Harris (1999, pp. 3–8 and 3–9) collected live rabbitsfoot at three sites located from near the confluence of Tenmile Creek downstream to the Caddo River confluence. However, the Ouachita River from Caddo River confluence downstream to the Little Missouri River

confluence has not been comprehensively surveyed for mussels. While the absence of rabbitsfoot from this reach is likely a result of no survey data and not actual absence, the best available scientific information supports designating critical habitat in two Ouachita River subunits due to the distance between the reaches known to be occupied. Therefore, the Service has created Unit RF4a to be from the Tenmile Creek confluence downstream to the Caddo River confluence (22.7 rkm (14.1 rmi)), and Unit RF4b to be from the Little Missouri River confluence downstream to U.S. Highway 79 near Camden, Arkansas (revised Unit RF4b; 43 rkm (26.7 rmi)). Together, the new Units RF4a and RF4b represent a net reduction of 92.2 rkm (57.3 rmi) from the originally proposed Unit RF4b.

- Saline River (Unit RF5): We have revised the upstream and downstream extent of Unit RF5. Collections by several surveyors since 2002 support the presence of a small population of rabbitsfoot in the Saline River from the Frazier Creek confluence near Mount Elba, Arkansas, to the Mill Creek confluence near Stillions, Arkansas (Service, unpublished data, 2013). One live specimen was collected in Grant County in 1993 (Illinois Natural History Survey Mollusk Collection 14549). One live specimen also was collected at U.S. Highway 167 in 2006 (AGFC Mussel Database 2014), but this record and the 1993 Grant County record are disjunct (approximately 48.3 rkm (30 rmi)) from the aforementioned reach downstream of Mount Elba. Historically, rabbitsfoot was reported from sites at Benton, Arkansas, and Jenkins Ferry State Park (University of Michigan Museum of Zoology 67254, 75750). Based on the best available scientific information, the Service has revised the upstream and downstream extent of Unit RF5 in this final designation due to the lack of live records downstream of the Mill Creek confluence near Stillions, Arkansas, and sporadic disjunct records upstream of the core population. This change represents a net reduction of 168.9 rkm (105.0 rmi) from the originally proposed Unit RF5.

- Black River (Unit RF9): We have revised the downstream boundary of Unit RF9. Rust (1993 *in* AGFC Mussel Database 2014) collected one live rabbitsfoot approximately 0.78 rkm (1.25 rmi) downstream of Powhatan, Arkansas. One live rabbitsfoot was collected near Powhatan in 1984 (AGFC Mussel Database 2014). There are no records from the Flat Creek confluence with the Black River downstream to the Strawberry River confluence with the Black River. Therefore, the Service has

modified Unit RF9 in this final designation so that the downstream boundary is at the Flat Creek confluence with the Black River downstream of Powhatan, Arkansas. This change represents a net reduction of 41.0 rkm (25.5 rmi) from the originally proposed Unit RF9.

- Spring River (Unit RF10): We have changed the upstream boundary of the originally proposed Unit RF10. Harris *et al.* (2007, pp. 14–16) collected three live rabbitsfoot in 2005 from a site approximately 1.55 rkm (2.5 rmi) upstream of Williford, Arkansas (or Arkansas Highway 58). They also reported numerous rabbitsfoot from muskrat middens in the reach from Williford to Ravenden Springs, Arkansas. One live specimen was collected in 1983, near the confluence of Ott Creek (AGFC Mussel Database 2014). The AGFC Mussel Database (2014) also contains a 1983 record from near the Pierce Creek confluence located upstream of Ott Creek near Hardy, Arkansas. The Spring River downstream of Hardy, Arkansas, supports a diverse and abundant mussel community as evidenced in our records. Thus, the best available scientific information supports the designation with a slight adjustment (net reduction) to the upstream extent of Unit RF10 downstream by approximately 11.3 rkm (7.0 rmi) to the Ott Creek confluence. Therefore, the Service has revised the upstream boundary of the originally proposed Unit RF10 in this final designation.

- Shenango River (Unit RF32): We have changed the upstream boundary of the originally proposed Unit RF32. Considering new information in Bursey (1987), the best available scientific information supports extending the extent of the originally proposed Unit RF32 (now Unit RF31 in this final designation) upstream 8.6 rkm (5.3 rmi).

The new unit descriptions are provided below in Final Critical Habitat Designation. Because of the removal of the originally proposed Unit RF11, originally numbered Units RF12 to RF32 have been renumbered Units RF11 to RF31. In addition, these revisions resulted in a net decrease of designated critical habitat for the Neosho mucket of approximately 3 rkm (2 rmi) and a net decrease of critical habitat for the rabbitsfoot of 349 rkm (217 rmi). The majority of the changes from the proposed rule are to units occurring in Arkansas, with a net reduction of approximately 350 rkm (218 rmi; a 27 percent decrease). There was only one increase in critical habitat length (originally proposed Unit RF32, now Unit RF31, in this final designation).

(6) The critical habitat in the originally proposed Unit RF19 (now Unit RF18 in this final designation) for rabbitsfoot in the Duck River overlaps with the oyster mussel (*Epioblasma capsaeformis*) critical habitat. In the Duck River, the oyster mussel has been renamed the Duck River dartersnapper (*Epioblasma ahlstedti*) and is separate and distinct from the oyster mussel. We agree that the oyster mussel and Duck River dartersnapper are distinct and separate species. However, the Service has not yet made a listing and critical habitat determination for the new entity, the Duck River dartersnapper. We incorporated language in this final rule to clarify the species distinction and name change, but at this time, the Duck River dartersnapper and oyster mussel are considered synonymous according to our regulations.

(7) In the proposed rule, we inadvertently left out the description of a physical or biological feature for both species that addresses habitats protected from disturbance or representative of the historical, geographic, and ecological distributions of the species. We have added the description into this final rule (see *Physical or Biological Features*, below).

(8) In the proposed rule, Primary Constituent Element 4 for both species stated that fish hosts for each mussel were “currently unknown” and provided a statement regarding natural fish assemblages “until appropriate host fish can be identified.” While we do not currently know all fish species that may act as hosts for one or both of the glochidia of these mussels, this final rule identifies those fish species we believe are or may be host species (see *Primary Constituent Elements for Neosho Mucket and Rabbitsfoot* in this rule and *General Biology* in the proposed rule (77 FR 63442)).

(9) In the proposed rule, we incorrectly labeled the Pond Creek National Wildlife Refuge (NWR) as Cossatot NWR. This has been corrected in this final rule.

(10) Several Counties were inadvertently left out of the Executive Summary of the proposed rule; we added them in this final designation.

(11) In the proposed rule, we incorrectly named Mammoth Cave National Park North Entrance Road as Maple Springs Ranger Station Road in the unit description for Unit RF21. The correct road name is used in this final rule.

Summary of the Species' Status

Please refer to the proposed listing and critical habitat rule (77 FR 63440; October 16, 2012) and final listing rule

(78 FR 57076, September 17, 2013) for the Neosho mucket and rabbitsfoot for a summary of species information. Additional information on the associated draft economic analysis and draft environmental assessment for the proposed rule was published in the **Federal Register** on May 9, 2013 (78 FR 27171).

For more information on relative abundance and trends of extant populations of Neosho mucket and rabbitsfoot by river basin please refer to the *Taxonomy, Life History, and Distribution* section of the proposed rule published in the **Federal Register** on October 16, 2012 (77 FR 63440).

Critical Habitat

Background

Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features

(a) Essential to the conservation of the species, and

(b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Conservation, as defined under section 3 of the Act, means to use and the use of all methods and procedures that are necessary to bring an endangered or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the requirement that Federal agencies ensure, in consultation with the Service, that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of critical habitat. 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 allow the government or public to access private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by non-Federal landowners. Where a landowner requests Federal agency funding or authorization for an action that may affect a listed species or critical habitat, the consultation requirements of section 7(a)(2) of the Act 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.

Under the first prong of the Act's definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat designation if they contain physical or biological features (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific and commercial data available, those physical or biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat). In identifying those physical or biological features within an area, we focus on the principal biological or physical constituent elements (primary constituent elements such as roost sites, nesting grounds, seasonal wetlands, water quality, tide, soil type) that are essential to the conservation of the species. Primary constituent elements are those specific elements of the physical or biological features that provide for a species' life-history processes and are essential to the conservation of the species.

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. For example, an area currently occupied by the species but that was not occupied at the time of listing may be essential for the conservation of the species and may be included in the critical habitat designation. We designate critical habitat in areas outside the geographical area occupied by a species only when a designation limited to its range would be inadequate

to ensure the conservation of the species.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific and commercial data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the **Federal Register** on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106-554; H.R. 5658)), and our associated Information Quality Guidelines provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

When we are determining which areas should be designated as critical habitat, our primary source of information is generally the information developed during the listing process for the species. Additional information sources may include the recovery plan for the species, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, biological assessments, other unpublished materials, or experts' opinions or personal knowledge.

Habitat is dynamic, and species may move from one area to another over time. We recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be needed for recovery of the species. Areas that are important to the conservation of the species, both inside and outside the critical habitat designation, will continue to be subject to: (1) Conservation actions implemented under section 7(a)(1) of the Act, (2) regulatory protections afforded by the requirement in section 7(a)(2) of the Act for Federal agencies to insure their actions are not likely to jeopardize the continued existence of any endangered or threatened species, and (3) section 9 of the Act's prohibitions on taking any individual of the species, including taking caused by actions that affect habitat. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas

may still result in jeopardy findings in some cases. These protections and conservation tools will continue to contribute to recovery of this species. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning efforts if new information available at the time of these planning efforts calls for a different outcome.

Physical or Biological Features

In accordance with section 3(5)(A)(i) and 4(b)(1)(A) of the Act and regulations at 50 CFR 424.12, in determining which areas within the geographical area occupied by the species at the time of listing to designate as critical habitat, we consider the physical or biological features essential to the conservation of the species and which may require special management considerations or protection. These include, but are not limited to:

- (1) Space for individual and population growth and for normal behavior;
- (2) Food, water, air, light, minerals, or other nutritional or physiological requirements;
- (3) Cover or shelter;
- (4) Sites for breeding, reproduction, or rearing (or development) of offspring; and
- (5) Habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.

We derive the specific physical or biological features essential to Neosho mucket and rabbitsfoot from studies of these species' habitat, ecology, and life history as described in the Critical Habitat section of the proposed rule to designate critical habitat published in the **Federal Register** on October 16, 2012 (77 FR 63440), and in the information presented below. Additional information can be found in the final listing rule published in the **Federal Register** on September 17, 2013 (78 FR 57076). We have determined that Neosho mucket and rabbitsfoot require the following physical or biological features:

Space for Individual and Population Growth and for Normal Behavior

The Neosho mucket is historically associated with the Illinois, Neosho, and Verdigris Rivers and their larger tributaries (Arkansas River basin). Generally, the Neosho mucket is found embedded in stable substrates associated with shallow riffles (areas

where shallow, generally less than 1 m (3.3 ft) in depth, turbulent water passes through and over stones or gravel of somewhat similar size) and runs (intermediate areas between pools and riffles with moderate current) with gravel and sand substrate and moderate to swift currents (Oesch 1984, p. 221; Harris 1998, p. 5; Obermeyer 2000, pp. 15–16). However, in Shoal Creek and the Illinois River, the Neosho mucket prefers near-shore areas or areas out of the main current (Harris 1998, p. 5). These habitats are formed and maintained by water quantity, channel slope, and normal sediment input to the system.

The rabbitsfoot is historically associated with small- to medium-sized streams and some larger rivers in the Lower Great Lakes and Lower Mississippi River sub-basins and Ohio, Cumberland, Tennessee, White, Arkansas, and Red River basins. The rabbitsfoot usually occurs in shallow areas along the bank and adjacent runs and riffles with gravel and sand substrates where the water velocity is reduced, but it also may occur in deep runs (Parmalee and Bogan 1998, pp. 211–212). Unlike the Neosho mucket (Barnhart 2003, p. 17), the rabbitsfoot seldom burrows in the substrate, but lies on its side (Watters 1988, p. 13; Fobian 2007, p. 24).

Neosho mucket and rabbitsfoot, similar to other mussels, are dependent on areas with flow refuges where shear stress (the stream's ability to entrain and transport bed material created by the flow acting on the bed material) is low and sediments remain stable during flood events (Layzer and Madison 1995, p. 341; Strayer 1999, pp. 468 and 472; Hastie *et al.* 2001, pp. 111–114). Flow refuges conceivably allow relatively immobile mussels such as the Neosho mucket and rabbitsfoot to remain in the same general location throughout their entire lives. These patches of stable habitat may be highly important for the rabbitsfoot since it typically does not burrow, making it more susceptible to displacement into unsuitable habitat. However, flow refuges are not created equally and there are likely other habitat variables that are important, but poorly understood (Roberts 2008, pers. comm.).

Natural river and creek channel stability are achieved by allowing the river or creek to develop a stable dimension, pattern, and profile, such that, over time, channel features are maintained and the river or creek system neither aggrades nor degrades. Channel instability occurs when the scouring (flushing) process leads to degradation or excessive sediment deposition results in aggradation. Stable

river and creeks consistently transport their sediment load, both in size and type, associated with local deposition and scour (Rosgen 1996, pp. 1–3).

Habitat conditions described above provide space, cover, shelter, and sites for breeding, reproduction, and growth of offspring for the Neosho mucket and rabbitsfoot. These habitats are formed and maintained by water quantity, channel features (dimension, pattern, and profile), and sediment input to the system through periodic flooding, which maintains connectivity and interaction with the flood plain, and are dynamic. Changes in one or more of these parameters can result in channel degradation or aggradation, with serious effects to mussels. Therefore, we identify adequate water quantity, stream channel stability, and floodplain connectivity to be physical or biological features for Neosho mucket and rabbitsfoot that are essential in accommodating feeding, breeding, growth, and other normal behaviors of these species and in promoting gene flow within each species' populations and movement of their fish hosts.

Food, Water, Air, Light, Minerals, or Other Nutritional or Physiological Requirements

The Neosho mucket and rabbitsfoot are riverine-adapted species that depend upon adequate water flow and are not found in ponds or lakes. Continuously flowing water is a habitat feature associated with all surviving populations of these species. Flowing water maintains the river and creek bottoms and flow refuge habitats in riffles and runs where these species are found, transports food items to the sedentary juvenile and adult life stages, removes wastes, and provides oxygen for respiration of the Neosho mucket and rabbitsfoot. A natural flow regime that includes periodic flooding and maintains connectivity and interaction with the floodplain is critical for the exchange of nutrients, movement of and spawning activities for potential fish hosts, and maintenance of flow refuges in riffle and run habitats.

Mussels, such as the Neosho mucket and rabbitsfoot, filter algae, detritus, microscopic animals, and bacteria from the water column (Fuller 1974, p. 221; Silverman *et al.* 1997, pp. 1862–1865; Nichols and Garling 2000, pp. 874–876; Strayer *et al.* 2004 pp. 430–431). Encysted (attached) glochidia are nourished by their fish hosts and feed for a period of one week to several months. Nutrient uptake by glochidia is not well understood, but probably occurs through the microvillae (fingerlike outward projections of a

cell's surface) of the mantle (the part of the outer layer of skin (epidermis) of a mollusk that secretes the shell) (Watters 2007, p. 55). For the first several months, juvenile mussels partially employ pedal (foot) feeding, extracting bacteria, algae, and detritus from the sediment, although they also may filter interstitial (pore) water (Yeager *et al.* 1994, pp. 217–221). However, their gills are rudimentary and generally incapable of filtering particles (Watters 2007, p. 56). Adult mussels also can obtain their food by deposit feeding, siphoning in food from the sediment and its interstitial (pore) water and pedal feeding directly from the sediment (Yeager *et al.* 1994, pp. 217–221; Vaughn and Hakenkamp 2001, pp. 1432–1438). Food availability and quality for the Neosho mucket and rabbitsfoot in their habitats are affected by habitat stability, floodplain connectivity, flow, and water and sediment quality.

The ranges of many water quality parameters that define suitable habitat conditions for the Neosho mucket and rabbitsfoot have not been investigated or are poorly understood. The pathways of exposure to a variety of environmental pollutants for all four mussel life stages (free and encysted glochidia, juveniles, and adults) and differences in exposure and sensitivity were previously discussed in the proposed rule (77 FR 63440, see Factor A). Environmental contamination is a causal (contributing) factor in the decline of mussel populations. We estimate most numeric standards for pollutants and water quality parameters (for example, dissolved oxygen, pH, heavy metals) adopted by States under the CWA represent levels essential to the conservation of these mussels. However, some regulatory mechanisms may not adequately protect mollusks in some reaches (77 FR 63440, see Factor D). Other factors that can potentially alter water quality are droughts and periods of low flow, nonpoint-source runoff from adjacent land surfaces (excessive amounts of sediments, nutrients, and pesticides), point-source discharges from municipal and industrial wastewater treatment facilities (excessive amounts of ammonia, chlorine, and metals), and random spills or unregulated discharge events. This could be particularly harmful during drought conditions when flows are depressed and pollutants are more concentrated.

As relatively sedentary animals, mussels must tolerate the full range of environmental stressors that occur within the streams where they persist. Both the amount (flow) and the physical

and chemical conditions (sediment and water quality) where these species currently exist vary widely according to season, precipitation events, and seasonal human activities within the various watersheds. Conditions across their historical ranges vary even more due to geology, geography, and differences in human population densities and land uses. In general, these species survive in areas where the severity, frequency, duration, and seasonality of water flow is adequate to maintain stable flow refuges in riffle and run habitats (sufficient flow to remove fine particles and sediments without causing degradation), and where sediment and water quality is adequate for year-round survival (moderate to high levels of dissolved oxygen; low to moderate exposure to environmental pollutants such as nutrients, dissolved metals, and pharmaceuticals; and relatively unpolluted water and sediments). Adequate water flow, water quality, and sediment quality (as defined above) is essential for normal behavior, growth, and viability during all life stages of the Neosho mucket and rabbitsfoot and their potential larva fish hosts. Therefore, based on the information above, we identify water flow, water quality, and sediment quality to be physical or biological features for both these species.

Sites for Breeding, Reproduction, or Rearing

Mussels require a fish host for transformation of larval mussels (glochidia) to juvenile mussels (Williams *et al.* 2008, p. 68); therefore, presence of the appropriate fish host(s) is essential to the conservation of the Neosho mucket and rabbitsfoot (77 FR 63440, see *Taxonomy, Life History, and Distribution*). Neosho mucket and rabbitsfoot juveniles require stable habitats with adequate water quantity and quality as previously described for growth and survival. Excessive sediments or dense growth of filamentous algae can expose juvenile mussels to entrainment or predation and be detrimental to the survival of juvenile mussels (Hartfield and Hartfield 1996, pp. 372–374). Geomorphic instability can result in the loss of interstitial habitats and juvenile mussels due to scouring or deposition (Hartfield 1993, pp. 372–373). Water quality, sediment quality, stable habitat, health of fish hosts, and diet (of all life stages) all influence survival of each life stage and subsequent reproduction and recruitment (Cope *et al.* 2008, p. 452).

Connections between the rivers and adjacent flood plains occur periodically during wet years and provide habitat for

spawning and foraging fish hosts that require flood plain habitats for successful reproduction and recruitment to adulthood. Barko *et al.* (2006, pp. 252–256) found that several fish host or potential host species benefited from exploiting the resources of flood plain habitats that were not typically available for use during normal hydrology years. Furthermore, Kwak (1988, pp. 243–247) and Slipke *et al.* (2005, p. 289) indicated that periodic inundation of floodplain habitats increased successful fish reproduction, which leads to increased availability of native host fishes for mussel reproduction. However, Rypel *et al.* (2009, p. 502) indicated that mussels tended to exhibit minimal growth during high flow years. Therefore, optimal flooding of these habitats would not be too frequent and should occur at similar frequencies to that of the natural hydrologic regime of the rivers and creeks inhabited by the Neosho mucket and rabbitsfoot. Based on the information above, we identify water quality, sediment quality, stable habitat, health of fish hosts, diet (of all life stages), and periodic flooding of floodplain habitat to be physical or biological features for these species.

Primary Constituent Elements for Neosho Mucket and Rabbitsfoot

Under the Act and its implementing regulations, we are required to identify the physical or biological features essential to the conservation of Neosho mucket and rabbitsfoot in areas occupied at the time of listing, focusing on the features' primary constituent elements. Primary constituent elements are those specific elements of the physical or biological features that provide for a species' life-history processes and are essential to the conservation of the species.

Based on the above needs and our current knowledge of the physical or biological features and habitat characteristics required to sustain the species' life-history processes, we determine that the primary constituent elements specific to the Neosho mucket and rabbitsfoot are:

(1) Geomorphically stable river channels and banks (channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation) with habitats that support a diversity of freshwater mussel and native fish (such as stable riffles, sometimes with runs, and mid-channel island habitats that provide flow refuges consisting of gravel and sand substrates with low to moderate amounts of fine sediment and attached filamentous algae).

(2) A hydrologic flow regime (the severity, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats where the species are found and to maintain connectivity of rivers with the floodplain, allowing the exchange of nutrients and sediment for maintenance of the mussel's and fish host's habitat, food availability, spawning habitat for native fishes, and the ability for newly transformed juveniles to settle and become established in their habitats.

(3) Water and sediment quality (including, but not limited to, conductivity, hardness, turbidity, temperature, pH, ammonia, heavy metals, and chemical constituents) necessary to sustain natural physiological processes for normal behavior, growth, and viability of all life stages.

(4) The occurrence of natural fish assemblages, reflected by fish species richness, relative abundance, and community composition, for each inhabited river or creek that will serve as an indication of appropriate presence and abundance of fish hosts necessary for recruitment of the Neosho mucket and rabbitsfoot. Suitable fish hosts for Neosho mucket glochidia include smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), and spotted bass (*Micropterus punctulatus*). Suitable fish host for rabbitsfoot may include, but are not limited to, blacktail shiner (*Cyprinella venusta*) from the Black and Little River and cardinal shiner (*Luxilus cardinalis*), red shiner (*C. lutrensis*), spotfin shiner (*C. spiloptera*), bluntface shiner (*C. camura*), rainbow darter (*Etheostoma caeruleum*), rosyface shiner (*Notropis rubellus*), striped shiner (*L. chrysocephalus*), and emerald shiner (*N. atherinoides*).

(5) Competitive or predaceous invasive (nonnative) species in quantities low enough to have minimal effect on survival of freshwater mussels.

Special Management Considerations or Protection

When designating critical habitat, we assess whether the specific areas within the geographic area occupied by the species at the time of listing contain features which are essential to the conservation of the species and which may require special management considerations or protection.

For Neosho mucket and rabbitsfoot, we have grouped the primary threats affecting their habitat, thus potentially the need to implement special management or protection, into nine categories.

(1) Impoundments (primary constituent elements 1–4). Dams eliminate and alter river flow within impounded areas, trap silt leading to increased sediment deposition, alter water quality, change hydrology and channel geomorphology, decrease habitat heterogeneity, affect normal flood patterns, and block upstream and downstream movement of mussels and fish (Layzer *et al.* 1993, pp. 68–69; Neves *et al.* 1997, pp. 63–64; Watters 2000, pp. 261–264). Within impounded waters, decline of mussels has been attributed to direct loss of supporting habitat, sedimentation, decreased dissolved oxygen, temperature levels, and alteration in resident fish populations (Neves *et al.* 1997, pp. 63–64; Pringle *et al.* 2000, pp. 810–815; Watters 2000, pp. 261–264). Downstream of dams, mussel declines are associated with changes and fluctuation in flow regime, channel scouring and bank erosion, reduced dissolved oxygen levels and water temperatures, and changes in resident fish assemblages (Williams *et al.* 1992, p. 7; Layzer *et al.* 1993, p. 69; Neves *et al.* 1997, pp. 63–64; Watters 2000, pp. 265–266; Pringle *et al.* 2000, pp. 810–815). Dams that are low to the water surface, or have water passing over them (small low head or mill dams) can have some of these same effects on mussels and their fish hosts, particularly reducing species richness and evenness and blocking fish host movements (Watters 2000, pp. 261–264; Dean *et al.* 2002, pp. 235–238). Examples of special management actions that would minimize or ameliorate these threats include: (a) Modified reservoir releases from dams to improve water quality and habitat conditions in many tailwaters, and (b) modified dam operations (for example, TVA's Tims Ford Dam on the Elk River, where water temperature is monitored and dam operation is adjusted to support endangered mussels downstream) and water quality and biological monitoring.

(2) Channelization (primary constituent elements 1–4). Dredging and channelization activities have profoundly altered riverine habitats nationwide. Hartfield (1993, pp. 131–139), Neves *et al.* (1997, pp. 71–72), and Watters (2000, pp. 268–269) reviewed the specific upstream and downstream effects of channelization on freshwater mussels. Channelization affects a stream physically (accelerates erosion, increases sediment bed load, reduces water depth, decreases habitat diversity, creates geomorphic (natural channel dimensions) instability, and eliminates riparian canopy) and biologically

(decreases fish and mussel diversity, changes species composition and abundance, decreases biomass, and reduces growth rates) (Hartfield 1993, pp. 131–139). Channel modification for navigation has been shown to increase flood heights (Belt 1975, p. 684), partly as a result of an increase in stream bed slope (Hubbard *et al.* 1993, p. 137). Flood events are exacerbated, conveying large quantities of sediment, potentially with adsorbed contaminants, into streams. Channel maintenance often results in increased turbidity and sedimentation that often smothers mussels (Stansbery 1970, p. 10). Examples of special management actions that would minimize or ameliorate these threats include: (a) Determining distribution and abundance of mussels, (b) developing dredging protocols and mussel identification booklets to help minimize effects (for example, ACOE–Memphis District in the White River avoids dredging known mussel beds), and (c) funding research on geomorphological requirements of mussels to better inform management decisions.

(3) Sedimentation (primary constituent elements 3–4). Excessive sediments are believed to negatively impact riverine mussel populations requiring clean, stable streams (Ellis 1936, pp. 39–40; Brim-Box and Mossa 1999, p. 99). Adverse effects resulting from sediments have been noted for many components of aquatic communities. Potential sediment sources within a watershed include virtually all activities that disturb the land surface. Most localities occupied by the Neosho mucket and rabbitsfoot, including viable populations, are currently being affected to varying degrees by sedimentation. Specific biological effects include reduced feeding and respiratory efficiency from clogged gills, disrupted metabolic processes, reduced growth rates, limited burrowing activity, physical smothering, and disrupted host fish attraction mechanisms (Ellis 1936, pp. 39–40; Marking and Bills 1979, p. 210; Vannote and Minshall 1982, pp. 4105–4106; Waters 1995, pp. 173–175; Hartfield and Hartfield 1996, p. 373). Examples of special management actions that would minimize or ameliorate these threats include: (a) Restoration and protection of riparian corridors, (b) implementation of best management practices to minimize erosion (such as State and industry practices for forestry activities), (c) stream bank restoration projects, and (d) private landowner programs to promote watershed and soil conservation.

(4) Chemical Contaminants (primary constituent elements 3–4). Chemical contaminants are ubiquitous in the environment and are considered a major contributor to the decline of mussel species (Richter *et al.* 1997, p. 1081; Strayer *et al.* 2004, p. 436; Wang *et al.* 2007, p. 2029; Cope *et al.* 2008, p. 451). Chemicals enter the environment through point- and nonpoint-source discharges including spills, industrial and municipal effluents, and residential and agricultural runoff. These sources contribute organic compounds, heavy metals, nutrients, pesticides, and a wide variety of newly emerging contaminants such as pharmaceuticals to the aquatic environment. As a result, water and sediment quality can be degraded to the extent that results in adverse effects to mussel populations. Examples of special management actions that would minimize or ameliorate these threats include: (a) Revising water quality standards (such as EPA's new ammonia aquatic life criteria), (b) implementing storm water best management practices, (c) promoting green areas along riparian corridors in rapidly developing urban areas (such as the Illinois River), (d) upgrading industrial and municipal treatment facilities to improve water quality in effluents, and (e) participating in private landowner programs to promote watershed conservation (such as USDA Farm Bill programs).

(5) Mining (primary constituent elements 1–4). Gravel, coal, and metal mining are activities negatively affecting water quality in Neosho mucket and rabbitsfoot habitat. Instream and alluvial gravel mining has been implicated in the destruction of mussel populations (Hartfield 1993, pp. 136–138; Brim-Box and Mossa 1999, pp. 103–104). Negative effects associated with gravel mining include stream channel modifications (altered habitat, disrupted flow patterns, sediment transport), water quality modifications (increased turbidity, reduced light penetration, increased temperature), macroinvertebrate population changes (elimination), and changes in fish populations, resulting from adverse effects to spawning and nursery habitat and food web disruptions (Kanehl and Lyons 1992, pp. 4–10). Coal mining activities, resulting in heavy metal-rich drainage, and associated sedimentation has adversely affected many drainages with rabbitsfoot populations (Ortmann 1909 *in* Butler 2005, p. 102; Gordon 1991, pp. 4 and 5; Layzer and Anderson 1992 *in* Butler 2005, p. 102). Numerous mussel toxicants, such as polycyclic aromatic hydrocarbons and heavy metals (copper, manganese, and zinc) from coal mining,

contaminate sediments when released into streams (Ahlstedt and Tuberville 1997, p. 75). Acid mine runoff may have local effects on mussel recruitment and may lead to mortality due to improper shell development or erosion (Huebner and Pynnonen 1990, pp. 2350–2353). Examples of special management actions that would minimize or ameliorate these threats include: (a) Remediating soils contaminated with heavy metals (such as Tri-State Mining Area's reclamation of contaminated areas to improve water quality), and (b) partnering with industry to identify mussel locations to avoid during instream and alluvial sand and gravel mining operations.

(6) Oil and Natural Gas Development (primary constituent elements 1–4). Exploration and extraction of these energy resources can result in increased siltation, a changed hydrograph (graph showing changes in the discharge of a river over a period of time), and altered water quantity and quality even at considerable distances from the mine or well field because effects are carried downstream from the original source. Examples of special management actions that would minimize or ameliorate these threats include: (a) Developing and implementing best management practices for oil and natural gas development activities (such as Fayetteville Shale located in the upper Little Red River watershed), (b) partnering with industry and nongovernmental organizations to restore mussel habitat (such as Southwestern Energy's ECH₂O (Energy Conserving Water) and the Archey Fork Little Red River Restoration Project), (c) creating conservation memoranda of agreement with industry to conserve mussel habitat (such as Crestwood Midstream in the upper Little Red River watershed), and (d) developing ecologically sustainable flow requirements for mussels.

(7) Invasive, nonindigenous species (primary constituent element 5). Invasive, nonindigenous species, such as zebra mussel, black carp, and Asian clam, have potentially adversely affected populations of the Neosho mucket and rabbitsfoot and their fish hosts, and these effects are expected to persist into the future. Examples of special management actions that would minimize or ameliorate these threats include: (a) Implementation of nonregulatory conservation measures to control Asian carp and other invasive, nonindigenous species, and (b) continued State engagement in efforts to minimize effects of Asian carp (such as eradication) on native fish resources.

(8) Temperature (primary constituent elements 3–4). Natural temperature regimes can be altered by impoundments, tailwater releases from dams, industrial and municipal effluents, and changes in riparian habitat. Low temperatures can significantly delay or prevent metamorphosis in mussels (Watters and O'Dee 1999, pp. 454–455). Cold water effluent below dams may negatively impact populations; rabbitsfoot were less abundant and in poor condition below a cold water outflow on the Little River, compared to two other sites upstream (Galbraith and Vaughn 2011, p. 198). Low water temperatures caused by dam releases also may disrupt seasonal patterns in reproduction (Galbraith and Vaughn 2009, pp. 43–44).

High temperatures can reduce dissolved oxygen concentrations in the water, which slows growth, reduces glycogen stores, impairs respiration, and may inhibit reproduction (Fuller 1974, pp. 240–241). Water temperature increases have been documented to shorten the period of glochidial encystment, reduce righting speed (various reflexes that tend to bring the body into normal position in space and resist forces acting to displace it out of normal position), and slow burrowing and movement responses (Bartsch *et al.* 2000, p. 237; Watters *et al.* 2001, p. 546; Schwalb and Pusch 2007, pp. 264–265). Several studies have documented the influence of temperature on the timing aspects of mussel reproduction (van Snik *et al.* 2002, p. 156; Allen *et al.* 2007, p. 85; Steingraeber *et al.* 2007, pp. 303–309). Peak glochidial releases are associated with water temperature thresholds that can be thermal minimums or maximums, depending on the species (Watters and O'Dee 2000, p. 136). Examples of special management actions that would minimize or ameliorate these threats include: (a) Increase cold water temperature to optimal range for mussels by modification to tailwater releases, (b) improve industrial and municipal water treatment, and (c) protect and restore riparian habitat.

(9) Climate change (primary constituent elements 2–4). As temperature increases due to climate change throughout the range of Neosho mucket and rabbitsfoot, both species may experience population declines as warmer rivers become more suitable for thermally tolerant species. Overall, the distribution of fish species is expected to change, including range shifts and local extirpations (Ficke *et al.* 2005, pp. 67–69; 2007, pp. 603–605). Because freshwater mussels are entirely dependent upon a fish host for

successful reproduction and dispersal, any changes in local fish populations would also affect freshwater mussel populations. Examples of special management actions that would minimize or ameliorate these threats include: (a) Reduce habitat fragmentation; (b) maintain ecosystem function and resiliency; (c) develop and implement strategies to help our native fish, wildlife, and habitats adapt to a changing climate; and (d) reduce non-climate stressors.

The reduction of these threats will require the implementation of special management considerations or protections within each of the critical habitat areas identified in this rule. All critical habitat requires active management to address some or all of the ongoing threats listed. Some of these activities include, but are not limited to, those previously discussed in the Summary of Factors Affecting the Species section in the final listing rule (78 FR 57076, September 17, 2013).

In summary, we find the areas we are designating as critical habitat were occupied at the time of listing and contain the features essential to the conservation of the Neosho mucket and rabbitsfoot, and these features may require special management considerations or protection. Special management considerations or protection may be required to eliminate, or to reduce to negligible levels, the threats affecting each unit and to preserve and maintain the essential physical or biological features the critical habitat units provide to the Neosho mucket and rabbitsfoot. A more detailed discussion of these threats is presented in the final listing rule under Summary of Factors Affecting the Species (78 FR 57076, September 17, 2013). Additional discussions of threats facing individual sites are provided in the individual unit descriptions.

Criteria Used To Identify Critical Habitat

As required by section 4(b)(2) of the Act, we use the best scientific data available to designate critical habitat. In accordance with the Act and our implementing regulations at 50 CFR 424.12(b), we review available information pertaining to the habitat requirements of the species and identify occupied areas at the time of listing that contain the features essential to the conservation of the species. As discussed above, we are designating critical habitat areas that we have determined to be occupied at the time of listing in 2013 and that contain sufficient elements of physical or biological features to support life-

history processes essential to the conservation of the Neosho mucket and the rabbitsfoot. If after identifying areas occupied by the species at the time of listing, we determine that those areas are inadequate to ensure conservation of the species, in accordance with the Act and our implementing regulations at 50 CFR 424.12(e), we then consider whether designating additional areas—outside those occupied at the time of listing—are essential for the conservation of the species. In this rule, we are not designating any areas outside the geographic area occupied by the species at the time of listing because occupied areas are sufficient for the conservation of the species.

In this rule, we have defined occupied habitat for the Neosho mucket as those stream reaches known to be currently extant. Extant Neosho mucket populations are naturally occurring populations represented by live or fresh dead specimens collected since 1985. For the rabbitsfoot, we have defined occupied habitat as those stream reaches that are sizeable and small populations as defined by Butler (2005, pp. 88–89), and the marginal populations of Fish Creek and Red River that are the last extant populations in their respective basins (Great Lakes and Cumberland) and Allegheny River, a metapopulation (interconnected populations where there is gene flow). All other populations classified as marginal are not considered as occupied habitat.

No unoccupied stream, as defined in the proposed critical habitat rule (77 FR 63440, October 16, 2012), is being designated as critical habitat for Neosho mucket or rabbitsfoot. We find that unoccupied stream reaches are not essential for the conservation of either species for one or more of the following reasons:

(1) Unoccupied habitats are isolated from occupied habitats due to reservoir construction and dam operations (dam water releases have altered natural stream hydrology, geomorphology, water temperature, and native mollusk and fish communities);

(2) Unoccupied areas exhibit limited habitat availability, degraded habitat, or low potential value for management (Muskingum, Elk, Scioto, Little Miami, Licking, East Fork White, Cumberland, Holston, Clinch, Sequatchie, and Buffalo (Duck River system) Rivers);

(3) Collection records for both species indicate that these species have been extirpated from unoccupied areas for several decades or more and, in some cases (such as Cottonwood River), reintroduction efforts have not been successful at re-establishing populations; or

(4) There are no historical records of occurrence within the stream reach for Neosho mucket, rabbitsfoot, or both.

(5) While we recognize the importance of unoccupied habitat to recovery of listed species, in this case, unoccupied habitat does not provide habitat for reintroduction at this time and does not reduce the level of stochastic and human-induced threats for the following reasons:

(a) Unoccupied habitat does not currently contain sufficient physical or biological features or have the ability to be restored to support life-history functions of the Neosho mucket and rabbitsfoot (such characteristics as geomorphically stable channels, perennial water flows, adequate water quality, and appropriate benthic substrates);

(b) Unoccupied habitat does not support the once diverse mollusk communities, including the presence of closely related species requiring physical or biological features similar to the Neosho mucket and rabbitsfoot; or

(c) Unoccupied habitat is not adjacent to currently occupied areas where there is potential for natural dispersal and reoccupation by the Neosho mucket and rabbitsfoot.

Based on the above analysis, a total of 38 units, all of which were occupied at the time of listing, are being designated based on sufficient elements of physical or biological features being present to support Neosho mucket (7 units) and rabbitsfoot (31 units) life-history processes. Some units contain all of the identified elements of physical or biological features and support multiple life-history processes. Some units contain only some elements of the physical or biological features necessary to support the Neosho mucket's or rabbitsfoot's particular use of that habitat.

When determining critical habitat boundaries within this final rule, we made every effort to avoid including developed areas such as dams, piers, and bridges, and other structures because such areas usually lack physical or biological features for the species. Areas designated as critical habitat for the Neosho mucket and rabbitsfoot include only stream channels within the ordinary high-water line and do not contain manmade structures (such as dams, piers and docks, bridges, or other similar structures), or areas inundated by lakes and reservoirs. The ordinary high-water line defines the stream channel and is the point on the stream bank where water is continuous and leaves some evidence, such as erosion or aquatic vegetation. The scale of the maps we prepared under the parameters for publication within the Code of

Federal Regulations may not reflect the exclusion of structures or other developed areas. Any such areas inadvertently left inside critical habitat boundaries shown on the maps of this final rule have been excluded by text in the final rule and are not designated as critical habitat. Therefore, a Federal action involving these areas would not trigger section 7 consultation with respect to critical habitat and the requirement of no adverse modification unless the specific action would affect the physical or biological features in the adjacent critical habitat.

The critical habitat designation is defined by the map or maps, as modified by any accompanying regulatory text, presented at the end of this document in the rule portion. We include more detailed information on the boundaries of the critical habitat designation in the preamble of this document. We will make the coordinates, plot points, or both on which each map is based available to the public on <http://www.regulations.gov> at Docket No. FWS–R4–ES–2013–0007 on our Internet site <http://www.fws.gov/arkansas-es/>, and at the field office responsible for the designation (see **FOR FURTHER INFORMATION CONTACT**, above).

Three critical habitat units for the Neosho mucket and rabbitsfoot are currently designated as critical habitat for the oyster mussel (*Epioblasma capsaeformis*; now recognized by the scientific community as the Duck River dartersnapper (*Epioblasma ahlstedti*) in the Duck River) and Cumberlandian combshell (*Epioblasma brevidens*) encompassing the Duck River, Tennessee (74 rkm (46 rmi)) and Bear Creek, Alabama and Mississippi (40 rkm (25 rmi)) (50 CFR 17.95(f)), and for the yellowcheek darter (*Etheostoma moorei*) in the Middle Fork Little Red River, Arkansas (23.2 rkm (14.5 rmi)) (50 CFR 17.95(e)). The existing critical habitat for the oyster mussel and Cumberlandian combshell completely overlaps the originally proposed Unit RF16 (Bear Creek, now Unit RF15), but the exact unit descriptions (length) differ due to mapping refinement since the earlier designation. In addition, five critical habitat units being designated for the Neosho mucket and rabbitsfoot are currently designated by the State of Kansas as critical habitat for both species in the Fall, Spring, Neosho, and Verdigris Rivers and for Neosho mucket in Shoal Creek (K.S.A. 32–959; Table 1) and are afforded similar State-level protections as those provided under the Act.

Final Critical Habitat Designation

TABLE 1—CRITICAL HABITAT AREAS FOR THE NEOSHO MUCKET AND RABBITSFOOT THAT ARE CURRENTLY DESIGNATED AS CRITICAL HABITAT FOR OTHER FEDERALLY AND STATE LISTED SPECIES

Unit (unit #)	Species present in unit	Federal reference	State reference	Length of overlap in rkm (rmi)
Shoal Creek (NM3)	Neosho mucket, fluted shell, Ouachita kidneyshell, Western fanshell, redspot chub.		K.S.A. 32–959	9.7 (6.0)
Spring River (NM4 and RF1)	Neosho mucket, rabbitsfoot, elktoe, ellipse shell, Neosho madtom, fluted shell, Ouachita kidneyshell, Western fanshell, redspot chub.		K.S.A. 32–959	11.6 (7.2)
Fall River (NM6)	Neosho mucket, Western fanshell		K.S.A. 32–959	90.4 (56.2)
Verdigris River (NM6 and RF2)	Neosho mucket, rabbitsfoot, Ouachita kidneyshell, western fanshell, butterfly.		K.S.A. 32–959	80.6 (50.1)
Neosho River (NM7 and RF3)	Neosho mucket, rabbitsfoot, butterfly, Neosho madtom, Ouachita kidneyshell, western fanshell.		K.S.A. 32–959	245.9 (152.8)
Middle Fork Little Red River (RF7)	Yellowcheek darter	50 CFR 17.95(e)		23.3 (14.5)
Bear Creek (RF15)	Oyster mussel (Duck River dartersnapper), Cumberlandian combshell.	50 CFR 17.95(f)		49.7 (30.9)
Duck River (RF18)	Oyster mussel (Duck River dartersnapper), Cumberlandian combshell.	50 CFR 17.95(f)		74.0 (46.0)
Total				585.2 (363.7)

We are designating seven units, totaling approximately 777 rkm (483 rmi), in four States (Arkansas, Kansas, Missouri, and Oklahoma) as critical habitat for the Neosho mucket (Table 2). We are designating 31 units (3 with subunits), totaling approximately 2,312 rkm (1,437 rmi), in 12 States (Alabama, Arkansas, Illinois, Indiana, Kansas, Kentucky, Mississippi, Missouri, Ohio, Oklahoma, Pennsylvania, and Tennessee) as critical habitat for the rabbitsfoot (Table 2). Four of the 31 units (Units NM4, NM7, RF1, and RF3) are occupied by both Neosho mucket and rabbitsfoot.

Public lands adjacent to Neosho mucket and rabbitsfoot critical habitat units consist of approximately 469 rkm (291 rmi) of riparian lands in the following units:

- Unit NM1: Ozark National Forest, 20.4 rkm (12.7 rmi); ACOE’s Lake Tenkiller Project, 9.0 rkm (5.6 rmi); and Sparrowhawk Wildlife Management Area (WMA), 2.2 rkm (1.4 rmi);
- Units NM4 and RF1: Spring River Wildlife Area, 1.4 rkm (0.9 rmi);
- Unit RF2: ACOE’s Oologah Lake Project, 0.6 rkm (0.4 rmi);

- Unit NM7: Neosho Wildlife Area, 6.1 rkm (3.8 rmi);
- Unit RF6: Little River NWR, 37.6 rkm (23.5 rmi); Ouachita National Forest, 16.1 rkm (10.0 rmi); and Pond Creek NWR, 11.4 rkm (7.2 rmi);
- Unit RF8a: Jacksonport State Park, 2.9 rkm (1.8 rmi) and Henry Gray–Hurricane Lake WMA, 7.9 rkm (4.9 rmi);
- Unit RF8b: White River NWR, 57.9 rkm (36.0 rmi);
- Unit RF10: Harold Alexander WMA, 1.1 rkm (0.7 rmi);
- Unit RF12: Buffalo National River, 113.6 rkm (70.6 rmi);
- Unit RF13: Sam A. Baker State Park, 1.0 rkm (0.6 rmi) and ACOE’s Wappapello Lake Project, 25.3 rkm (15.7 rmi);
- Unit RF15: Tishomingo State Park, 6.1 rkm (3.8 rmi); NPS Natchez Trace Parkway, 4.5 rkm (2.8 rmi); and TVA Pickwick Lake Project, 7.4 rkm (4.6 rmi);
- Unit RF17: Fern Cave NWR, 0.5 rkm (0.3 rmi);
- Unit RF18: Yanahli WMA, 38.9 rkm (24.3 rmi) and Santa Fe County Park, 1.4 rkm (0.9 rmi);
- Unit RF19a: Shiloh National Military Park, 2.6 rkm (1.6 rmi);
- Unit RF19b: Kentucky Dam Village State Resort Park, 0.6 rkm (0.4 rmi) and

unnamed TVA land downstream of Kentucky Lake Dam, 2.4 rkm (1.5 rmi);

- Unit RF20: Massac Forest Nature Preserve, 2.2 rkm (1.4 rmi); West Kentucky WMA, 5.6 rkm (3.5 rmi); Ballard WMA, 2.6 rkm (1.6 rmi); and Chestnut Hills Nature Preserve, 2.4 rkm (1.5 rmi);
- Unit RF21: Mammoth Cave National Park, 17.0 rkm (10.6 rmi);
- Unit RF22: Pennsylvania State Game Land, 277, 2.9 rkm (1.8 rmi) and Pennsylvania State Game Land 85, 0.6 rkm (0.4 rmi);
- Unit RF23: Clear Creek State Forest, 9.9 rkm (6.2 rmi);
- Unit RF24: Erie NWR, 16.2 rkm (10.1 rmi);
- Unit RF25: Prophetstown State Park, 2.1 rkm (1.3 rmi);
- Unit RF26: Muskingum Watershed Conservancy Land, 5.0 rkm (3.1 rmi);
- Unit RF27: Little Darby State Scenic Waterway–River Lands, 8.7 rkm (5.4 rmi);
- Unit RF29: Fish Creek Wildlife Area, 1.6 rkm (1.0 rmi); and
- Unit RF31: ACOE’s Shenango River Lake Project, 8.8 rkm (5.5 rmi).

TABLE 2—APPROXIMATE RIVER DISTANCES CURRENTLY OCCUPIED BY NEOSHO MUCKET AND RABBITSFOOT

Species	Approximate river distances currently occupied by the species	
	River km	River miles
Neosho mucket	776.5	482.5
Rabbitsfoot	2,312.1	1,436.7
Total	3,088.6	1,919.2
Species, Stream (Unit), and State	Currently occupied	
Neosho mucket:		
Unit NM1, Illinois River AR, OK	146.1	90.8
Unit NM2, Elk River, MO, OK	20.3	12.6
Unit NM3, Shoal Creek, KS, MO	75.8	47.1
Unit NM4, Spring River, KS, MO	102.3	63.6
Unit NM5, North Fork Spring River, MO	16.4	10.2
Unit NM6, Fall and Verdigris Rivers, KS	171.1	106.3
Unit NM7, Neosho River, KS	244.5	151.9
Total	776.5	482.5
Rabbitsfoot:		
Unit RF1, Spring River, MO, KS	56.5	35.1
Unit RF2, Verdigris River, OK	38.0	23.6
Unit RF3, Neosho River, KS	26.6	16.5
Unit RF4a, Ouachita River, AR	22.7	14.1
Unit RF4b, Ouachita River, AR	43.0	26.7
Unit RF5, Saline River, AR	119.4	74.2
Unit RF6, Little River, OK, AR	139.7	86.8
Unit RF7, Middle Fork Little Red River, AR	24.8	15.4
Unit RF8a, White River, AR	188.3	117.0
Unit RF8b, White River, AR	68.9	42.8
Unit RF9, Black River, AR	51.2	31.8
Unit RF10, Spring River, AR	51.5	32.0
Unit RF11, Strawberry River, AR	123.8	76.9
Unit RF12, Buffalo River, AR	113.6	70.6
Unit RF13, St. Francis River, MO	64.3	40.0
Unit RF14, Big Sunflower River, MS	51.5	32.0
Unit RF15, Bear Creek, AL, MS	49.7	30.9
Unit RF16, Big Black River, MS	43.3	26.9
Unit RF17, Paint Rock River, AL	81.0	50.3
Unit RF18, Duck River, TN	235.3	146.2
Unit RF19a, Tennessee River, TN	26.7	16.6
Unit RF19b, Tennessee River, KY	35.6	22.1
Unit RF20, Ohio River, KY, IL	45.9	28.5
Unit RF21, Green River, KY	175.6	109.1
Unit RF22, French Creek, PA	120.4	74.8
Unit RF23, Allegheny River, PA	57.3	35.6
Unit RF24, Muddy Creek, PA	20.1	12.5
Unit RF25, Tippecanoe River, IN	75.6	47.0
Unit RF26, Walhonding River, OH	17.5	10.9
Unit RF27, Little Darby Creek, OH	33.3	20.7
Unit RF28, North Fork Vermilion River and Middle Branch North Fork Vermilion River, IL	28.5	17.7
Unit RF29, Fish Creek, OH	7.7	4.8
Unit RF30, Red River, KY, TN	50.2	31.2
Unit RF31, Shenango River, PA	24.8	15.4
Total	2,312.1	1,436.7

These critical habitat units include the river channels within the ordinary high-water line. As defined at 33 CFR 329.11, the ordinary high-water mark on nontidal rivers is the line on the shore established by the fluctuations of water and indicated by physical characteristics, such as a clear, natural line impressed on the bank; shelving; changes in the character of soil;

destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas. States were granted ownership of lands beneath navigable waters up to the ordinary high-water line upon achieving Statehood (*Pollard v. Hagan*, 44 U.S. (3 How.) 212 (1845)). Prior to Statehood, the American colonies may have made

grants to private parties that included lands below the ordinary high-water mark of some navigable waters that are included in this final rule. However, most, if not all, lands beneath the navigable waters included in this final rule are owned by the States. Although areas designated as critical habitat for the Neosho mucket and rabbitsfoot include only stream channels within the

ordinary high-water line, riparian lands along the waters adjacent to, but not included in, the critical habitat units are either in private ownership, or owned by municipalities, States, or Federal entities. Table 3 summarizes primary adjacent riparian landowners in each of

the Neosho mucket and rabbitsfoot critical habitat units by private, State, Tribal (jurisdictional, not ownership), or Federal ownership. One Neosho mucket and two rabbitsfoot critical habitat units, respectively, are located within Tribal jurisdictional areas: Unit NM1

(Illinois River, Oklahoma; 103.0 rkm (64.0 rmi)), Unit RF2 (Verdigris River, Oklahoma; 38.0 rkm (23.6 rmi)), and Unit RF6 (Little River, Oklahoma; 41.4 rkm (25.7 rmi)).

TABLE 3—OWNERSHIP OF RIPARIAN LANDS ADJACENT TO—BUT NOT INCLUDED IN—THE CRITICAL HABITAT UNITS FOR NEOSHO MUCKET AND RABBITSFOOT

Critical habitat units	Adjacent federal rkm (rmi)	Adjacent state & local government rkm (rmi)	Adjacent private rkm (rmi)	Adjacent tribal* (subset of Private) rkm (rmi)
Neosho Mucket				
Unit NM1: Illinois River	29.4 (18.3)	2.3 (1.4)	114.4 (71.1)	103.0 (64.0)
Unit NM2: Elk River	0	0	20.3 (12.6)	0
Unit NM3: Shoal Creek	0	0	75.8 (47.1)	0
Unit NM4: Spring River	0	1.4 (0.9)	100.9 (62.7)	0
Unit NM5: North Fork Spring River	0	0	16.4 (10.2)	0
Unit NM6: Fall and Verdigris Rivers	0	0	171.1 (106.3)	0
Unit NM7: Neosho River	0	6.1 (3.8)	238.3 (148.1)	0
Total	29.4 (18.3)	9.8 (6.1)	737.3 (458.1)	103.0 (64.0)
Rabbitsfoot				
Unit RF1: Spring River	0	1.4 (0.9)	55.0 (34.2)	0
Unit RF2: Verdigris River	0.6 (0.4)	0	37.3 (23.2)	37.3 (23.2)
Unit RF3: Neosho River	0	0	26.6 (16.5)	0
Unit RF4a: Ouachita River	0	0	22.7 (14.1)	0
Unit RF4b: Ouachita River	0	0	43.0 (26.7)	0
Unit RF5: Saline River	0	0	119.4 (74.2)	0
Unit RF6: Little River	63.9 (39.7)	0	75.8 (47.1)	41.4 (25.7)
Unit RF7: Middle Fork Little Red River	0	0	24.8 (15.4)	0
Unit RF8a: White River	0	10.8 (6.7)	177.5 (110.3)	0
Unit RF8b: White River	57.9 (36.0)	0	10.9 (6.8)	0
Unit RF9: Black River	0	0	51.2 (31.8)	0
Unit RF10: Spring River	0	1.1 (0.7)	50.4 (31.3)	0
Unit RF11: Strawberry River	0	0	123.8 (76.9)	0
Unit RF12: Buffalo River	113.6 (70.6)	0	0	0
Unit RF13: St. Francis River	25.2 (15.7)	1.0 (0.6)	38.1 (23.7)	0
Unit RF14: Big Sunflower River	0	0	51.5 (32.0)	0
Unit RF15: Bear Creek	11.9 (7.4)	6.1 (3.8)	31.7 (19.7)	0
Unit RF16: Big Black River	0	0	43.3 (26.9)	0
Unit RF17: Paint Rock River	0.5 (0.3)	0	80.5 (50.0)	0
Unit RF18: Duck River	0	40.5 (25.2)	194.7 (121.0)	0
Unit RF19a: Tennessee River	2.6 (1.6)	0	24.1 (15.0)	0
Unit RF19b: Tennessee River	2.4 (1.5)	0.6 (0.4)	32.5 (20.2)	0
Unit RF20: Ohio River	0	12.9 (8.0)	33.0 (20.5)	0
Unit RF21: Green River	17.0 (10.6)	0	158.5 (98.5)	0
Unit RF22: French Creek	0	3.5 (2.2)	116.8 (72.6)	0
Unit RF23: Allegheny River	0	10.0 (6.2)	47.3 (29.4)	0
Unit RF24: Muddy Creek	16.3 (10.1)	0	3.9 (2.4)	0
Unit RF25: Tippecanoe River	0	2.1 (1.3)	73.5 (45.7)	0
Unit RF26: Walhonding River	0	5.0 (3.1)	12.6 (7.8)	0
Unit RF27: Little Darby Creek	0	8.7 (5.4)	24.6 (15.3)	0
Unit RF28: North Fork Vermilion River and Middle Branch North Fork Vermilion River	0	0	28.5 (17.7)	0
Unit RF29: Fish Creek	0	1.6 (1.0)	6.1 (3.8)	0
Unit RF30: Red River	0	0	50.2 (31.2)	0
Unit RF31: Shenango River	8.8 (5.5)	0	15.9 (9.9)	0
Total	320.7 (199.4)	105.3 (65.5)	1,885.8	82.7 (48.9)
Total for both species	350.1 (217.7)	115.1 (71.6)	(1,171.8) 2,623.1 (1,629.9)	185.7 (112.9)

Note: Distances may not sum due to rounding.

* Tribal Jurisdictional Area only, does not represent riparian land ownership by any tribe and is a subset of the private lands category.

We present brief descriptions of all units, including the upstream and downstream boundaries of each stream reach, and reasons why they meet the definition of critical habitat for the Neosho mucket and rabbitsfoot.

Neosho Mucket

Unit NM1: Illinois River—Benton and Washington Counties, Arkansas; and Adair, Cherokee, and Delaware Counties, Oklahoma

Unit NM1 includes 146.1 rkm (90.8 rmi) of the Illinois River from the Muddy Fork Illinois River confluence with the Illinois River south of Savoy, Washington County, Arkansas, downstream to the Baron Creek confluence southeast of Tahlequah, Cherokee County, Oklahoma. This unit contains all or some components of all four physical or biological features and contains primary constituent elements 2, 3, 4, and 5. The physical or biological features in this unit may require special management considerations or protection to address changes in stream channel stability associated with urban development and clearing of riparian areas due to land use conversion in the watershed; alteration of water chemistry or water and sediment quality; and changes in stream bed material composition and quality from activities that would release sediments or nutrients into the water, such as urban development and associated construction projects, livestock grazing, confined animal operations, and timber harvesting. The majority of the riparian lands adjacent to, but not included in, this unit are in private ownership or private lands under tribal jurisdiction (Table 3).

Unit NM2: Elk River—McDonald County, Missouri; and Delaware County, Oklahoma

Unit NM2 includes a total of 20.3 rkm (12.6 rmi) of the Elk River from Missouri Highway 59 at Noel, McDonald County, Missouri, to the confluence of Buffalo Creek immediately downstream of the Oklahoma and Missouri State line, Delaware County, Oklahoma. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The primary biological or physical features in this unit may require special management considerations or protection to address changes in the existing flow regime due to such activities as impoundment, water diversion, or water withdrawal; alteration of water chemistry or water quality; and changes in stream bed material composition and sediment

quality from activities that would release sediments or nutrients into the water, such as urban development and associated construction projects, livestock grazing, confined animal operations (turkey and chicken), timber harvesting, and mining. All the riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit NM3: Shoal Creek—Cherokee County, Kansas; and Newton County, Missouri

Unit NM3 includes approximately 75.8 rkm (47.1 rmi) of Shoal Creek from Missouri Highway W near Ritchey, Newton County, Missouri, to Empire Lake where inundation begins in Cherokee County, Kansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes to the same activities as discussed in Unit NM2, above, and releases of chemical contaminants from industrial and municipal effluents (77 FR 63440, see Factor A). All riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit NM4: Spring River—Jasper and Lawrence Counties, Missouri; and Cherokee County, Kansas

Unit NM4 includes 102.3 rkm (63.6 rmi) of the Spring River from Missouri Highway 97 north of Stotts City, Lawrence County, Missouri, downstream to the confluence of Turkey Creek north of Empire, Cherokee County, Kansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes to the same activities as discussed in Unit NM2, above, and releases of chemical contaminants from industrial and municipal effluents. Almost all (99 percent) of the riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit NM5: North Fork Spring River—Jasper County, Missouri

Unit NM5 includes 16.4 rkm (10.2 rmi) of the North Fork Spring River from the confluence of Buck Branch southwest of Jasper, Missouri, downstream to its confluence with the Spring River near Purcell, Jasper County, Missouri. This unit contains all

or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes to the same activities as discussed in Unit NM2, above. All riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit NM6: Fall River—Elk, Greenwood, and Wilson Counties, Kansas; Verdigris River—Montgomery and Wilson Counties, Kansas

Unit NM6 includes a total of 171.1 rkm (106.3 rmi), including 90.4 rkm (56.2 rmi) of the Fall River from Fall River Lake dam northwest of Fall River, Greenwood County, Kansas, downstream to its confluence with the Verdigris River near Neodesha, Wilson County, Kansas. Unit NM6 also includes 80.6 rkm (50.1 rmi) of the Verdigris River from Kansas Highway 39 near Benedict, Wilson County, Kansas downstream to the Elk River confluence near Independence, Montgomery County, Kansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes to the same activities as discussed in Unit NM2, above. All riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit NM7: Neosho River—Allen, Cherokee, Coffey, Labette, Neosho, and Woodson Counties, Kansas

Unit NM7 includes 244.5 rkm (151.9 rmi) of the Neosho River from Kansas Highway 58 west of LeRoy, Coffey County, Kansas, downstream to the Kansas and Oklahoma State line, Cherokee County, Kansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes to the same activities as discussed in Unit NM2, above, and releases of chemical contaminants from industrial and municipal effluents and tail water releases downstream of John Redmond Reservoir. All riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Rabbitsfoot

The physical or biological features in units RF1 through RF31 may require special management considerations to address changes in the existing flow regime due to such activities as impoundment, water diversion, or water withdrawal; alteration of water chemistry or water quality; and changes in stream bed material composition and sediment quality from activities that would release sediments or nutrients into the water, such as urban development and associated construction projects, livestock grazing, confined animal operations (turkey and chicken), timber harvesting, and mining, and releases of chemical contaminants from industrial and municipal effluents. Where there are other activities in individual units requiring special management considerations, they are set forth in the individual unit descriptions.

Unit RF1: Spring River—Jasper County, Missouri; and Cherokee County, Kansas

Unit RF1 includes 56.5 rkm (35.1 rmi) of the Spring River from Missouri Highway 96 at Carthage, Jasper County, Missouri, downstream to the confluence of Turkey Creek north of Empire, Cherokee County, Kansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection described above. The majority of the riparian lands adjacent to, but not included in, this unit are in private ownership or private lands under tribal jurisdiction (Table 3).

Unit RF2: Verdigris River—Rogers County, Oklahoma

Unit RF2 includes 38.0 rkm (23.6 rmi) of the Verdigris River from Oologah Lake dam north of Claremore, Oklahoma, downstream to Oklahoma Highway 266 northwest of Catoosa, Rogers County, Oklahoma. This unit contains all or some components of all four physical or biological features and in part, contains primary constituent elements 3, 4, and 5. It is possible that primary constituent elements 1 and 2 are limiting factors for rabbitsfoot distribution and abundance from Oologah Lake dam downstream to the confluence of the Caney River; thus we are unable to determine at this time whether this reach contains primary constituent elements 1 and 2. The physical or biological features in this unit may require special management considerations or protection as described above and changes in the

existing flow regime due to such activities as impoundment, tail water releases from Oologah Lake dam, and channelization associated with the McClellan-Kerr Arkansas River Navigation System. The majority of the riparian lands adjacent to, but not included in, this unit are in private ownership or private lands under tribal jurisdiction (Table 3).

Unit RF3: Neosho River—Allen County, Kansas

Unit RF3 includes 26.6 rkm (16.5 rmi) of the Neosho River from the Deer Creek confluence northwest of Iola, Kansas, downstream to the confluence of Owl Creek southwest of Humboldt, Allen County, Kansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above except for releases of chemical contaminants from industrial and municipal effluents. Approximately 97 percent of the riparian lands adjacent to, but not included in, this unit are in private ownership and the remaining lands in State or local ownership (Table 3).

Unit RF4a: Ouachita River—Clark and Hot Spring Counties, Arkansas

Unit RF4a includes 22.7 rkm (14.1 rmi) of the Ouachita River from the Tenmile Creek confluence north of Donaldson downstream to the Caddo River confluence near Caddo Valley, Hot Spring and Clark Counties, Arkansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above. Approximately 82 percent of the riparian lands adjacent to, but not included in, this unit are in private ownership and the remaining 18 percent are in Federal ownership (Table 3).

Unit RF4b: Ouachita River—Ouachita County, Arkansas

Unit RF4b includes 43.0 rkm (26.7 rmi) of the Ouachita River from the Little Missouri River confluence downstream to U.S. Highway 79 at Camden, Ouachita County, Arkansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management

considerations or protection to address changes described above. All the riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit RF5: Saline River—Ashley, Bradley, Cleveland, and Drew Counties, Arkansas

Unit RF5 includes 119.4 rkm (74.2 rmi) of the Saline River from Frazier Creek confluence near Mount Elba, Cleveland County, Arkansas, to the Mill Creek confluence near Stillions, Ashley and Bradley Counties, Arkansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above. All the riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit RF6: Little River—McCurtain County, Oklahoma; and Little River and Sevier Counties, Arkansas

Unit RF6 includes 139.7 rkm (86.8 rmi) of the Little River from the Glover River confluence northwest of Idabel, McCurtain County, Oklahoma, downstream to U.S. Highway 71 north of Wilton, Little River and Sevier Counties, Arkansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above. Riparian lands adjacent to, but not included in, this unit are in private ownership (42 percent), Federal (35 percent), and private land under tribal jurisdiction (23 percent) (Table 3).

Unit RF7: Middle Fork Little Red River—Cleburne and Van Buren Counties, Arkansas

Unit RF7 includes 24.8 rkm (15.4 rmi) of the Middle Fork Little Red River from the confluence of Little Tick Creek north of Shirley, Arkansas, downstream to Greers Ferry Reservoir (where inundation begins), Van Buren County, Arkansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above and natural gas development and hillside rock harvesting. All riparian lands adjacent

to, but not included in, this unit are in private ownership (Table 3).

Unit RF8a: White River—Independence, Jackson, White, and Woodruff Counties, Arkansas

Unit RF8a includes 188.3 rkm (117.0 rmi) of the White River from the Batesville Dam at Batesville, Independence County, Arkansas, downstream to the Little Red River confluence north of Georgetown, White, and Woodruff Counties, Arkansas. This unit contains all or some components of all four physical or biological features and contains primary constituent elements 2, 3, 4, and 5. The ACOE maintains a navigation channel, which involves routine dredging and snag removal, from Newport, Arkansas, to its confluence with the Mississippi River. The physical or biological features in this unit may require special management considerations or protection described above except for releases of chemical contaminants from industrial and municipal effluents and including tail water releases from a series of reservoirs on the upper White River; row crop agriculture; increasing demand for instream sand from the White River upstream of Newport, Arkansas, to support natural gas development needs; natural gas development; and channelization. Riparian lands adjacent to, but not included in, this unit are in private ownership (94 percent) and State and local ownership (6 percent) (Table 3).

Unit RF8b: White River—Arkansas and Monroe Counties, Arkansas

There are no records of rabbitsfoot from the 160-rkm (100-rmi) reach separating Unit RF8a from Unit RF8b (Butler 2005, p. 66). Unit RF8b includes 68.9 rkm (42.8 rmi) of the White River from U.S. Highway 79 at Clarendon, Monroe County, Arkansas, downstream to Arkansas Highway 1 near St. Charles, Arkansas County, Arkansas. This unit contains all or some components of all four physical or biological features and contains primary constituent elements 2, 3, 4, and 5. The ACOE maintains a navigation channel, which involves routine dredging and snag removal, from Newport, Arkansas, to its confluence with the Mississippi River. The physical or biological features in this unit may require special management considerations or protection described above except for releases of chemical contaminants from industrial and municipal effluents and including tail water releases from a series of reservoirs on the upper White River; row crop agriculture; increasing demand for instream sand from the

White River upstream of Newport, Arkansas, to support natural gas development needs; natural gas development; and channelization. Approximately 84 percent of the riparian lands adjacent to, but not included in, this unit are in Federal ownership and 16 percent are in private ownership (Table 3).

Unit RF9: Black River—Lawrence and Randolph Counties, Arkansas

Unit RF9 includes 51.2 rkm (31.8 rmi) of the Black River from U.S. Highway 67 at Pocahontas, Randolph County, Arkansas, downstream to the Flat Creek confluence southeast of Powhatan, Lawrence County, Arkansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above and including row crop agriculture. All riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit RF10: Spring River—Lawrence, Randolph, and Sharp Counties, Arkansas

Unit RF10 includes 51.5 rkm (32.0 rmi) of the Spring River from the Ott Creek confluence southwest of Hardy in Sharp County, Arkansas, downstream to its confluence with the Black River east of Black Rock, Lawrence and Randolph Counties, Arkansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above. All riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit RF11: Strawberry River—Independence, Izard, Lawrence, and Sharp Counties, Arkansas

Unit RF11 includes 123.8 rkm (76.9 rmi) of the Strawberry River from Arkansas Highway 56 south of Horseshoe Bend, Izard County, Arkansas, downstream to its confluence with the Black River southeast of Strawberry, Lawrence County, Arkansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above. All riparian

lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit RF12: Buffalo River—Marion, Newton, and Searcy Counties, Arkansas

Unit RF12 includes 113.6 rkm (70.6 rmi) of the Buffalo River from the Cove Creek confluence southeast of Erbie, Newton County, Arkansas, downstream to U.S. Highway 65 west of Gilbert, Searcy County, Arkansas and Arkansas Highway 14 southeast of Mull, Arkansas, downstream to the Leatherwood Creek confluence in the Lower Buffalo Wilderness Area, Arkansas. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above. All riparian lands adjacent to, but not included in, this unit are in Federal ownership (Table 3).

Unit RF13: St. Francis River—Madison and Wayne Counties, Missouri

Unit RF13 includes 64.3 rkm (40.0 rmi) of the St. Francis River from the Twelvemile Creek confluence west of Saco, Madison County, Missouri, downstream to Lake Wappello (where inundation begins), Wayne County, Missouri. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above. Riparian lands adjacent to, but not included in, this unit are in private (59 percent), Federal (39 percent), and less than 2 percent in State or local ownership (Table 3).

Unit RF14: Big Sunflower River—Sunflower County, Mississippi

Unit RF14 includes 51.5 rkm (32.0 rmi) of the Big Sunflower River from Mississippi Highway 442 west of Doddsville, Mississippi, downstream to the Quiver River confluence east of Indianola, Sunflower County, Mississippi. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above and row crop agriculture and channelization. All riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit RF15: Bear Creek—Tishomingo County, Mississippi; and Colbert County, Alabama

Unit RF15 includes 49.7 rkm (30.9 rmi) of Bear Creek from the Alabama and Mississippi State line east of Golden, Tishomingo County, Mississippi, downstream to Alabama County Road 4 southwest of Sutton Hill, Colbert County, Alabama (just upstream of Pickwick Lake). Unit RF15 in its entirety is currently designated as critical habitat for the oyster mussel (Duck River dartersnapper) and Cumberlandian combshell. Unit RF15 contains all or some components of all four physical or biological features, except in the Bear Creek Floodway, which has been channelized for flood control and only contains components of physical or biological features associated with the species' nutritional or physiological requirements and contains all five primary constituent elements, except in the Bear Creek Floodway, which has been channelized for flood control and only contains primary constituent elements 3, 4, and 5. The physical or biological features in this unit may require special management considerations or protection to address changes described above. Riparian lands adjacent to, but not included in, this unit are in private (64 percent), Federal (24 percent), and 12 percent in State or local ownership (Table 3).

Unit RF16: Big Black River—Hinds and Warren Counties, Mississippi

Unit RF16 includes 43.3 rkm (26.9 rmi) of Big Black River from Porter Creek confluence west of Lynchburg, Hinds County, Mississippi, downstream to Mississippi Highway 27 west of Newman, Warren County, Mississippi. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above, as well as row crop agriculture and channelization. All riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit RF17: Paint Rock River—Jackson, Madison, and Marshall Counties, Alabama

Unit RF17 includes 81.0 rkm (50.3 rmi) of the Paint Rock River from the convergence of Estill Fork and Hurricane Creek north of Skyline, Jackson County, Alabama, downstream to U.S. Highway 431 south of New

Hope, Madison and Marshall Counties, Alabama. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above as well as row crop agriculture and channelization. Approximately 99 percent of the riparian lands adjacent to, but not included in, this unit are in private ownership and 1 percent is in Federal ownership (Table 3).

Unit RF18: Duck River—Hickman, Humphreys, Marshall, Maury, and Perry Counties, Tennessee

Unit RF18 includes 235.3 rkm (146.2 rmi) of the Duck River from Lillard Mill (rkm 288; rmi 179) west of Tennessee Highway 272, Marshall County, Tennessee, downstream to Interstate 40 near Bucksport, Hickman County, Tennessee. Seventy-four rkm (46 rmi) in Unit RF18 from rkm 214 (rmi 133) upstream to Lillard's Mill at rkm 288 (rmi 179) is currently designated as critical habitat for the oyster mussel and Cumberlandian combshell (50 CFR 17.95(f)). Unit RF18 contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above as well as row crop agriculture and channelization. Approximately 83 percent of the riparian lands adjacent to, but not included in, this unit are in private ownership and 17 percent are in State or local ownership (Table 3).

Unit RF19a: Tennessee River—Hardin County, Tennessee

Unit RF19a includes 26.7 rkm (16.6 rmi) of Tennessee River from Pickwick Lake Dam downstream to U.S. Highway 64 near Adamsville, Hardin County, Tennessee. This unit contains all or some components of all four physical or biological features and contains primary constituent elements 1, 3, 4, and 5. The physical or biological features in this unit may require special management considerations or protection to address changes described above as well as row crop agriculture, channelization, and channel stability associated with tail water releases. Approximately 90 percent of the riparian lands adjacent to, but not included in, this unit are in private ownership and 10 percent are in State or local ownership (Table 3).

Unit RF19b: Tennessee River—Livingston, Marshall, and McCracken Counties, Kentucky

Unit RF19b includes 35.6 rkm (22.1 rmi) of the Tennessee River from Kentucky Lake Dam downstream to its confluence with the Ohio River, McCracken and Livingston Counties, Kentucky. This unit contains all or some components of all four physical or biological features, and in part, contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above. Approximately 93 percent of the riparian lands adjacent to, but not included in, this unit are in private ownership, 7 percent are in Federal ownership, and less than 1 percent is in State or local ownership (Table 3).

Unit RF20: Ohio River—Ballard and McCracken Counties, Kentucky; Massac and Pulaski Counties, Illinois

Unit RF20 includes 45.9 rkm (28.5 rmi) of the Ohio River from the Tennessee River confluence at the downstream extent of Owens Island downstream to Lock and Dam 53 near Olmstead, Illinois. This unit contains all or some components of all four physical or biological features, and in part, contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above, as well as row crop agriculture, channelization, and channel stability associated with tail water releases. Approximately 72 percent of the riparian lands adjacent to, but not included in, this unit are in private ownership and 28 percent are in State or local ownership (Table 3).

Unit RF21: Green River—Edmonson, Green, Hart, and Taylor Counties, Kentucky

Unit RF21 includes 175.6 rkm (109.1 rmi) of the Green River from Green River Lake Dam south of Campbellsville, Taylor County, Kentucky, downstream to Mammoth Cave National Park North Entrance Road in Mammoth Cave National Park, Kentucky. This unit contains all or some components of all four physical or biological features, and in part, contains all five primary constituent elements. Releases from Green River Lake dam have altered hydrologic flows and temperature regimes in the tail water reach (Butler 2005, p. 39). The physical or biological features in this unit may require special management

considerations or protection to address changes described above and row crop agriculture, channelization, and channel stability associated with tail water releases. Approximately 90 percent of the riparian lands adjacent to, but not included in, this unit are in private ownership and 10 percent are in Federal ownership (Table 3).

Unit RF22: French Creek—Crawford, Erie, Mercer, and Venango Counties, Pennsylvania

Unit RF22 includes 120.4 rkm (74.8 rmi) of French Creek from Union City Reservoir Dam northeast of Union City, Erie County, Pennsylvania, downstream to its confluence with the Allegheny River near Franklin, Venango County, Pennsylvania. The Allegheny River rabbitsfoot population (Unit RF23) is likely a single metapopulation with the French Creek population (Unit RF22) (Butler 2005, p. 31). This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above as well as row crop agriculture and oil and gas development. Approximately 97 percent of the riparian lands adjacent to, but not included in, this unit are in private ownership and 3 percent are in Federal ownership (Table 3).

Unit RF23: Allegheny River—Venango County, Pennsylvania

Unit RF23 includes 57.3 rkm (35.6 rmi) of the Allegheny River from the French Creek confluence near Franklin, Venango County, Pennsylvania, downstream to Interstate 80 near Emlenton, Venango County, Pennsylvania. The lower Allegheny River and French Creek (Unit RF22) populations likely represent a single metapopulation because no barriers exist between the streams (Butler 2005, p. 29). This unit contains all or some components of all four physical or biological features and likely functions as a metapopulation to French Creek (Unit RF22). This unit contains primary constituent elements 1, 3, 4, and 5 for the rabbitsfoot. A series of nine locks and dams and Kinzua Dam constructed over the past century has resulted in altered hydrologic flow regimes in the Allegheny River (Butler 2005, p. 29). The physical or biological features in this unit may require special management considerations or protection to address changes described above as well as row crop agriculture, oil and gas development, and

channelization. Approximately 83 percent of the riparian lands adjacent to, but not included in, this unit are in private ownership and 17 percent are in State or local ownership (Table 3).

Unit RF24: Muddy Creek—Crawford County, Pennsylvania

Unit RF24 includes 20.1 rkm (12.5 rmi) of Muddy Creek from Pennsylvania Highway 77 near Little Cooley, Crawford County, Pennsylvania, downstream to its confluence with French Creek east of Cambridge Springs, Crawford County, Pennsylvania. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above and oil and gas development. Approximately 81 percent of the riparian lands adjacent to, but not included in, this unit are in Federal ownership and 19 percent are in private ownership (Table 3).

Unit RF25: Tippecanoe River—Carroll, Pulaski, Tippecanoe, and White Counties, Indiana

Unit RF25 includes 75.6 rkm (47.0 rmi) of the Tippecanoe River from Indiana Highway 14 near Winamac, Pulaski County, Indiana, downstream to its confluence with the Wabash River northeast of Battle Ground, Tippecanoe County, Indiana, excluding Lakes Shafer and Freeman and the stream reach between the two lakes. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above. Approximately 97 percent of the riparian lands adjacent to, but not included in, this unit are in private ownership and 3 percent are in State or local ownership (Table 3).

Unit RF26: Walhonding River—Coshocton County, Ohio

Unit RF26 includes 17.5 rkm (10.9 rmi) of the Walhonding River from the convergence of the Kokosing and Mohican Rivers downstream to Ohio Highway 60 near Warsaw, Coshocton County, Ohio. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above.

Approximately 83 percent of the riparian lands adjacent to, but not included in, this unit are in private ownership and 17 percent are in State or local ownership (Table 3).

Unit RF27: Little Darby Creek—Madison and Union Counties, Ohio

Unit RF27 includes 33.3 rkm (20.7 rmi) of Little Darby Creek from Ohio Highway 161 near Chuckery, Union County, Ohio, downstream to U.S. Highway 40 near West Jefferson, Madison County, Ohio. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above and row crop agriculture. All riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit RF28: North Fork Vermilion River and Middle Branch North Fork Vermilion River, respectively, Vermilion County, Illinois

Unit RF28 includes a total of 28.5 rkm (17.7 rmi). Unit RF28 includes 21.2 rkm (13.2 rmi) of the North Fork Vermilion River from the confluence of Middle Branch North Fork Vermilion River downstream to Illinois Highway 1 and U.S. Highway 136 upstream of Lake Vermilion, Vermilion County, Illinois. Unit RF28 also includes 7.2 rkm (4.5 rmi) of the Middle Branch North Fork Vermilion River from the Jordan Creek confluence northwest of Alvin, Illinois, downstream to its confluence with North Fork Vermilion River west of Alvin, Vermilion County, Illinois. The rabbitsfoot in the North Fork Vermilion River is considered a metapopulation with the Middle Branch North Fork Vermilion River population (Butler 2005, p. 47). This unit contains all or some components of all four physical or biological features, including connectivity between North Fork Vermilion River and Middle Branch North Fork Vermilion River. This unit contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above and channelization and row crop agriculture. All riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit RF29: Fish Creek—Williams County, Ohio

Unit RF29 includes 7.7 rkm (4.8 rmi) of Fish Creek from the Indiana and Ohio

State line northwest of Edgerton, Ohio, downstream to its confluence with the St. Joseph's River north of Edgerton, Williams County, Ohio. This unit contains all or some components of all four physical or biological features and sustains genetic diversity and historical distribution as the only remaining rabbitsfoot population in the Great Lakes sub-basin. This unit contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above as well as row crop agriculture and confined animal operations (hogs). Approximately 90 percent of the riparian lands adjacent to, but not included in, this unit are in private ownership and 10 percent are in State or local ownership (Table 3).

Unit RF30: Red River—Logan County, Kentucky; and Montgomery and Robertson Counties, Tennessee

Unit RF30 includes 50.2 rkm (31.2 rmi) of the Red River from the South Fork Red River confluence west of Adairville, Kentucky, downstream to the Sulphur Fork confluence southwest of Adams, Tennessee. This unit contains all or some components of all four physical or biological features and sustains genetic diversity and historical distribution as the largest of two remaining rabbitsfoot populations within the Cumberland River basin. This unit contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protection to address changes described above as well as row crop agriculture and channelization. All riparian lands adjacent to, but not included in, this unit are in private ownership (Table 3).

Unit RF31: Shenango River—Mercer County, Pennsylvania

Unit RF31 includes 24.8 rkm (15.4 rmi) of the Shenango River from Porter Road near Greenville, Pennsylvania, downstream to the point of inundation by Shenango River Lake near Big Bend, Mercer County, Pennsylvania. This unit contains all or some components of all four physical or biological features and contains all five primary constituent elements. The physical or biological features in this unit may require special management considerations or protections to address changes described above as well as consumptive water uses. Approximately 54 percent of the riparian lands adjacent to, but not included in, this unit are in Federal ownership and 46 percent are in private ownership (Table 3).

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. In addition, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under the Act or result in the destruction or adverse modification of proposed critical habitat.

Decisions by the 5th and 9th Circuit Courts of Appeals have invalidated our regulatory definition of “destruction or adverse modification” (50 CFR 402.02) (see *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service*, 378 F. 3d 1059 (9th Cir. 2004) and *Sierra Club v. U.S. Fish and Wildlife Service*, 245 F.3d 434 (5th Cir. 2001)), and we do not rely on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat. Under the provisions of the Act, we determine destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the effected critical habitat would continue to serve its intended conservation role for the species.

If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Examples of actions that are subject to the section 7 consultation process are actions on State, tribal, local, or private lands that require a Federal permit (such as a permit from the ACOE under section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*) or a permit from the Service under section 10 of the Act) or that involve some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency). Federal actions not affecting listed species or critical habitat, and actions on State, tribal, local, or private lands that are not federally funded or authorized, do not require section 7 consultation.

As a result of section 7 consultation, we document compliance with the requirements of section 7(a)(2) through our issuance of:

(1) A concurrence letter for Federal actions that may affect, but are not likely to adversely affect, listed species or critical habitat; or

(2) A biological opinion for Federal actions that may affect and are likely to adversely affect, listed species or critical habitat.

When we issue a biological opinion concluding that a project is likely to jeopardize the continued existence of a listed species and/or destroy or adversely modify critical habitat, we provide reasonable and prudent alternatives to the project, if any are identifiable, that would avoid the likelihood of jeopardy and/or destruction or adverse modification of critical habitat. We define “reasonable and prudent alternatives” (at 50 CFR 402.02) as alternative actions identified during consultation that:

(1) Can be implemented in a manner consistent with the intended purpose of the action,

(2) Can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction,

(3) Are economically and technologically feasible, and

(4) Would, in the Director's opinion, avoid the likelihood of jeopardizing the continued existence of the listed species and/or avoid the likelihood of destroying or adversely modifying critical habitat.

Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions in instances where we have listed a new species or subsequently designated critical habitat that may be affected and the Federal agency has retained discretionary involvement or control over the action (or the agency's discretionary involvement or control is authorized by law). Consequently, Federal agencies sometimes may need to request reinitiation of consultation with us on actions for which formal consultation has been completed, if those actions with discretionary involvement or control may affect subsequently listed species or designated critical habitat.

Application of the “Adverse Modification” Standard

The key factor related to the adverse modification determination is whether, with implementation of the proposed Federal action, the affected critical

habitat would continue to serve its intended conservation role for the species. Activities that may destroy or adversely modify critical habitat are those that alter the physical or biological features to an extent that appreciably reduces the conservation value of critical habitat for Neosho mucket and the rabbitsfoot. As discussed above, the role of critical habitat is to support life-history needs of the species and provide for the conservation of the species.

Section 4(b)(8) of the Act requires us to briefly evaluate and describe, in any proposed or final regulation that designates critical habitat, activities involving a Federal action that may destroy or adversely modify such habitat, or that may be affected by such designation.

Activities that may affect critical habitat, when carried out, funded, or authorized by a Federal agency, should result in consultation for the Neosho mucket and rabbitsfoot. These activities include, but are not limited to:

(1) Actions that would alter the geomorphology of their stream and river habitats. Such activities may include, but are not limited to, instream excavation or dredging, impoundment, channelization, sand and gravel mining, clearing riparian vegetation, and discharge of fill materials. These activities could cause aggradation or degradation of the channel bed elevation or significant bank erosion, result in entrainment or burial of these mollusks, and cause other direct or cumulative adverse effects to these species and their life cycles.

(2) Actions that would significantly alter the existing flow regime where these species occur. Such activities may include, but are not limited to, impoundment, channelization, urban development, water diversion, water withdrawal, and tail water releases downstream of dams. These activities could eliminate or reduce the habitat necessary for growth and reproduction of these mollusks and their life cycles including fish hosts.

(3) Actions that would significantly alter water chemistry or water quality (for example, temperature, pH, contaminants, conductivity, and excess nutrients). Such activities may include, but are not limited to, tail water releases downstream of dams, or the release of chemicals, biological pollutants, or heated effluents into surface water or connected groundwater at a point source or by dispersed release (nonpoint source). These activities could alter water conditions that are beyond the tolerances of these mussels or their fish hosts or both, and result in direct or

cumulative adverse effects to the species and their life cycles.

(4) Actions that would significantly alter stream bed material composition and quality by increasing sediment deposition or filamentous algal growth. Such activities may include, but are not limited to, construction projects, gravel and sand mining, oil and gas development, livestock grazing, timber harvest, off-road vehicle use, and other watershed and floodplain disturbances that release sediments or contaminants into the water. These activities could eliminate or reduce habitats necessary for the survival, growth, and reproduction of these mollusks or their fish hosts or both by causing excessive sedimentation and burial of Neosho mucket and rabbitsfoot or their habitats, sublethal effects from sediment exposure that are not readily apparent, acute and chronic exposure to chemical contaminants resulting in sublethal and lethal effects, and eutrophication leading to excessive filamentous algal growth. Excessive filamentous algal growth can cause reduced nighttime dissolved oxygen levels and prevent mussel glochidia from settling into stream sediments.

Exemptions

Application of Section 4(a)(3) of the Act

Section 4(a)(3)(B)(i) of the Act (16 U.S.C. 1533(a)(3)(B)(i)) provides that: "The Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan (INRMP) prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation." There are no Department of Defense lands with a completed INRMP within the critical habitat designation.

Consideration of Impacts Under Section 4(b)(2) of the Act

Section 4(b)(2) of the Act states that the Secretary must designate and make revisions to critical habitat on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. The Secretary may exclude an area from critical habitat if she determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless she determines, based on the best scientific

data available, that the failure to designate such area as critical habitat will result in the extinction of the species. In making that determination, the statute on its face, as well as the legislative history, are clear that the Secretary has broad discretion regarding which factor(s) to use and how much weight to give to any factor.

Consideration of Economic Impacts

Under section 4(b)(2) of the Act, we consider the economic impacts of specifying any particular area as critical habitat. In order to consider economic impacts of the proposed designation, we prepared a DEA (Industrial Economics Incorporated (IEC) 2012). The DEA, dated February 6, 2013, was made available for public review from May 9, 2013, through June 10, 2013 (78 FR 27171), from August 27, 2013, through October 28, 2013 (78 FR 52894), and from May 14, 2014, to July 14, 2014 (79 FR 27547). Following the close of the last comment period, an FEA was developed, taking into consideration the public comments and any new information (IEC 2013, entire). By analyzing economic impacts of the proposed designation, which differs from the final designation, the FEA does not capture the exact incremental impacts of the final designation. Therefore, a final summary memorandum has been prepared describing our revised forecast calculations (IEC 2014a and 2014b, entire).

The intent of the FEA is to quantify the economic impacts of all potential conservation efforts for Neosho mucket and rabbitsfoot; some of these costs will likely be incurred regardless of whether we designate critical habitat (baseline). The economic impact of the proposed critical habitat designation is analyzed by comparing scenarios both "with critical habitat" and "without critical habitat." The "without critical habitat" scenario represents the baseline for the analysis, considering protections already in place for the species (for example, under the Federal listing and other Federal, State, and local regulations). The baseline, therefore, represents the costs incurred regardless of whether critical habitat is designated. The "with critical habitat" scenario describes the incremental impacts associated specifically with the proposed designation of critical habitat for the species. The incremental conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat for the species. In other words, the incremental costs are those attributable solely to the designation of critical

habitat above and beyond the baseline costs; these are the costs we consider in the final designation of critical habitat. The analysis looks retrospectively at baseline impacts incurred since the species was listed, and forecasts both baseline and incremental impacts likely to occur with the designation of critical habitat.

The FEA also addresses how potential economic impacts are likely to be distributed, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation activities on government agencies, private businesses, and individuals. The FEA measures lost economic efficiency associated with residential and commercial development and public projects and activities, such as economic impacts on water management and transportation projects, Federal lands, small entities, and the energy industry. Decisionmakers can use this information to assess whether the effects of the proposed designation might unduly burden a particular group or economic sector. Finally, the FEA looks retrospectively at costs that occurred between the publication of the final listing rule and the final rule designating critical habitat, and considers those costs that may occur in the 20 years following the designation of critical habitat, which was determined to be the appropriate period for analysis because limited planning information was available for most activities to forecast activity levels for projects beyond a 20-year timeframe. The FEA quantifies economic impacts of Neosho mucket and rabbitsfoot conservation efforts associated with the following categories of activity:

- (1) Water flow management;
- (2) Water quality management;
- (3) Timber, agriculture, and grazing;
- (4) Mining;
- (5) Oil and gas;
- (6) Transportation and utilities;
- (7) Development and recreation; and
- (8) Other activities (such as animal

and biological control, prescribed burns, land clearing, habitat or shoreline restoration, among others).

Baseline protections for the Neosho mucket and rabbitsfoot address a broad range of threats within a significant portion of the critical habitat area. The key conclusion for the incremental analysis is that critical habitat designation is not expected to generate additional requests for conservation efforts in any of the proposed critical habitat units. All critical habitat units are occupied by at least one of the two mussel species. In addition, incremental economic impacts of the designation

will likely be limited to additional administrative costs to the Service, Federal agencies, and third parties. This result is attributed to the following key findings: (1) Baseline protections exist for Neosho mucket and rabbitsfoot, and (2) all designated critical habitat is occupied by at least one of the two mussel species.

In total, the incremental impacts to all economic activities are estimated to be \$4,400,000 over the 20-year timeframe, or \$290,000 on an annualized basis (assuming a 7 percent discount rate) for the proposed critical habitat. Units RF2 (Verdigris River) and NM1 (Illinois River) are expected to generate the largest incremental impacts, due to section 7 consultations expected to occur in all categories within these units. The majority of incremental impacts across all units are related to transportation and utilities, followed by timber, agriculture, and grazing. Incremental costs associated with transportation are estimated to be \$1,400,000 over the 20-year timeframe; \$960,000 is associated with timber, agriculture, and grazing over the 20-year timeframe.

Incremental conservation costs of avoiding impacts to mussels and their habitat will vary depending on a variety of factors, including, but not limited to, location, size, and type of project being proposed, as well as the extent to which mussels occur in the project area. These include the costs for mussel surveys, relocation, monitoring and reporting, mussel propagation and population augmentation, best management practices for erosion and sedimentation controls, timing restrictions, and limiting project scope, or in-stream work.

Exclusions Based on Economic Impacts

Our economic analysis did not identify any disproportionate costs that are likely to result from the designation. Consequently, the Secretary is not exercising her discretion to exclude any areas from this designation of critical habitat for the Neosho mucket and rabbitsfoot based on economic impacts.

A copy of the FEA with supporting documents may be obtained by contacting the Arkansas Ecological Services Field Office (see **ADDRESSES**, above) or by downloading from the Internet at <http://www.regulations.gov>.

Exclusions Based on National Security Impacts

Under section 4(b)(2) of the Act, we consider whether there are lands owned or managed by the Department of Defense or Department of Homeland Security where a national security

impact might exist. In preparing this final rule, we have determined that no lands within the designated critical habitat for the Neosho mucket and rabbitsfoot are owned or managed by the Department of Defense or Department of Homeland Security, and, therefore, we anticipate no impact on national security or homeland security. Consequently, the Secretary is not exercising her discretion to exclude any areas from this final designation based on impacts on national security or homeland security.

Exclusions Based on Other Relevant Impacts

Under section 4(b)(2) of the Act, we consider any other relevant impacts resulting from the designation of critical habitat. We consider a number of factors, including whether the landowners have developed any HCPs or other management plans for the area, or whether there are conservation partnerships that would be encouraged by designation of, or exclusion from, critical habitat. In addition, we look at any tribal issues, and consider the government-to-government relationship of the United States with tribal entities. We also consider any social impacts that might occur because of the designation.

In preparing this final rule, we have determined that there are currently no permitted HCPs or other approved management plans for Neosho mucket and rabbitsfoot, and the final designation includes only tribal jurisdictional areas, not lands managed by any Tribe or trust resources. We anticipate no effect to tribal lands, partnerships, or HCPs from this critical habitat designation. Accordingly, the Secretary is not exercising her discretion to exclude any areas from this final designation based on other relevant impacts.

Required Determinations

Regulatory Planning and Review (Executive Orders 12866 and 13563)

Executive Order 12866 provides that the Office of Information and Regulatory Affairs (OIRA) will review all significant rules. The Office of Information and Regulatory Affairs has determined that this rule is not significant.

Executive Order 13563 reaffirms the principles of E.O. 12866 while calling for improvements in the nation's regulatory system to promote predictability, to reduce uncertainty, and to use the best, most innovative, and least burdensome tools for achieving regulatory ends. The executive order directs agencies to consider regulatory approaches that

reduce burdens and maintain flexibility and freedom of choice for the public where these approaches are relevant, feasible, and consistent with regulatory objectives. E.O. 13563 emphasizes further that regulations must be based on the best available science and that the rulemaking process must allow for public participation and an open exchange of ideas. We have developed this rule in a manner consistent with these requirements.

Regulatory Flexibility Act (5 U.S.C. 601 et seq.)

Under the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 *et seq.*), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 (5 U.S.C. 801 *et seq.*), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of an agency certifies the rule will not have a significant economic impact on a substantial number of small entities. The SBREFA amended the RFA to require Federal agencies to provide a certification statement of the factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities.

According to the Small Business Administration, small entities include small organizations, such as independent nonprofit organizations; small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents; as well as small businesses. Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than \$5 million in annual sales, general and heavy construction businesses with less than \$27.5 million in annual business, special trade contractors doing less than \$11.5 million in annual business, and agricultural businesses with annual sales less than \$750,000. To determine if potential economic impacts on these small entities are significant, we consider the types of activities that might trigger regulatory impacts under this rule, as well as the types of project modifications that may result. In general, the term "significant economic impact" is meant to apply to a typical

small business firm's business operations.

The Service's current understanding of the requirements under the RFA, as amended, and following recent court decisions, is that Federal agencies are only required to evaluate the potential incremental impacts of rulemaking on those entities directly regulated by the rulemaking itself, and therefore, not required to evaluate the potential impacts to indirectly regulated entities. The regulatory mechanism through which critical habitat protections are realized is section 7 of the Act, which requires Federal agencies, in consultation with the Service, to ensure that any action authorized, funded, or carried by the agency is not likely to destroy or adversely modify critical habitat. Therefore, under section 7 only Federal action agencies are directly subject to the specific regulatory requirement (avoiding destruction and adverse modification) imposed by critical habitat designation. Consequently, it is our position that only Federal action agencies will be directly regulated by this designation. There is no requirement under RFA to evaluate the potential impacts to entities not directly regulated. Moreover, Federal agencies are not small entities. Therefore, because no small entities are directly regulated by this rulemaking, the Service certifies that this final critical habitat designation will not have a significant economic impact on a substantial number of small entities.

During the development of this final rule, we reviewed and evaluated all information submitted during the comment period that may pertain to our consideration of the probable incremental economic impacts of this critical habitat designation. Based on this information, we affirm our certification that this final critical habitat designation will not have a significant economic impact on a substantial number of small entities, and a regulatory flexibility analysis is not required.

Energy Supply, Distribution, or Use—Executive Order 13211

Executive Order 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use) requires agencies to prepare Statements of Energy Effects when undertaking certain actions. OMB has provided guidance for implementing this Executive Order that outlines nine outcomes that may constitute "a significant adverse effect" when compared to not taking the regulatory action under consideration. Appendix A of the FEA discusses the

potential for critical habitat to affect utilities through the additional cost of considering adverse modification in section 7 consultation. Critical habitat designation for the mussels is anticipated to affect oil and gas activities. The Service does not anticipate consulting with the Federal Energy Regulatory Commission on hydropower operations as a result of the designation. Impacts to oil and gas development are limited to the administrative costs of consultation, and, therefore, reductions in oil and natural gas production are not anticipated. This analysis projects approximately 14 actions each year on oil and gas related activities, totaling approximately \$7,000 per year. The magnitude of these consultation costs is not anticipated to increase the cost of energy production or distribution in the United States in excess of one percent.

The economic analysis finds that none of the nine outcomes is relevant to this analysis. Thus, based on information in the economic analysis, energy-related impacts associated with Neosho mucket and rabbitsfoot conservation activities within critical habitat are not expected. As such, the designation of critical habitat is not expected to significantly affect energy supplies, distribution, or use. Therefore, this action is not a significant energy action, and no Statement of Energy Effects is required.

Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501 *et seq.*), we make the following findings:

(1) This rule will not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, or tribal governments, or the private sector, and includes both "Federal intergovernmental mandates" and "Federal private sector mandates." These terms are defined in 2 U.S.C. 658(5)–(7). "Federal intergovernmental mandate" includes a regulation that "would impose an enforceable duty upon State, local, or tribal governments" with two exceptions. It excludes "a condition of Federal assistance." It also excludes "a duty arising from participation in a voluntary Federal program," unless the regulation "relates to a then-existing Federal program under which \$500,000,000 or more is provided annually to State, local, and tribal governments under entitlement authority," if the provision would "increase the stringency of conditions of assistance" or "place caps upon, or

otherwise decrease, the Federal Government's responsibility to provide funding," and the State, local, or tribal governments "lack authority" to adjust accordingly. At the time of enactment, these entitlement programs were: Medicaid; Aid to Families with Dependent Children work programs; Child Nutrition; Food Stamps; Social Services Block Grants; Vocational Rehabilitation State Grants; Foster Care, Adoption Assistance, and Independent Living; Family Support Welfare Services; and Child Support Enforcement. "Federal private sector mandate" includes a regulation that "would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance or (ii) a duty arising from participation in a voluntary Federal program."

The designation of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency. Furthermore, to the extent that non-Federal entities are indirectly impacted because they receive Federal assistance or participate in a voluntary Federal aid program, the Unfunded Mandates Reform Act would not apply, nor would critical habitat shift the costs of the large entitlement programs listed above onto State governments.

(2) We do not believe that this rule will significantly or uniquely affect small governments because it would not produce a Federal mandate of \$100 million or greater in any year; that is, it is not a "significant regulatory action" under the Unfunded Mandates Reform Act. Small governments will be affected only to the extent that any programs having Federal funds, permits, or other authorized activities must ensure that their actions will not adversely affect the critical habitat. The FEA concludes incremental impacts may occur due to administrative costs of section 7 consultations for activities related to water flow management; water quality; timber, agriculture, and grazing; mining; oil and gas; transportation and utilities; development and recreation; and other activities; however, these are not

expected to significantly affect small government entities. Consequently, we do not believe that the critical habitat designation will significantly or uniquely affect small government entities. As such, a Small Government Agency Plan is not required.

Takings—Executive Order 12630

In accordance with Executive Order 12630 ("Government Actions and Interference with Constitutionally Protected Private Property Rights"), we have analyzed the potential takings implications of designating critical habitat for Neosho mucket and rabbitsfoot in a takings implications assessment. As discussed above, the designation of critical habitat affects only Federal actions. Although private parties that receive Federal funding, assistance, or require approval or authorization from a Federal agency for an action may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency.

The majority of the designation occurs in navigable waterways whose stream bottoms are owned by the States. Impacts of this designation could occur on non-Federal riparian lands adjacent to, but not included in, the critical habitat designation where there is Federal involvement (such as Federal funding or permitting) subject to section 7 of the Act, or where a decision on a proposed action on federally owned land could affect economic activity on adjoining non-Federal land. However, in general, we believe that the takings implications associated with this critical habitat designation will be insignificant. Based on the best available information, the takings implications assessment concludes that this designation of critical habitat for the Neosho mucket and rabbitsfoot does not pose significant takings implications.

Federalism—Executive Order 13132

In accordance with Executive Order 13132 (Federalism), this rule does not have significant Federalism effects. A Federalism summary impact statement is not required. In keeping with Department of the Interior and Department of Commerce policy, we requested information from, and coordinated development of, this critical habitat designation with appropriate State resource agencies in Alabama, Arkansas, Illinois, Indiana, Kansas, Kentucky, Mississippi, Missouri, Ohio, Oklahoma, Pennsylvania, and Tennessee. We received comments from Kansas,

Illinois, Ohio, Oklahoma, and Pennsylvania and have addressed them in the Summary of Comments and Recommendations and Summary of Changes from Proposed Rule sections of this rule. From a federalism perspective, the designation of critical habitat directly affects only the responsibilities of Federal agencies. The Act imposes no other duties with respect to critical habitat, either for States and local governments, or for anyone else. As a result, this rule does not have substantial direct effects either on the States, or on the relationship between the national government and the States, or on the distribution of powers and responsibilities among the various levels of government. The designation may have some benefit to these governments because the areas that contain the features essential to the conservation of the species are more clearly defined, and the physical or biological features of the habitat necessary to the conservation of the species are specifically identified. This information does not alter where and what federally sponsored activities may occur. However, it may assist local governments in long-range planning (because these local governments no longer have to wait for case-by-case section 7 consultations to occur).

Where State and local governments require approval or authorization from a Federal agency for actions that may affect critical habitat, consultation under section 7(a)(2) would be required. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency.

Civil Justice Reform—Executive Order 12988

In accordance with Executive Order 12988 (Civil Justice Reform), the Office of the Solicitor has determined that the rule does not unduly burden the judicial system and that it meets the applicable standards set forth in sections 3(a) and 3(b)(2) of the Order. We are designating critical habitat in accordance with the provisions of the Act. To assist the public in understanding the habitat needs of the species, the rule identifies the elements of physical or biological features essential to the conservation of the Neosho mucket and rabbitsfoot. The designated areas of critical habitat are presented on maps, and the rule provides several options for the

interested public to obtain more detailed location information, if desired.

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This rule does not contain any new collections of information that require approval by OMB under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.)

It is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses pursuant to NEPA in connection with designating critical habitat under the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This position was upheld by the U.S. Court of Appeals for the Ninth Circuit (*Douglas County v. Babbitt*, 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)). However, when the range of the species includes States within the Tenth Circuit, such as that of Neosho mucket and rabbitsfoot, 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), we undertake a NEPA analysis for critical habitat designation and notify the public of the availability of the draft environmental assessment for a proposal when it is finished.

We performed this NEPA analysis and made the draft environmental assessment available for public comment on May 9, 2013 (78 FR 27171), August 27, 2013 (78 FR 52894), and May 14, 2014 (79 FR 27547). The final environmental assessment has been completed and is available with the publication of this final rule. You may obtain a copy of the final environmental assessment online at <http://www.regulations.gov>, by mail from the Arkansas Ecological Services Field Office (see **ADDRESSES**, above), or by

visiting the office Web site at <http://www.fws.gov/arkansas-es/>.

The final environmental assessment included a detailed analysis of the potential effects of the proposed critical habitat designation on resource categories, including:

- (1) Water flow management;
- (2) Water quality management;
- (3) Timber, agriculture, and grazing;
- (4) Mining;
- (5) Oil and gas;
- (6) Transportation and utilities;
- (7) Development and recreation; and
- (8) Other activities (such as animal

and biological control, prescribed burns, land clearing, habitat or shoreline restoration, among others, environmental justice, and cumulative effects).

The scope of the effects were primarily limited to those activities involving Federal actions, because critical habitat designation does not have any impact on the environment other than through the Act's section 7 consultation process conducted for Federal actions. Private actions that have no Federal involvement are not affected by critical habitat designation.

Based on the review and evaluation of the information contained in the environmental assessment, we determined that the designation of critical habitat for the Neosho mucket and rabbitsfoot does not constitute a major Federal action having a significant impact on the human environment under the meaning of section 102(2)(c) of NEPA, and so an environmental impact statement is not required.

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination With Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge

our responsibilities to work directly with tribes in developing programs for healthy ecosystems, to acknowledge that tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to tribes.

We determined that there are no tribal lands occupied by the Neosho mucket and rabbitsfoot at the time of listing that contain the physical or biological features essential to conservation of the species, and no tribal lands unoccupied by the Neosho mucket and rabbitsfoot that are essential for the conservation of the species. Therefore, we are not designating critical habitat for the Neosho mucket and rabbitsfoot on tribal lands.

References Cited

A complete list of all references cited is available on the Internet at <http://www.regulations.gov> and upon request from the Arkansas Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this rulemaking are the staff members of the Arkansas Ecological Services Field Office.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Regulation Promulgation

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—[AMENDED]

- 1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 1531–1544; 4201–4245, unless otherwise noted.

- 2. Amend § 17.11(h) by revising the entries for “Mucket, Neosho” and “Rabbitsfoot” under CLAMS in the List of Endangered and Threatened Wildlife to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
*	*	*	*	*	*	*	*
CLAMS							
*	*	*	*	*	*	*	*
Mucket, Neosho	<i>Lampsilis rafinesqueana</i> .	U.S.A. (AR, KS, MO, OK).	NA	E	816	17.95(f)	NA
*	*	*	*	*	*	*	*
Rabbitsfoot	<i>Quadrula cylindrica cylindrica</i> .	U.S.A. (AL, AR, GA, IN, IL, KS, KY, LA, MO, MS, OH, OK, PA, TN, WV).	NA	T	816	17.95(f)	NA
*	*	*	*	*	*	*	*

* * * * *

■ 3. In § 17.95, amend paragraph (f) by adding entries for “Neosho Mucket (*Lampsilis rafinesqueana*)” and “Rabbitsfoot (*Quadrula cylindrica cylindrica*)”, immediately following the entry for “Slabside Pearlymussel (*Pleuronaia dolabellodes*),” to read as follows:

§ 17.95 Critical habitat—fish and wildlife.

* * * * *

(f) *Clams and Snails*.

* * * * *

Neosho Mucket (*Lampsilis rafinesqueana*)

(1) Critical habitat units are depicted for the Neosho mucket on the maps below in the following Counties:

(i) Benton and Washington Counties, Arkansas;

(ii) Allen, Cherokee, Coffey, Elk, Greenwood, Labette, Montgomery, Neosho, Wilson, and Woodson Counties, Kansas;

(iii) Jasper, Lawrence, McDonald, and Newton Counties, Missouri; and

(iv) Adair, Cherokee, and Delaware Counties, Oklahoma.

(2) Within these areas, the primary constituent elements of the physical or biological features essential to the conservation of the Neosho mucket consist of five components:

(i) Geomorphically stable river channels and banks (channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation) with habitats that support a diversity of freshwater mussel and native fish (such as stable riffles, sometimes with runs,

and mid-channel island habitats that provide flow refuges consisting of gravel and sand substrates with low to moderate amounts of fine sediment and attached filamentous algae).

(ii) A hydrologic flow regime (the severity, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats where the species are found and to maintain connectivity of rivers with the floodplain, allowing the exchange of nutrients and sediment for maintenance of the mussel’s and fish host’s habitat, food availability, spawning habitat for native fishes, and the ability for newly transformed juveniles to settle and become established in their habitats.

(iii) Water and sediment quality (including, but not limited to, conductivity, hardness, turbidity, temperature, pH, ammonia, heavy metals, and chemical constituents) necessary to sustain natural physiological processes for normal behavior, growth, and viability of all life stages.

(iv) The occurrence of natural fish assemblages, reflected by fish species richness, relative abundance, and community composition, for each inhabited river or creek that will serve as an indication of appropriate presence and abundance of fish hosts necessary for recruitment of the Neosho mucket. Suitable fish hosts for Neosho mucket glochidia include smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), and spotted bass (*Micropterus punctulatus*).

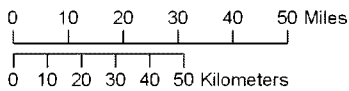
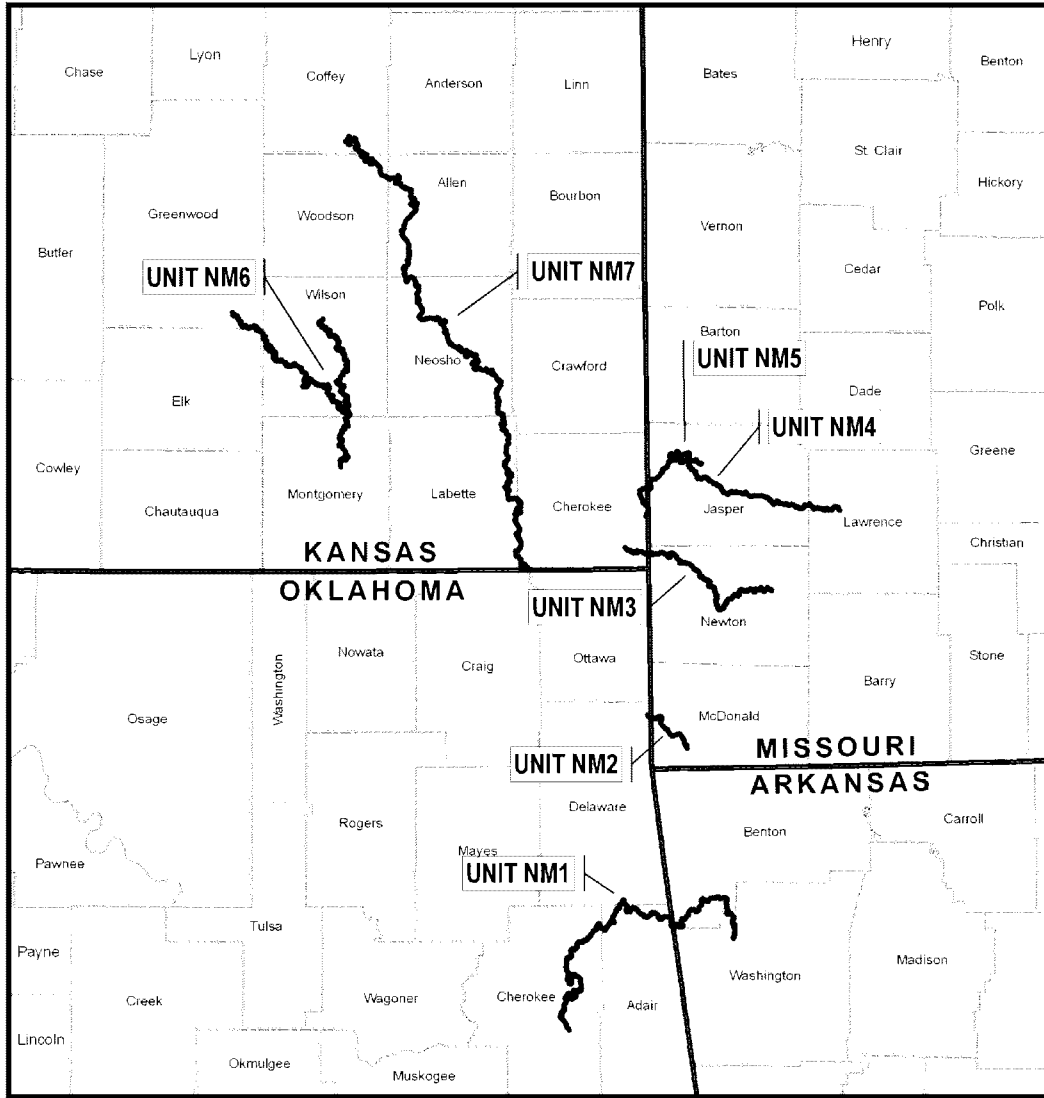
(v) Competitive or predaceous invasive (nonnative) species in quantities low enough to have minimal effect on survival of freshwater mussels.

(3) Critical habitat does not include manmade structures (such as dams, piers and docks, bridges, or other similar structures) within the legal boundaries on June 1, 2015.

(4) *Critical habitat map units*. Data layers defining map units were developed using ESRI ArcGIS mapping software along with various spatial data layers. Critical habitat unit upstream and downstream limits were delineated at the nearest road crossing or stream confluence of each occupied reach. Data layers defining map units were created with U.S. Geological Survey National Hydrography Dataset (NHD) Medium Flowline data. ArcGIS was also used to calculate river kilometers (rkm) and river miles (rmi) from the NHD dataset, and it was used to determine longitude and latitude coordinates in decimal degrees. The projection used in mapping and calculating distances and locations within the units was North American Albers Equal Area Conic, NAD 83. The maps in this entry, as modified by any accompanying regulatory text, establish the boundaries of the critical habitat designation. The coordinates, plot points, or both on which each map is based are available to the public at the Service’s Internet site (http://www.fws.gov/arkansas-es/te_listing.html), the Federal eRulemaking Portal (<http://www.regulations.gov> at Docket No. FWS–R4–ES–2013–0007), and at the field office responsible for this designation. You may obtain field office location information by contacting one of the Service regional offices, the addresses of which are listed at 50 CFR 2.2.

(5) Note: Index map of all critical habitat units for the Neosho mucket follows:

Index map of critical habitat units for Neosho mucket



 Critical Habitat



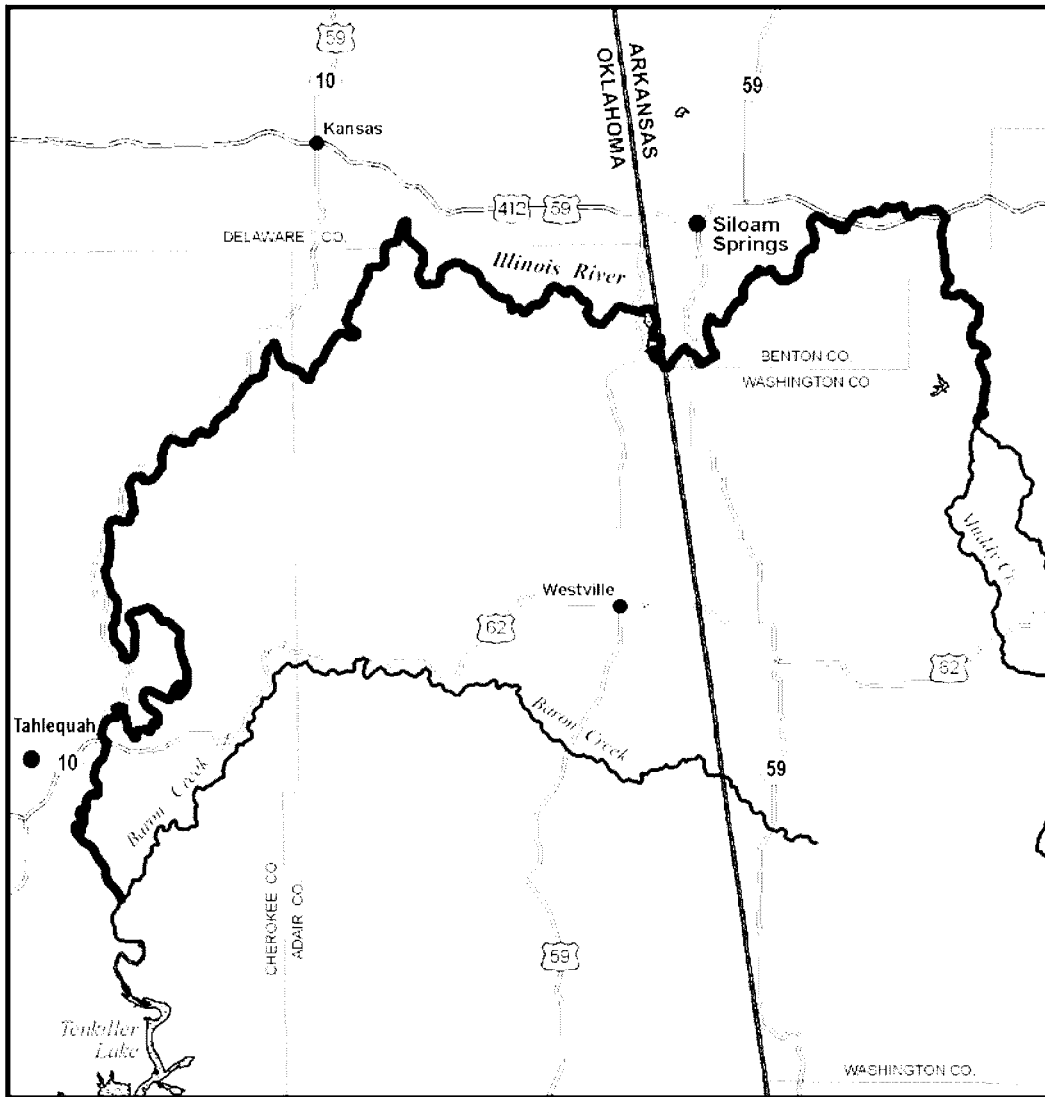
(6) Unit NM1: Illinois River—Benton and Washington Counties, Arkansas; and Adair, Cherokee, and Delaware Counties, Oklahoma.

(i) *General Description:* Unit NM1 includes 146.1 rkm (90.8 rmi) of the Illinois River from the Muddy Fork Illinois River confluence south of Savoy,

Washington County, Arkansas, downstream to the Baron Creek confluence southeast of Tahlequah, Cherokee County, Oklahoma.

(ii) Map of Unit NM1 follows:

Map of Unit NM1 (Illinois River) of critical habitat for Neosho mucket



(7) Unit NM2: Elk River—McDonald County, Missouri; and Delaware County, Oklahoma.

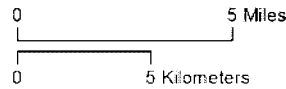
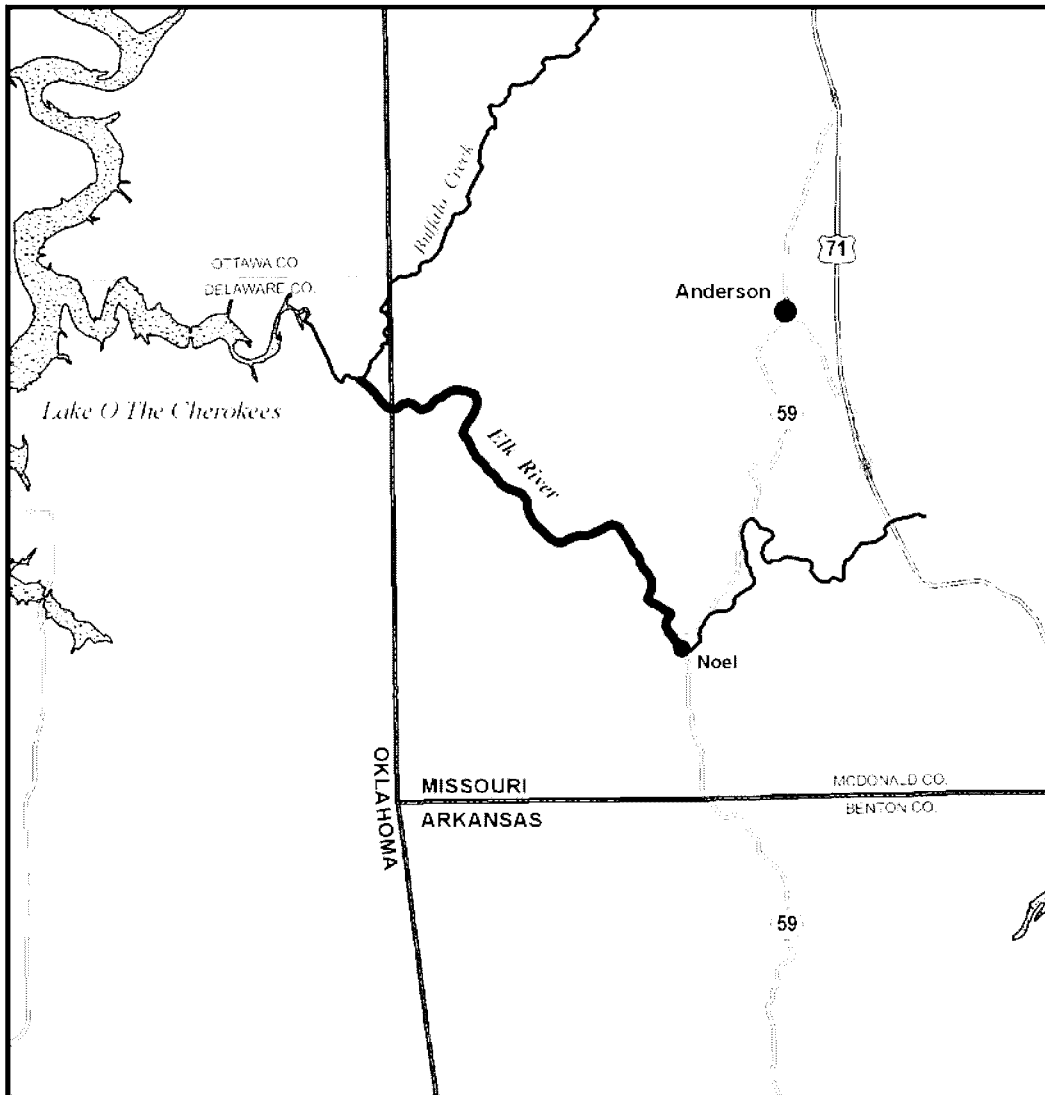
(i) *General Description:* Unit NM2 includes 20.3 rkm (12.6 rmi) of the Elk

River from Missouri Highway 59 at Noel, McDonald County, Missouri, to the confluence of Buffalo Creek immediately downstream of the

Oklahoma and Missouri State line, Delaware County, Oklahoma.

(ii) Map of Unit NM2 follows:

Map of Unit NM2 (Elk River) of critical habitat for Neosho mucket



 Critical Habitat



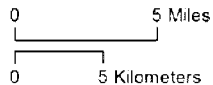
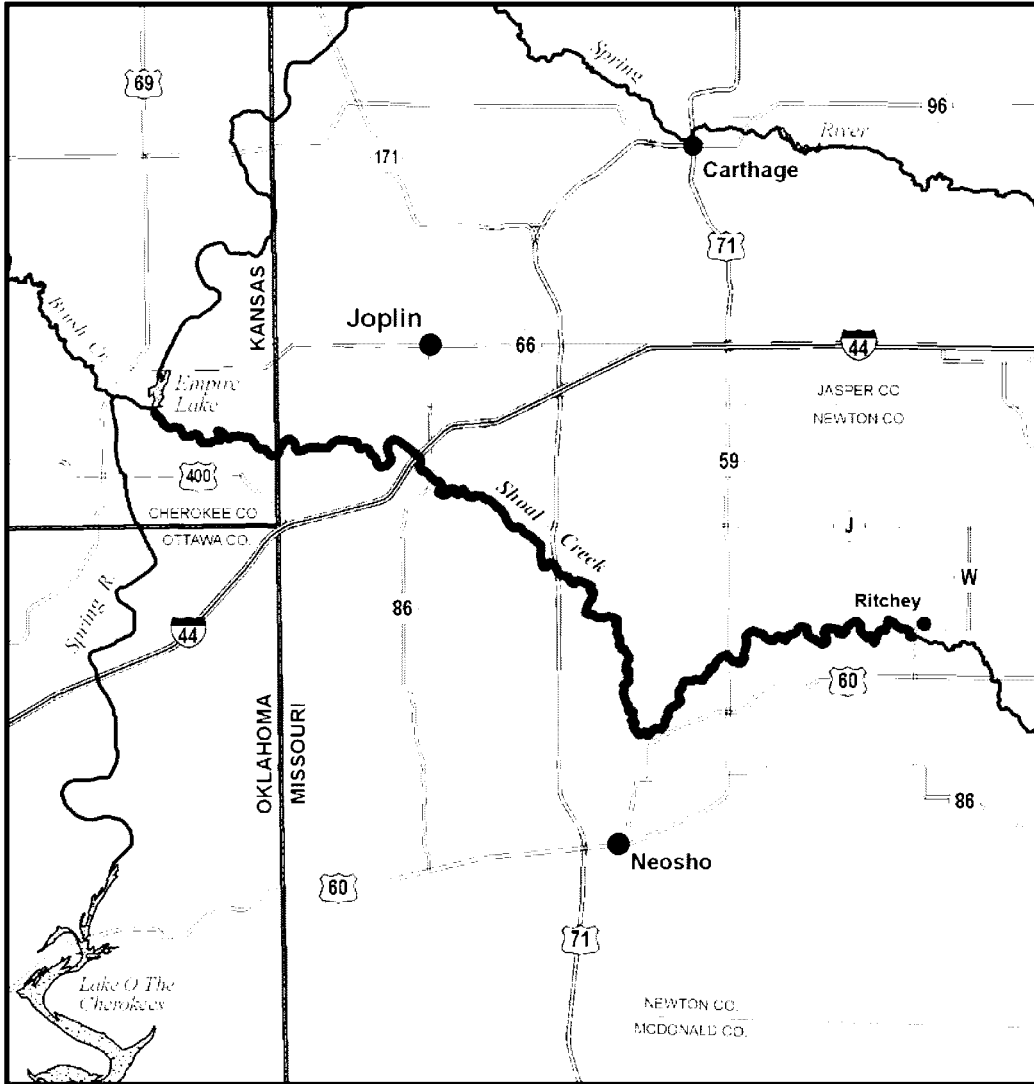
(8) Unit NM3: Shoal Creek—Cherokee County, Kansas; and Newton County, Missouri.

(i) *General Description:* Unit NM3 includes 75.8 rkm (47.1 rmi) of Shoal Creek from Missouri Highway W near Ritchey, Newton County, Missouri, to

Empire Lake where inundation begins in Cherokee County, Kansas.

(ii) Map of Unit NM3 follows:

Map of Unit NM3 (Shoal Creek) of critical habitat for Neosho mucket



 Critical Habitat



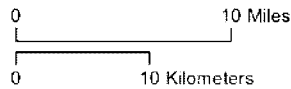
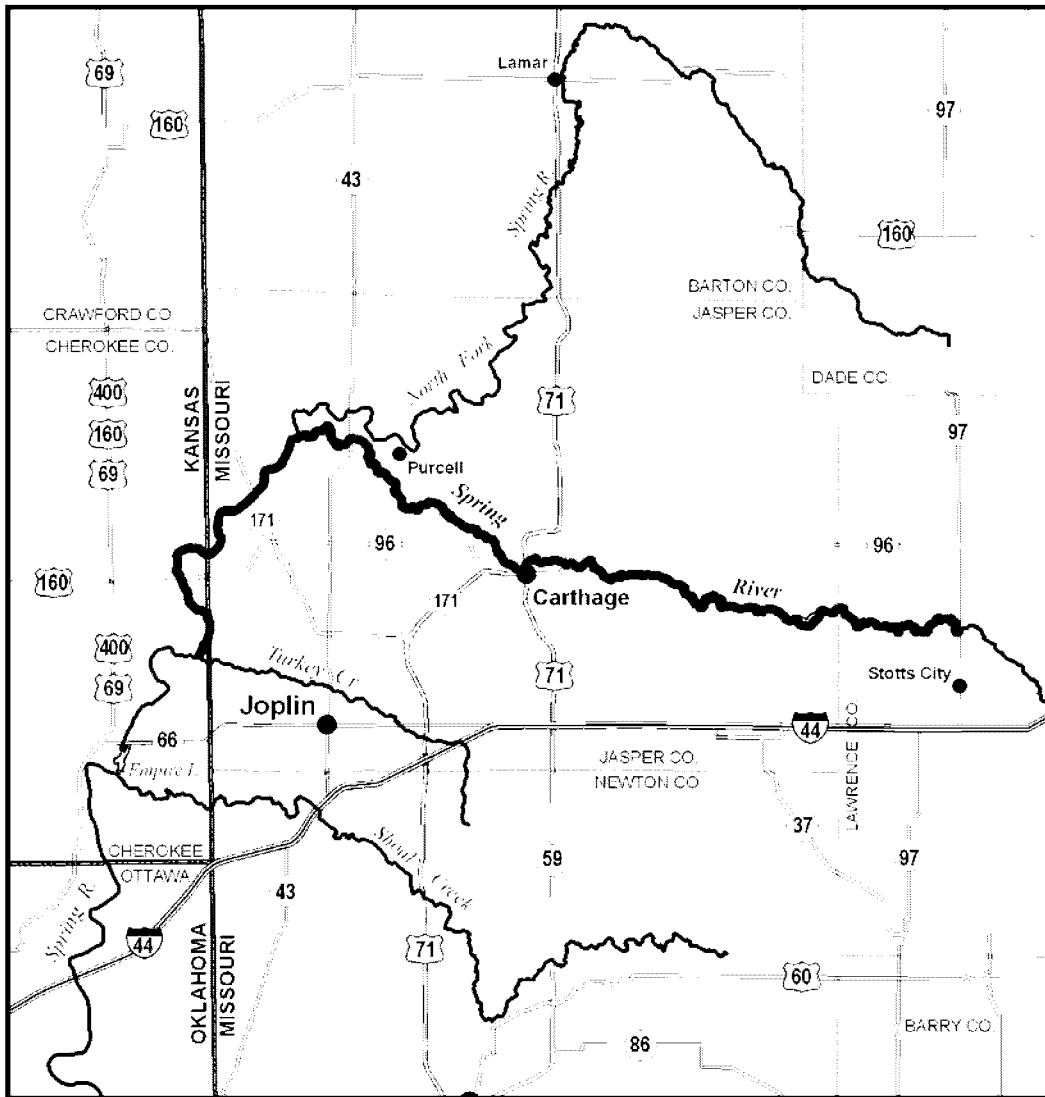
(9) Unit NM4: Spring River—Jasper and Lawrence Counties, Missouri; and Cherokee County, Kansas.

(i) *General Description:* Unit NM4 includes 102.3 rkm (63.6 rmi) of the Spring River from Missouri Highway 97 north of Stotts City, Lawrence County,

Missouri, downstream to the confluence of Turkey Creek north of Empire, Cherokee County, Kansas.

(ii) Map of Unit NM4 follows:

Map of Unit NM4 (Spring River) of critical habitat for Neosho mucket



 Critical Habitat



1493 320

(10) Unit NM5: North Fork Spring River—Jasper County, Missouri.

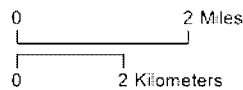
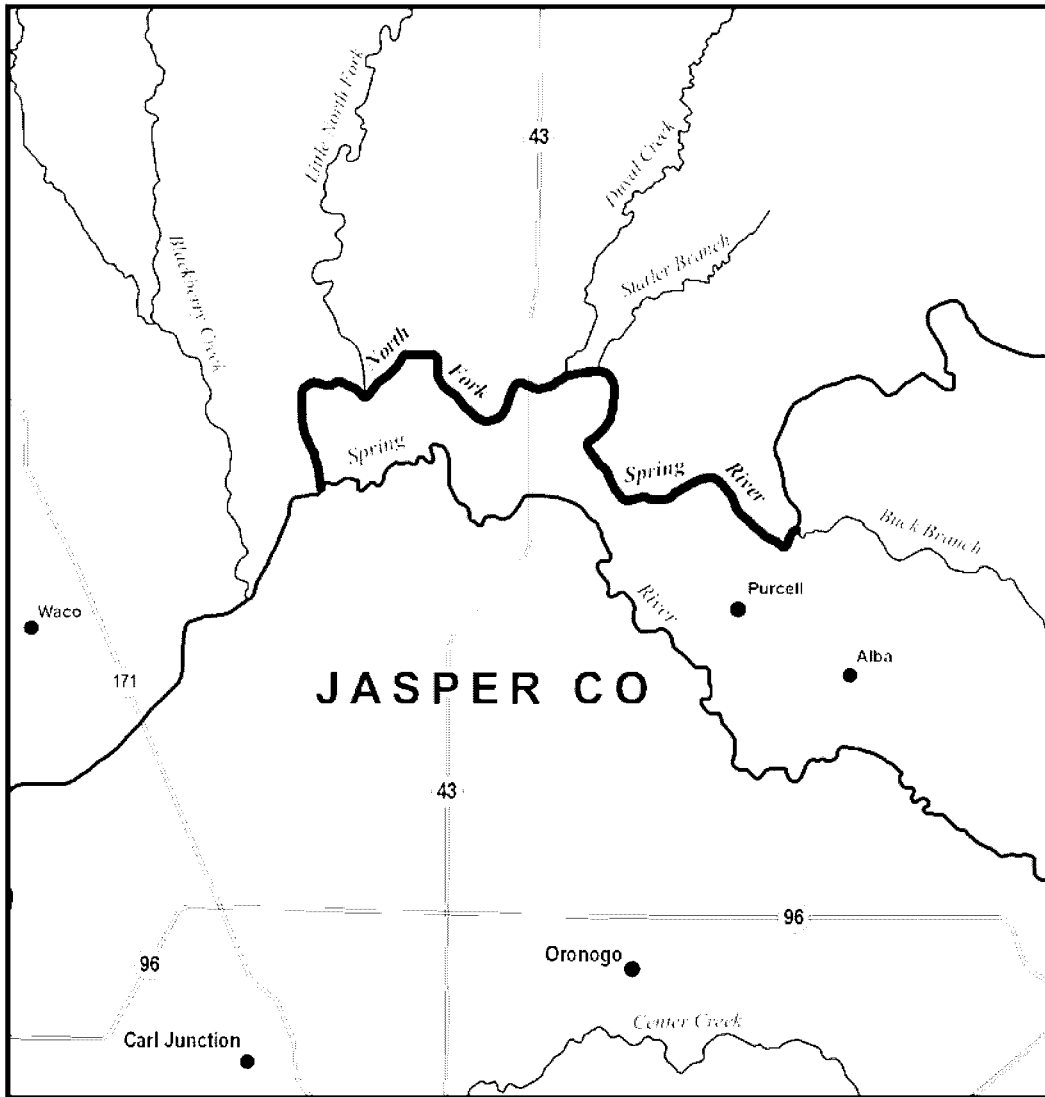
(i) *General Description:* Unit NM5 includes 16.4 rkm (10.2 rmi) of the

North Fork Spring River from the confluence of Buck Branch southwest of Jasper, Missouri, downstream to its

confluence with the Spring River near Purcell, Jasper County, Missouri.

(ii) Map of Unit NM5 follows:

Map of Unit NM5 (North Fork Spring River) of critical habitat for Neosho mucket



(11) Unit NM6: Fall River—Elk, Greenwood, and Wilson Counties, Kansas; Verdigris River—Montgomery and Wilson Counties, Kansas.

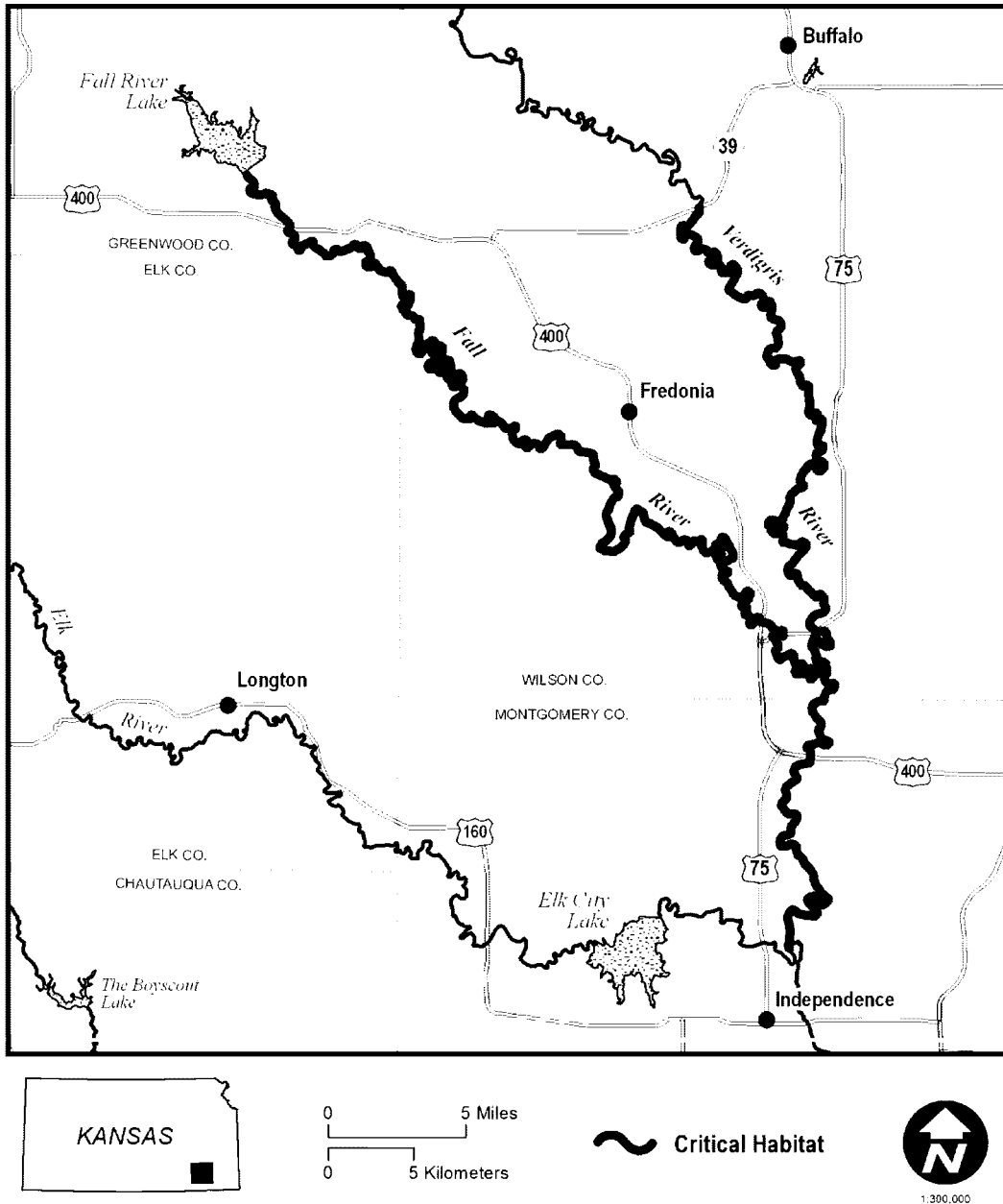
(i) *General Description:* Unit NM6 includes a total of 171.1 rkm (106.3 rmi) including 90.4 rkm (56.2 rmi) of the Fall

River from Fall River Lake dam northwest of Fall River, Greenwood County, Kansas, downstream to its confluence with the Verdigris River near Neodesha, Wilson County, Kansas. Unit NM6 also includes 80.6 rkm (50.1 rmi) of the Verdigris River from Kansas

Highway 39 near Benedict, Wilson County, Kansas, downstream to the Elk River confluence near Independence, Montgomery County, Kansas.

(ii) Map of Unit NM6 follows:

Map of Unit NM6 (Fall & Verdigris Rivers) of critical habitat for Neosho mucket



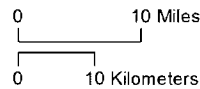
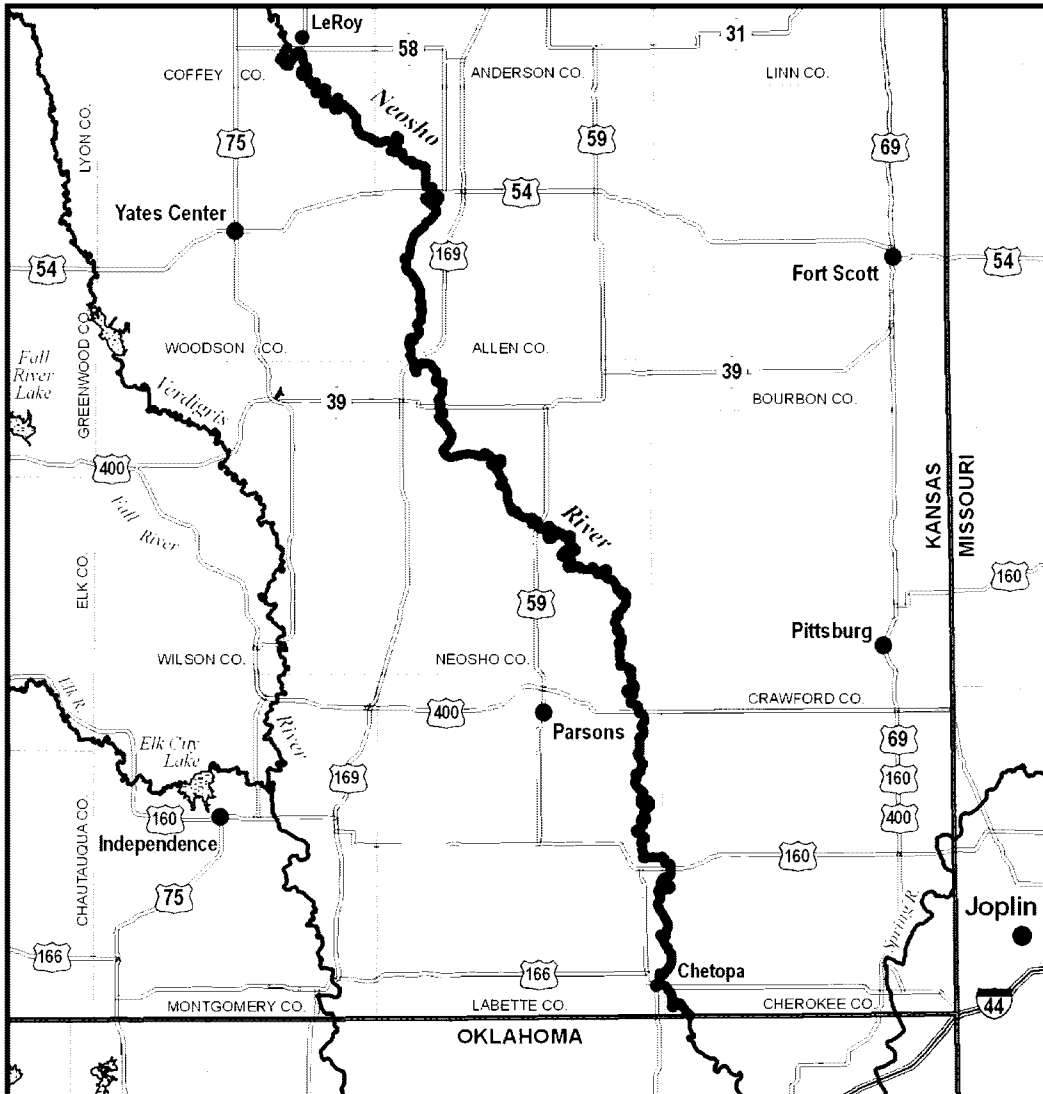
(12) Unit NM7: Neosho River—Allen, Cherokee, Coffey, Labette, Neosho, and Woodson Counties, Kansas.

(i) *General Description:* Unit NM7 includes 244.5 rkm (151.9 rmi) of the Neosho River from Kansas Highway 58 west of LeRoy, Coffey County, Kansas,

downstream to the Kansas and Oklahoma State line, Cherokee County, Kansas.

(ii) Map of Unit NM7 follows:

Map of Unit NM7 (Neosho River) of critical habitat for Neosho mucket



 Critical Habitat



1:700,000

Rabbitsfoot (*Quadrula cylindrica cylindrica*)

(1) Critical habitat units are depicted for rabbitsfoot on the maps below in the following Counties:

(i) Colbert, Jackson, Madison, and Marshall Counties, Alabama;

(ii) Arkansas, Ashley, Bradley, Clark, Cleburne, Cleveland, Drew, Hot Spring, Independence, Izard, Jackson, Lawrence, Little River, Marion, Monroe, Newton, Ouachita, Randolph, Searcy,

Sevier, Sharp, Van Buren, White, and Woodruff Counties, Arkansas;

(iii) Massac, Pulaski, and Vermilion Counties, Illinois;

(iv) Carroll, Pulaski, Tippecanoe, and White Counties, Indiana;

(v) Allen and Cherokee Counties, Kansas;

(vi) Ballard, Edmonson, Green, Hart, Livingston, Logan, Marshall, McCracken, and Taylor Counties, Kentucky;

(vii) Hinds, Sunflower, Tishomingo, and Warren Counties, Mississippi;

(viii) Jasper, Madison, and Wayne Counties, Missouri;

(ix) Coshocton, Madison, Union, and Williams Counties, Ohio;

(x) McCurtain and Rogers Counties, Oklahoma;

(xi) Crawford, Erie, Mercer, and Venango Counties, Pennsylvania; and

(xii) Hardin, Hickman, Humphreys, Marshall, Maury, Montgomery, Perry, and Robertson Counties, Tennessee.

(2) Within these areas, the primary constituent elements of the physical or biological features essential to the

conservation of the rabbitsfoot consist of five components:

(i) Geomorphically stable river channels and banks (channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation) with habitats that support a diversity of freshwater mussel and native fish (such as stable riffles, sometimes with runs, and mid-channel island habitats that provide flow refuges consisting of gravel and sand substrates with low to moderate amounts of fine sediment and attached filamentous algae).

(ii) A hydrologic flow regime (the severity, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats where the species are found and to maintain connectivity of rivers with the floodplain, allowing the exchange of nutrients and sediment for maintenance of the mussel's and fish host's habitat, food availability, spawning habitat for native fishes, and the ability for newly transformed juveniles to settle and become established in their habitats.

(iii) Water and sediment quality (including, but not limited to, conductivity, hardness, turbidity, temperature, pH, ammonia, heavy metals, and chemical constituents) necessary to sustain natural

physiological processes for normal behavior, growth, and viability of all life stages.

(iv) The occurrence of natural fish assemblages, reflected by fish species richness, relative abundance, and community composition, for each inhabited river or creek that will serve as an indication of appropriate presence and abundance of fish hosts necessary for recruitment of the rabbitsfoot. Suitable fish hosts for rabbitsfoot may include, but are not limited to, blacktail shiner (*Cyprinella venusta*) from the Black and Little River and cardinal shiner (*Luxilus cardinalis*), red shiner (*C. lutrensis*), spotfin shiner (*C. spiloptera*), bluntface shiner (*C. camura*), rainbow darter (*Etheostoma caeruleum*), rosyface shiner (*Notropis rubellus*), striped shiner (*L. chrysocephalus*), and emerald shiner (*N. atherinoides*).

(v) Competitive or predaceous invasive (nonnative) species in quantities low enough to have minimal effect on survival of freshwater mussels.

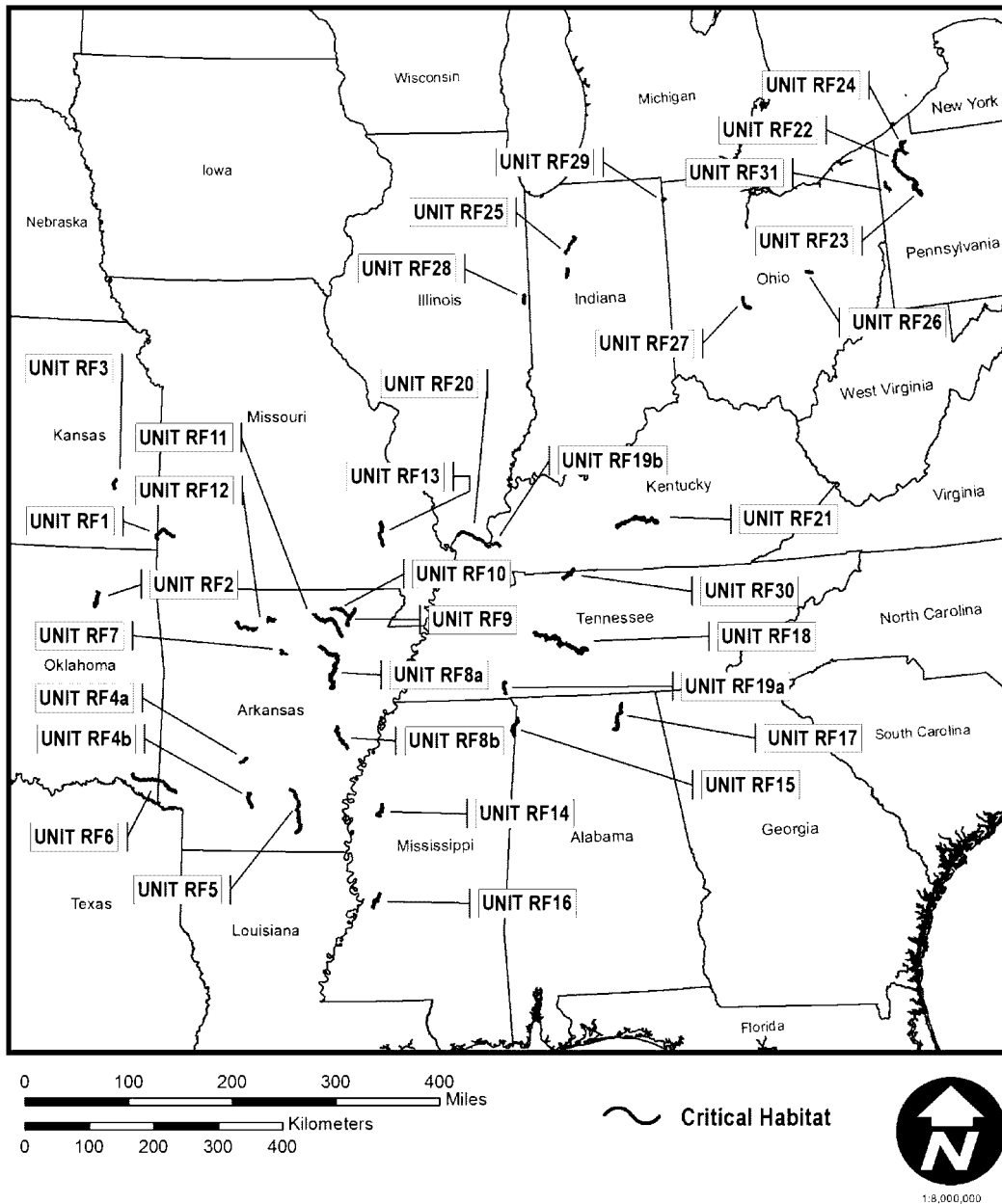
(3) Critical habitat does not include manmade structures (such as dams, piers and docks, bridges, or other similar structures) within the legal boundaries on June 1, 2015.

(4) *Critical habitat map units.* Data layers defining map units were developed using ESRI ArcGIS mapping

software along with various spatial data layers. Critical habitat unit upstream and downstream limits were delineated at the nearest road crossing or stream confluence of each occupied reach. Data layers defining map units were created with U.S. Geological Survey National Hydrography Dataset (NHD) Medium Flowline data. ArcGIS was also used to calculate river kilometers (rkm) and river miles (rmi) from the NHD dataset, and it was used to determine longitude and latitude coordinates in decimal degrees. The projection used in mapping and calculating distances and locations within the units was North American Albers Equal Area Conic, NAD 83. The maps in this entry, as modified by any accompanying regulatory text, establish the boundaries of the critical habitat designation. The coordinates, plot points, or both on which each map is based are available to the public at the Service's Internet site (http://www.fws.gov/arkansas-es/te_listing.html), the Federal eRulemaking Portal (<http://www.regulations.gov> at Docket No. FWS-R4-ES-2013-0007), and at the field office responsible for this designation. You may obtain field office location information by contacting one of the Service regional offices, the addresses of which are listed at 50 CFR 2.2.

(5) Note: Index map of all critical habitat units for the rabbitsfoot follows:

Index map of critical habitat units for Rabbitsfoot



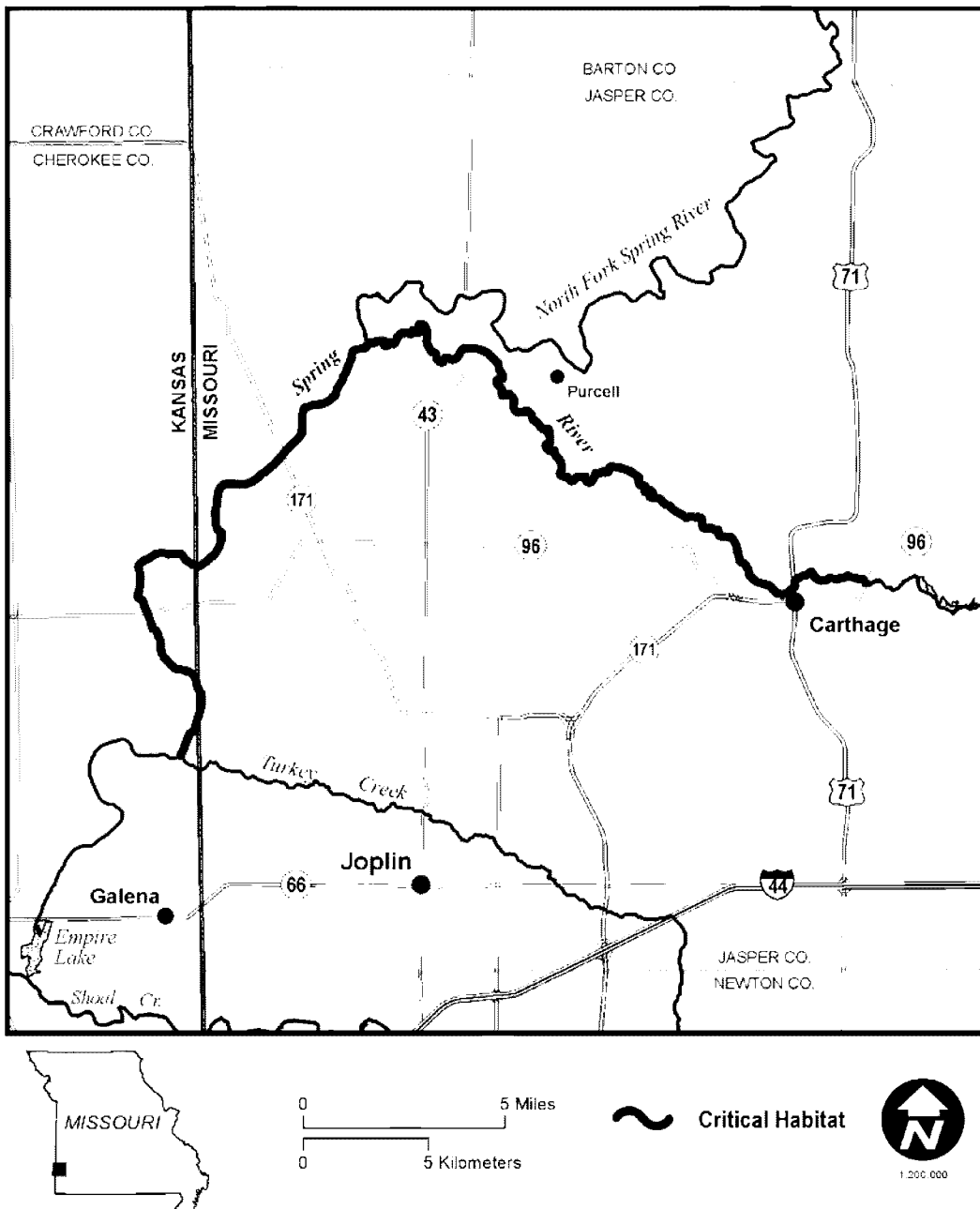
(6) Unit RF1: Spring River—Jasper County, Missouri; and Cherokee County, Kansas.

(i) *General Description:* Unit RF1 includes 56.5 rkm (35.1 rmi) of the Spring River from Missouri Highway 96 at Carthage, Jasper County, Missouri,

downstream to the confluence of Turkey Creek north of Empire, Cherokee County, Kansas.

(ii) Map of Unit RF1 follows:

Map of Unit RF1 (Spring River) of critical habitat for Rabbitsfoot



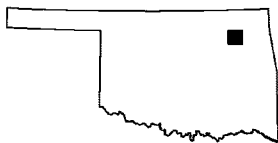
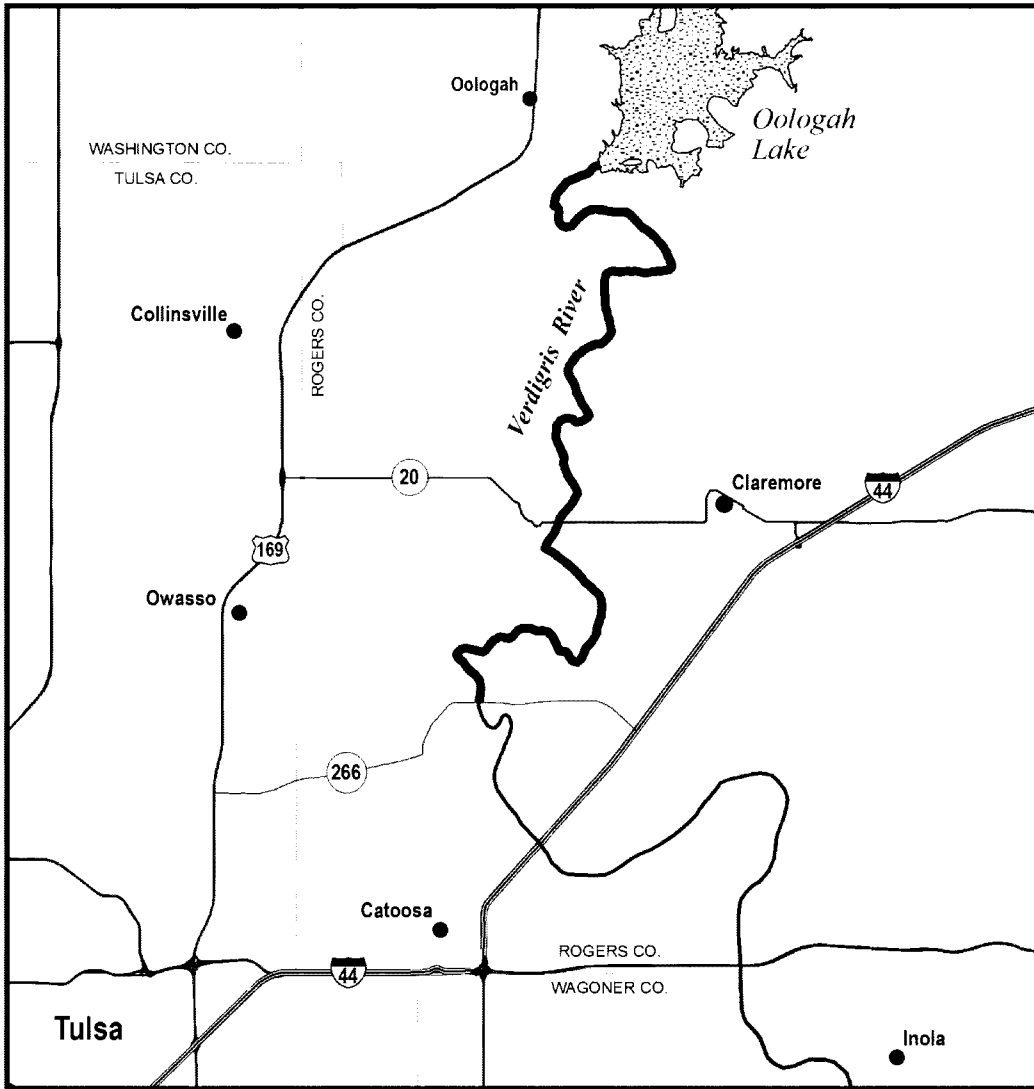
(7) Unit RF2: Verdigris River—Rogers County, Oklahoma.
 (i) *General Description:* Unit RF2 includes 38.0 rkm (23.6 rmi) of the

Verdigris River from Oologah Lake dam north of Claremore, Oklahoma, downstream to Oklahoma Highway 266

northwest of Catoosa, Rogers County, Oklahoma.

(ii) Map of Unit RF2 follows:

Map of Unit RF2 (Verdigris River) of critical habitat for Rabbitsfoot



(8) Unit RF3: Neosho River—Allen County, Kansas.

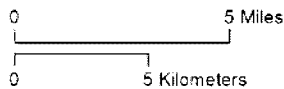
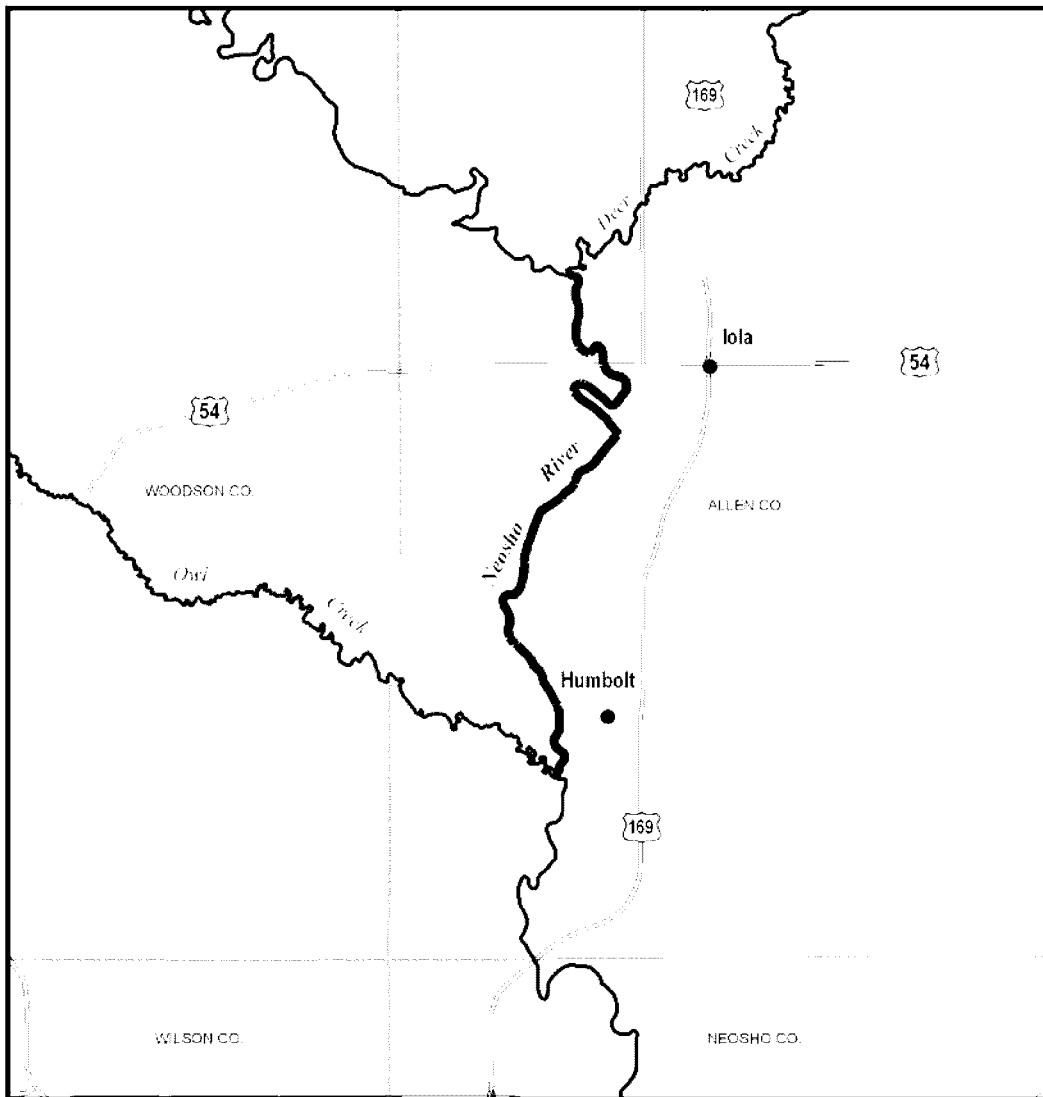
(i) *General Description:* Unit RF3 includes 26.6 rkm (16.5 rmi) of the

Neosho River from the Deer Creek confluence northwest of Iola, Kansas, downstream to the confluence of Owl

Creek southwest of Humboldt, Allen County, Kansas.

(ii) Map of Unit RF3 follows:

Map of Unit RF3 (Neosho River) of critical habitat for Rabbitsfoot



Critical Habitat



1:250,000

(9) Unit RF4a: Ouachita River—Clark and Hot Spring Counties, Arkansas.

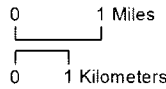
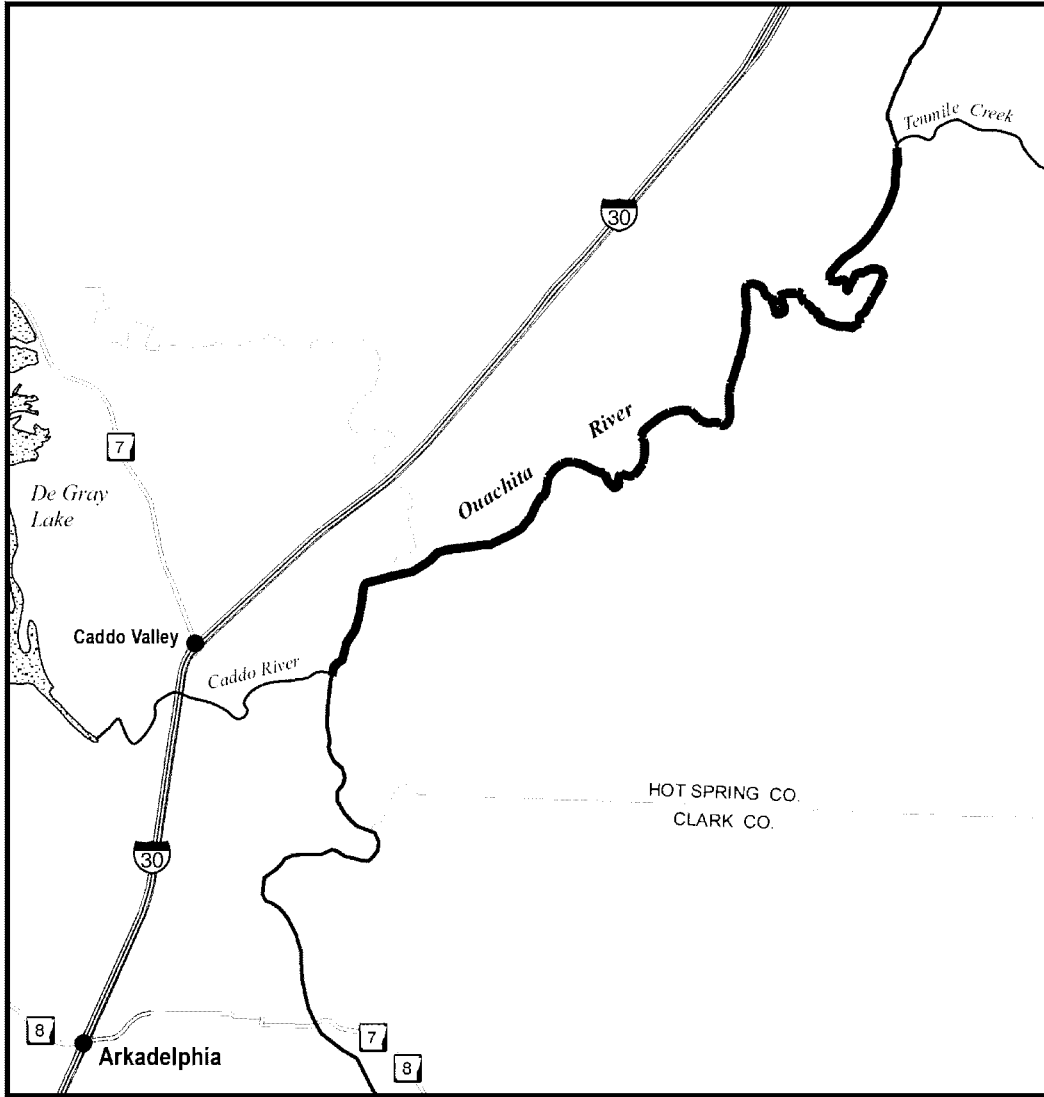
(i) *General Description:* Unit RF4a includes 22.7 rkm (14.1 rmi) of the

Ouachita River from the Tenmile Creek confluence north of Donaldson downstream to the Caddo River

confluence near Caddo Valley, Hot Spring and Clark Counties, Arkansas.

(ii) Map of Unit RF4a follows:

Map of Unit RF4a (Ouachita River) of critical habitat for Rabbitsfoot



Critical Habitat



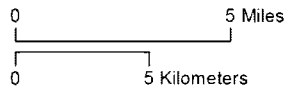
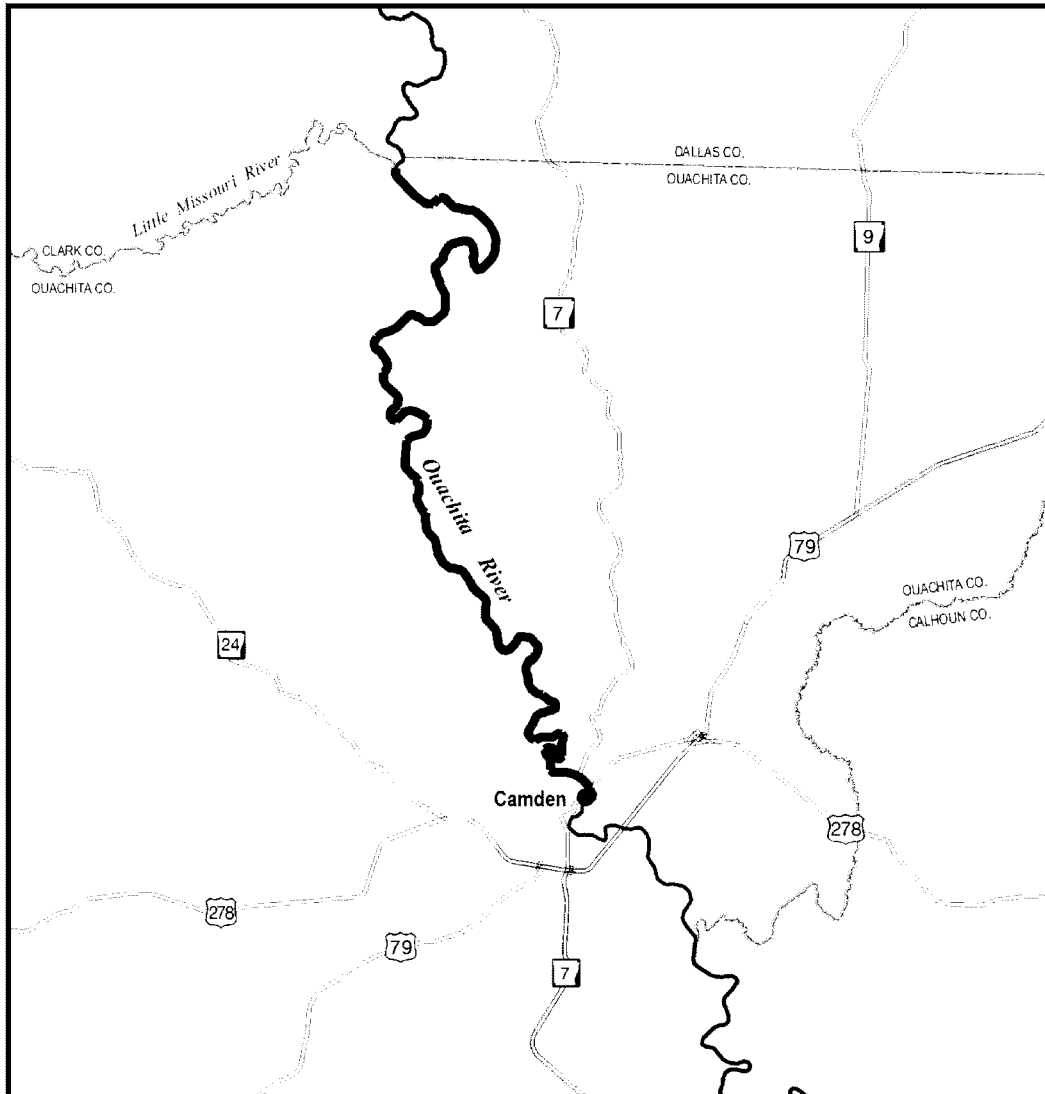
(10) Unit RF4b: Ouachita River—
Ouachita County, Arkansas.

(i) *General Description:* Unit RF4b
includes 43.0 rkm (26.7 rmi) of the

Ouachita River from the Little Missouri
River confluence downstream to U.S.
Highway 79 at Camden, Ouachita
County, Arkansas.

(ii) Map of Unit RF4b follows:

Map of Unit RF4b (Ouachita River) of critical habitat for Rabbitsfoot



 Critical Habitat



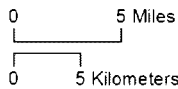
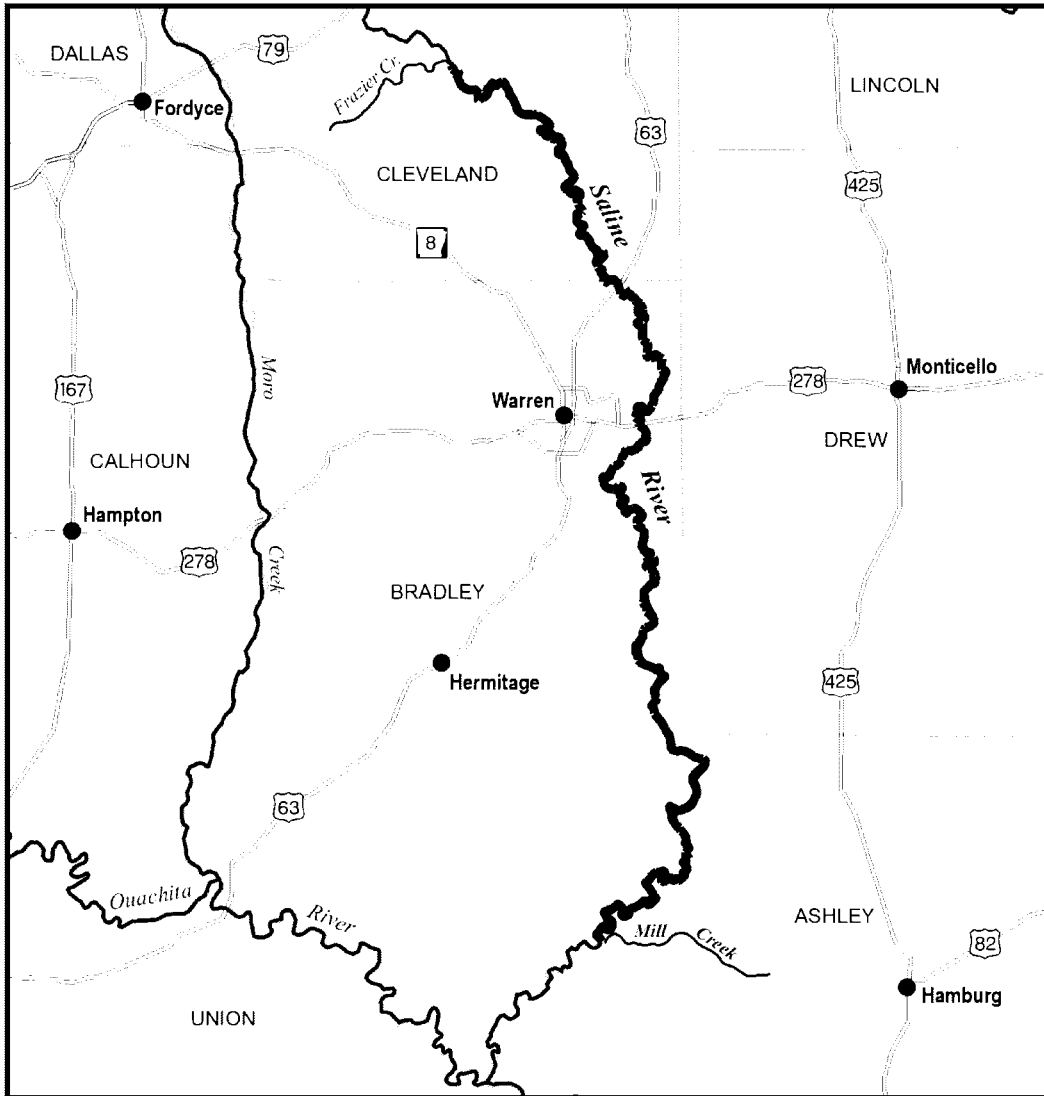
(11) Unit RF5: Saline River—Ashley, Bradley, Cleveland, and Drew Counties, Arkansas.

(i) *General Description:* Unit RF5 includes 119.4 rkm (74.2 rmi) of the Saline River from the Frazier Creek confluence near Mount Elba, Cleveland

County, Arkansas, to the Mill Creek confluence near Stillions, Ashley and Bradley Counties, Arkansas.

(ii) Map of Unit RF5 follows:

Map of Unit RF5 (Saline River) of critical habitat for Rabbitsfoot



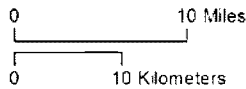
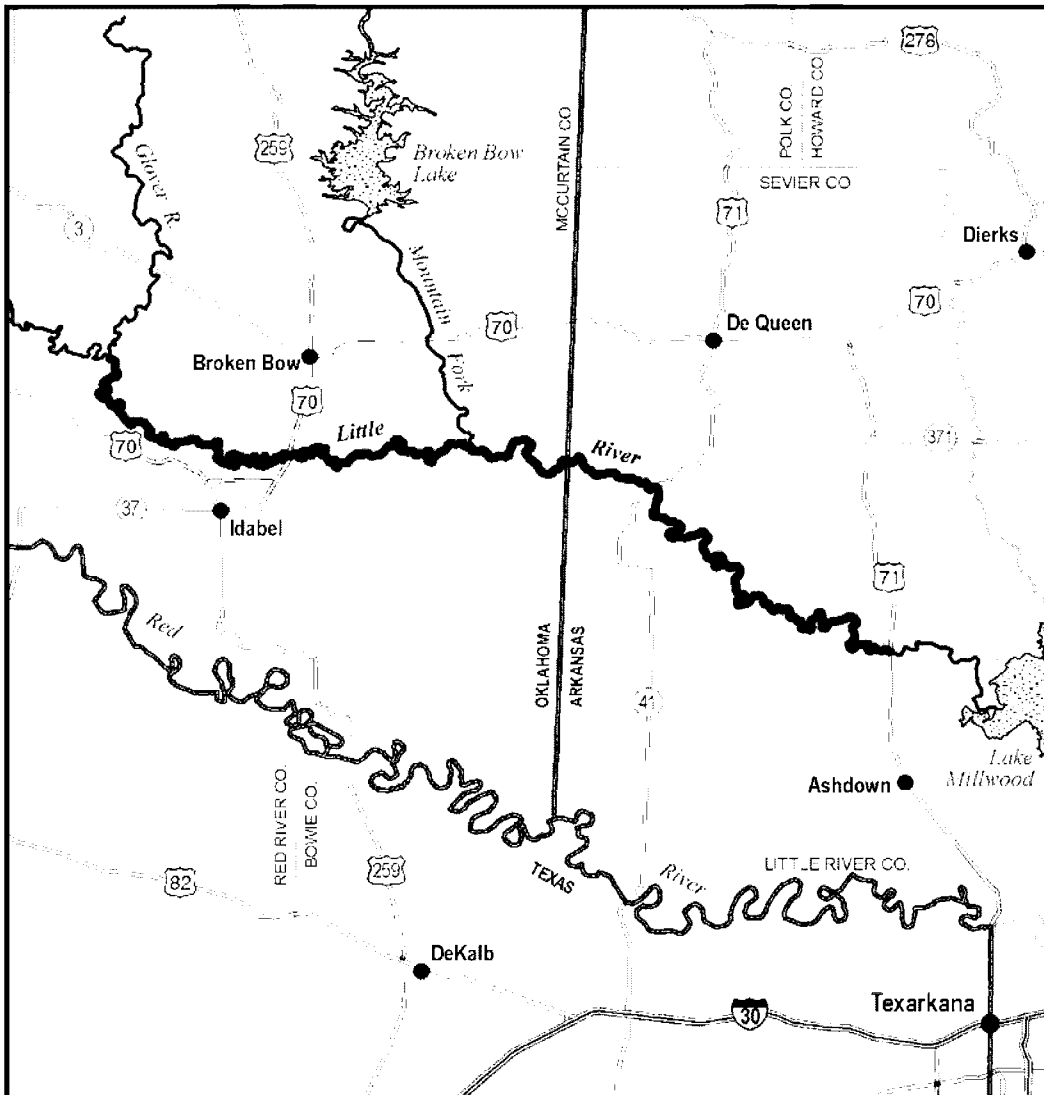
(12) Unit RF6: Little River—
 McCurtain County, Oklahoma; and
 Little River and Sevier Counties,
 Arkansas.

(i) *General Description:* Unit RF6
 includes 139.7 rkm (86.8 rmi) of the
 Little River from the Glover River
 confluence northwest of Idabel,
 McCurtain County, Oklahoma,

downstream to U.S. Highway 71 north
 of Wilton, Little River and Sevier
 Counties, Arkansas.

(ii) Map of Unit RF6 follows:

Map of Unit RF6 (Little River) of critical habitat for Rabbitsfoot



 Critical Habitat



(13) Unit RF7: Middle Fork Little Red River—Cleburne and Van Buren Counties, Arkansas.

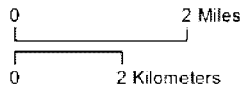
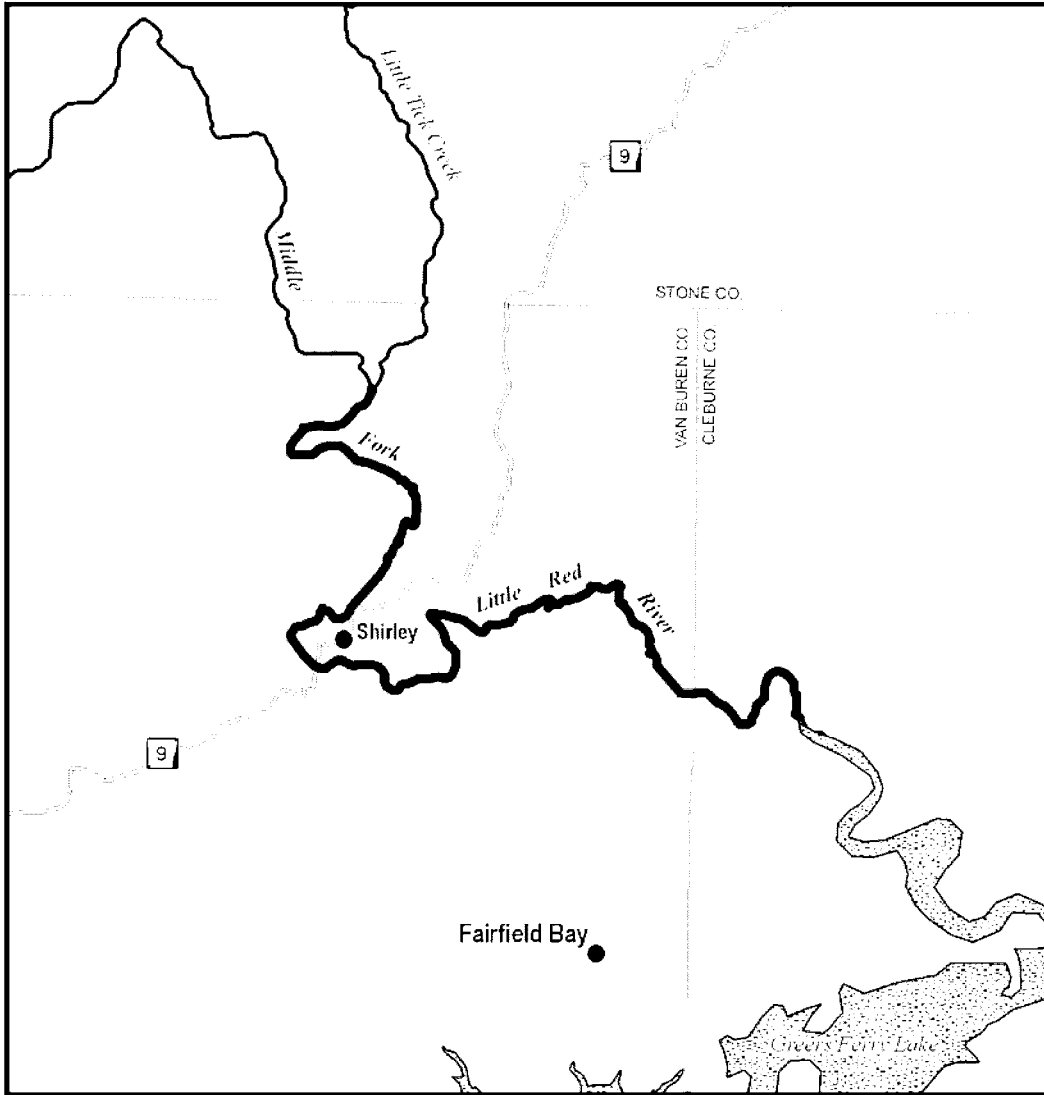
(i) *General Description:* Unit RF7 includes 24.8 rkm (15.4 rmi) of the

Middle Fork Little Red River from the confluence of Little Tick Creek north of Shirley, Arkansas, downstream to Greers Ferry Reservoir (where

inundation begins), Van Buren County, Arkansas.

(ii) Map of Unit RF7 follows:

Map of Unit RF7 (Middle Fork Little Red River) of critical habitat for Rabbitsfoot



 Critical Habitat



(14) Unit RF8a: White River—Independence, Jackson, White, and Woodruff Counties, Arkansas.

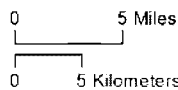
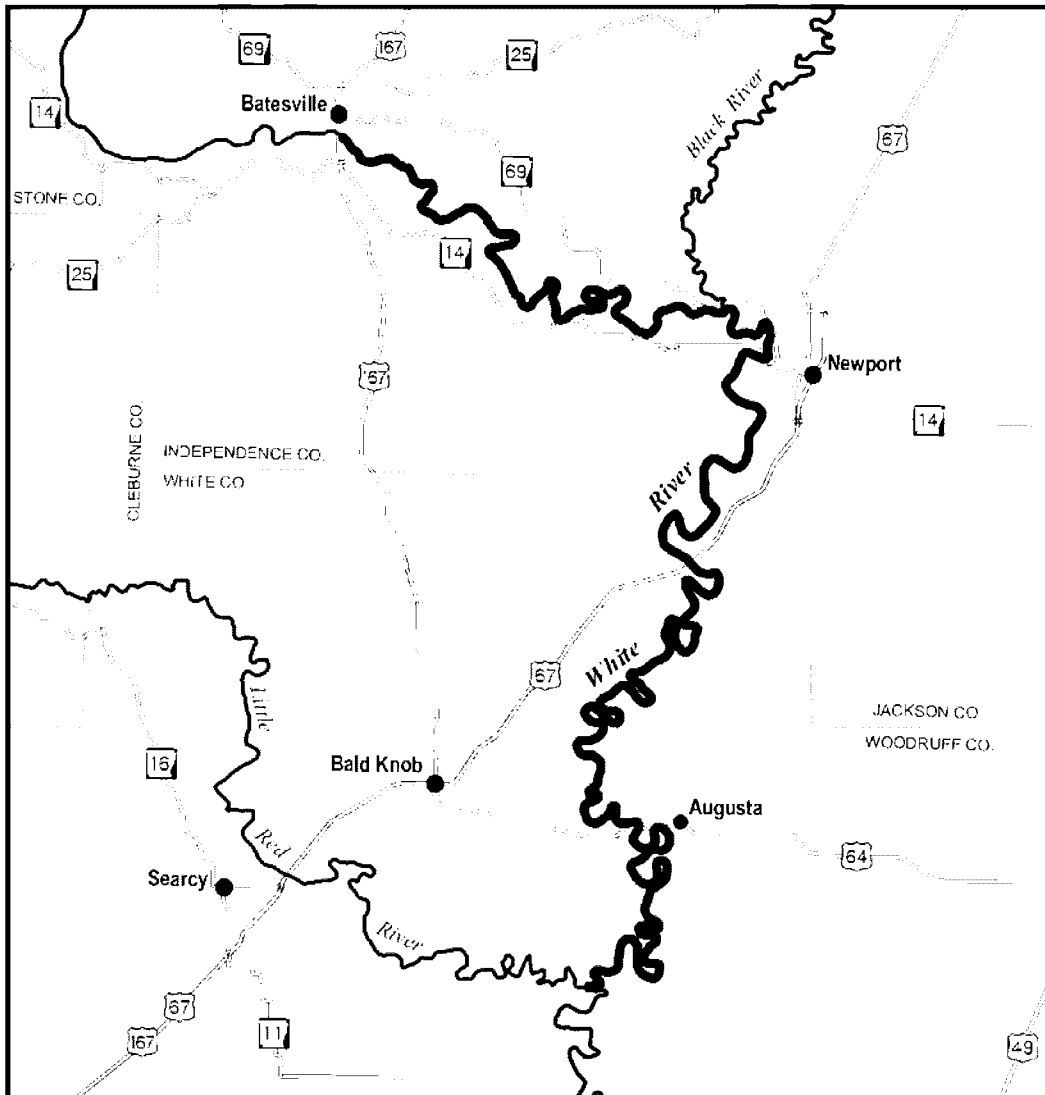
(i) *General Description:* Unit RF8a includes 188.3 rkm (117.0 rmi) of the

White River from the Batesville Dam at Batesville, Independence County, Arkansas, downstream to the Little Red River confluence north of Georgetown,

White, and Woodruff Counties, Arkansas.

(ii) Map of Unit RF8a follows:

Map of Unit RF8a (White River) of critical habitat for Rabbitsfoot



~ Critical Habitat



1:400,000

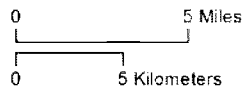
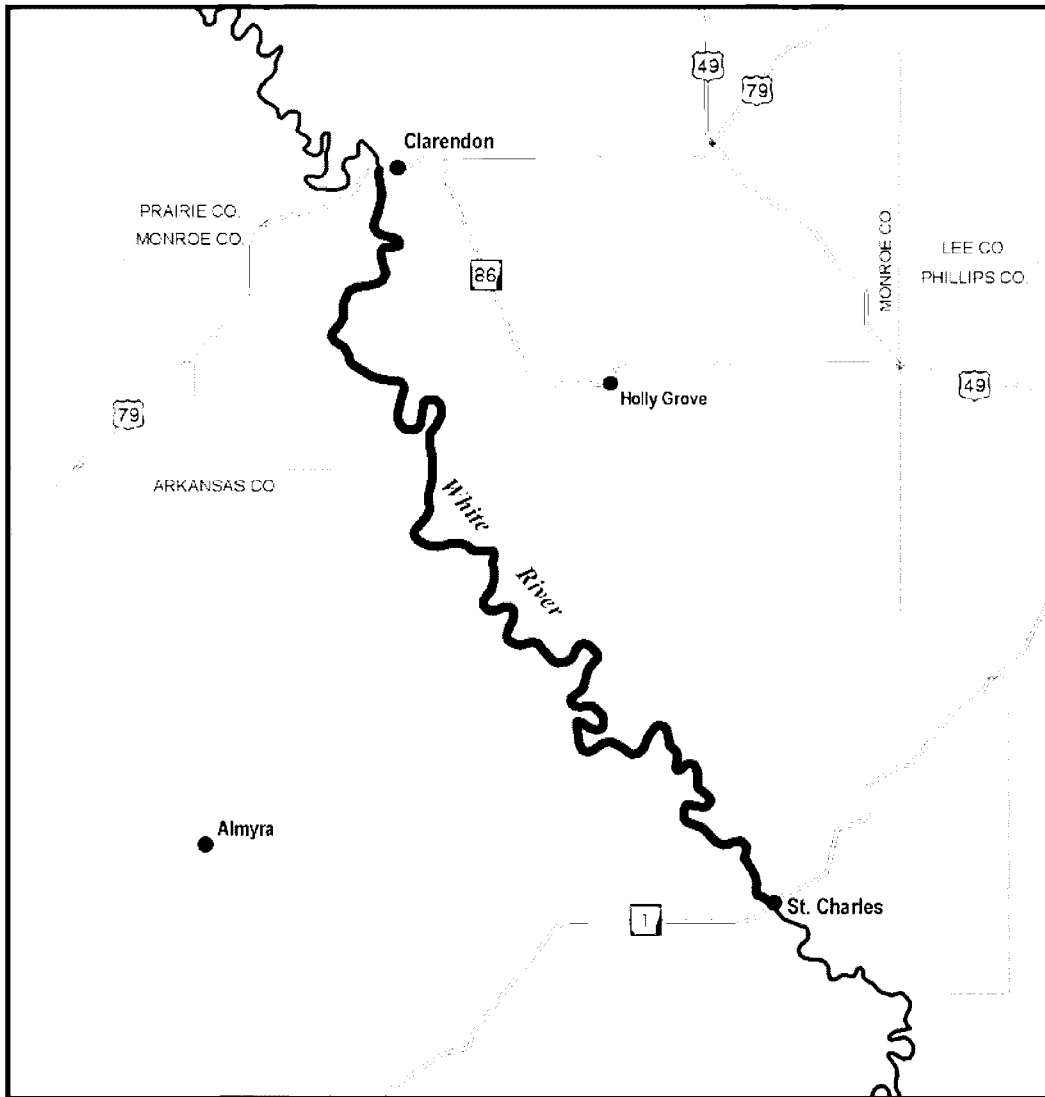
(15) Unit RF8b: White River—Arkansas and Monroe Counties, Arkansas.

(i) *General Description:* Unit RF8b includes 68.9 rkm (42.8 rmi) of the White River from U.S. Highway 79 at Clarendon, Monroe County, Arkansas,

downstream to Arkansas Highway 1 near St. Charles, Arkansas County, Arkansas.

(ii) Map of Unit RF8b follows:

Map of Unit RF8b (White River) of critical habitat for Rabbitsfoot



 Critical Habitat



(16) Unit RF9: Black River—Lawrence and Randolph Counties, Arkansas.

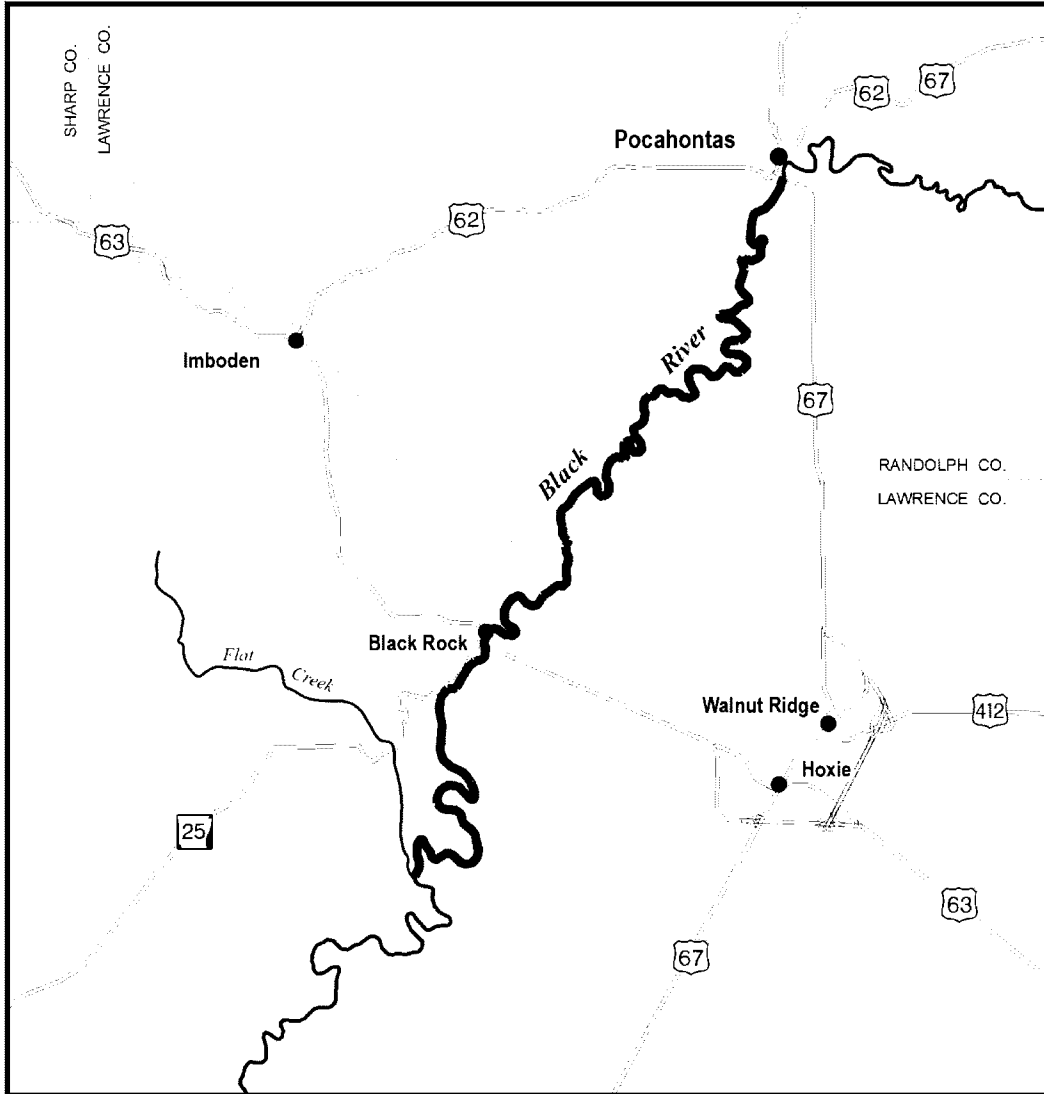
(i) *General Description:* Unit RF9 includes 51.2 rkm (31.8 rmi) of the

Black River from U.S. Highway 67 at Pocahontas, Randolph County, Arkansas, downstream to the Flat Creek

confluence southeast of Powhatan, Lawrence County, Arkansas.

(ii) Map of Unit RF9 follows:

Map of Unit RF9 (Black River) of critical habitat for Rabbitsfoot



 Critical Habitat



1:200,000

(17) Unit RF10: Spring River—Lawrence, Randolph, and Sharp Counties, Arkansas.

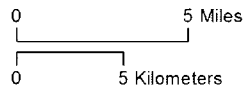
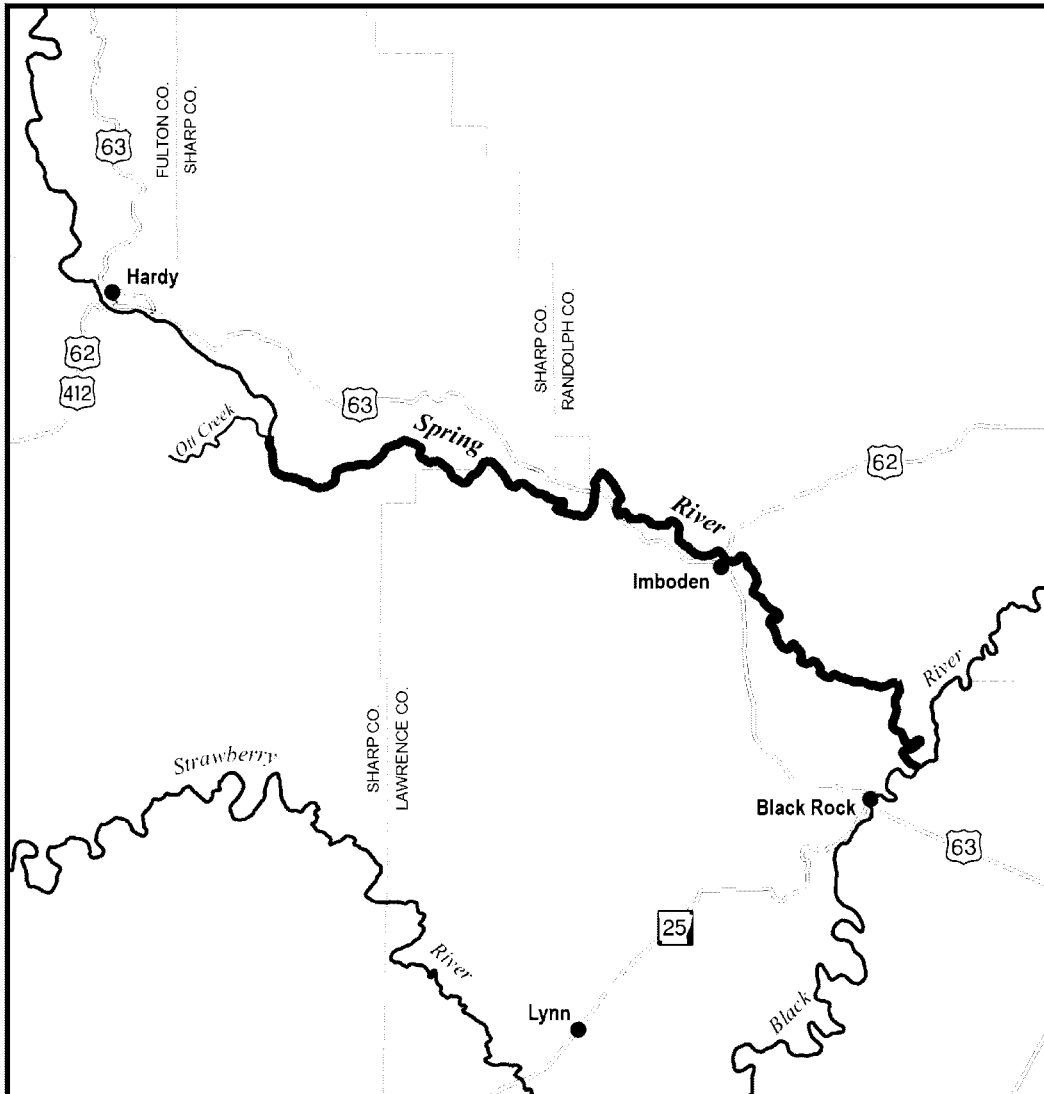
(i) *General Description:* Unit RF10 includes 51.5 rkm (32.0 rmi) of the

Spring River from the Ott Creek confluence southwest of Hardy in Sharp County, Arkansas, downstream to its confluence with the Black River east of

Black Rock, Lawrence and Randolph Counties, Arkansas.

(ii) Map of Unit RF10 follows:

Map of Unit RF10 (Spring River) of critical habitat for Rabbitsfoot



(18) Unit RF11: Strawberry River—Independence, IZard, Lawrence, and Sharp Counties, Arkansas.

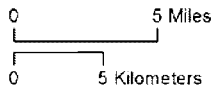
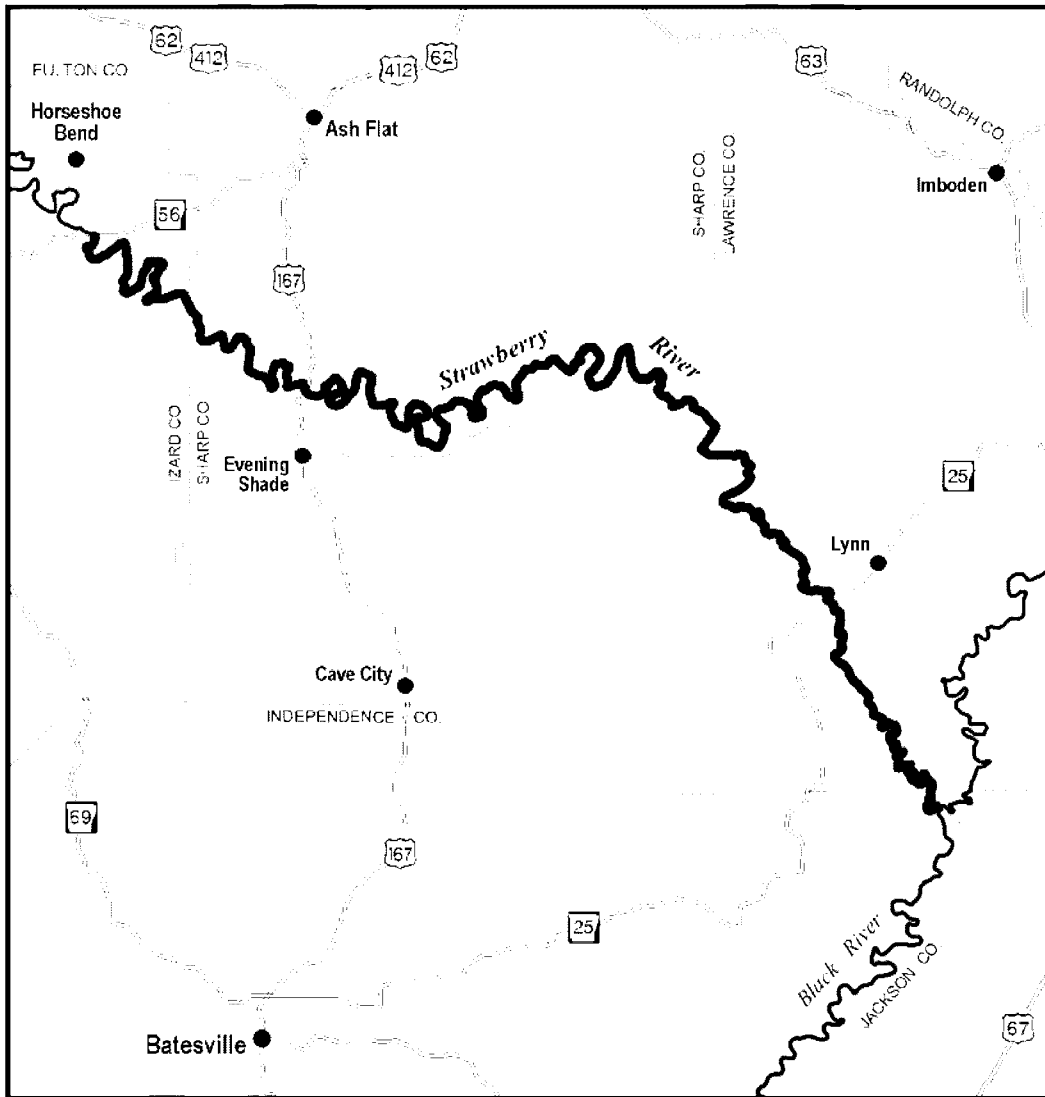
(i) *General Description:* Unit RF11 includes 123.8 rkm (76.9 rmi) of the

Strawberry River from Arkansas Highway 56 south of Horseshoe Bend, IZard County, Arkansas, downstream to its confluence with the Black River

southeast of Strawberry, Lawrence County, Arkansas.

(ii) Map of Unit RF11 follows:

Map of Unit RF11 (Strawberry River) of critical habitat for Rabbitsfoot



 Critical Habitat



1:300,000

(19) Unit RF12: Buffalo River—Marion, Newton, and Searcy Counties, Arkansas.

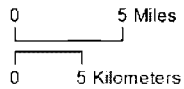
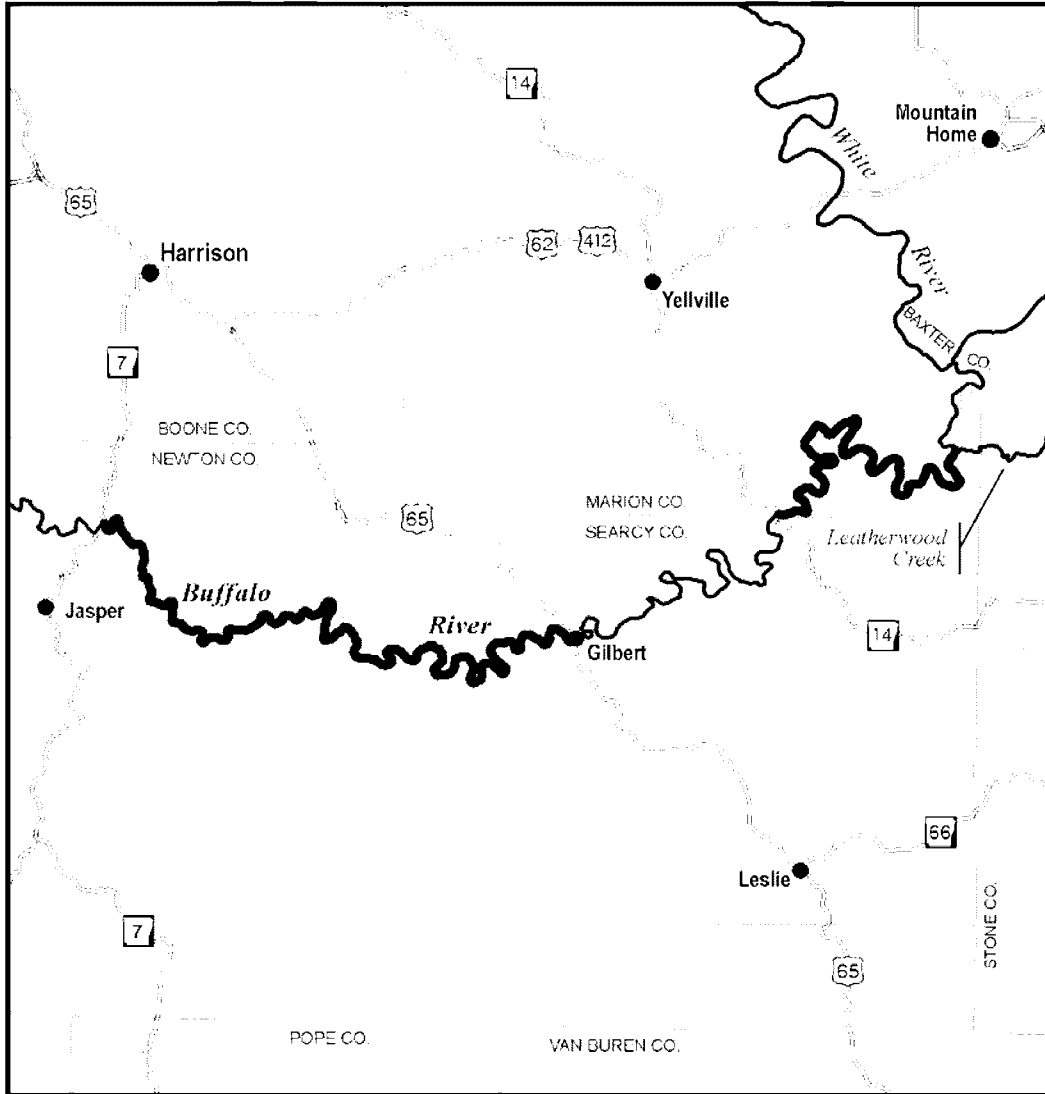
(i) *General Description:* Unit RF12 includes 113.6 rkm (70.6 rmi) of the Buffalo River from the Cove Creek

confluence southeast of Erbie, Newton County, Arkansas, downstream to U.S. Highway 65 west of Gilbert, Searcy County, Arkansas, and Arkansas Highway 14 southeast of Mull, Arkansas, downstream to the

Leatherwood Creek confluence in the Lower Buffalo Wilderness Area, Arkansas.

(ii) Map of Unit RF12 follows:

Map of Unit RF12 (Buffalo River) of critical habitat for Rabbitsfoot



~ Critical Habitat



1:400,000

(20) Unit RF13: St. Francis River—Madison and Wayne Counties, Missouri.

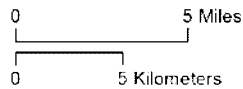
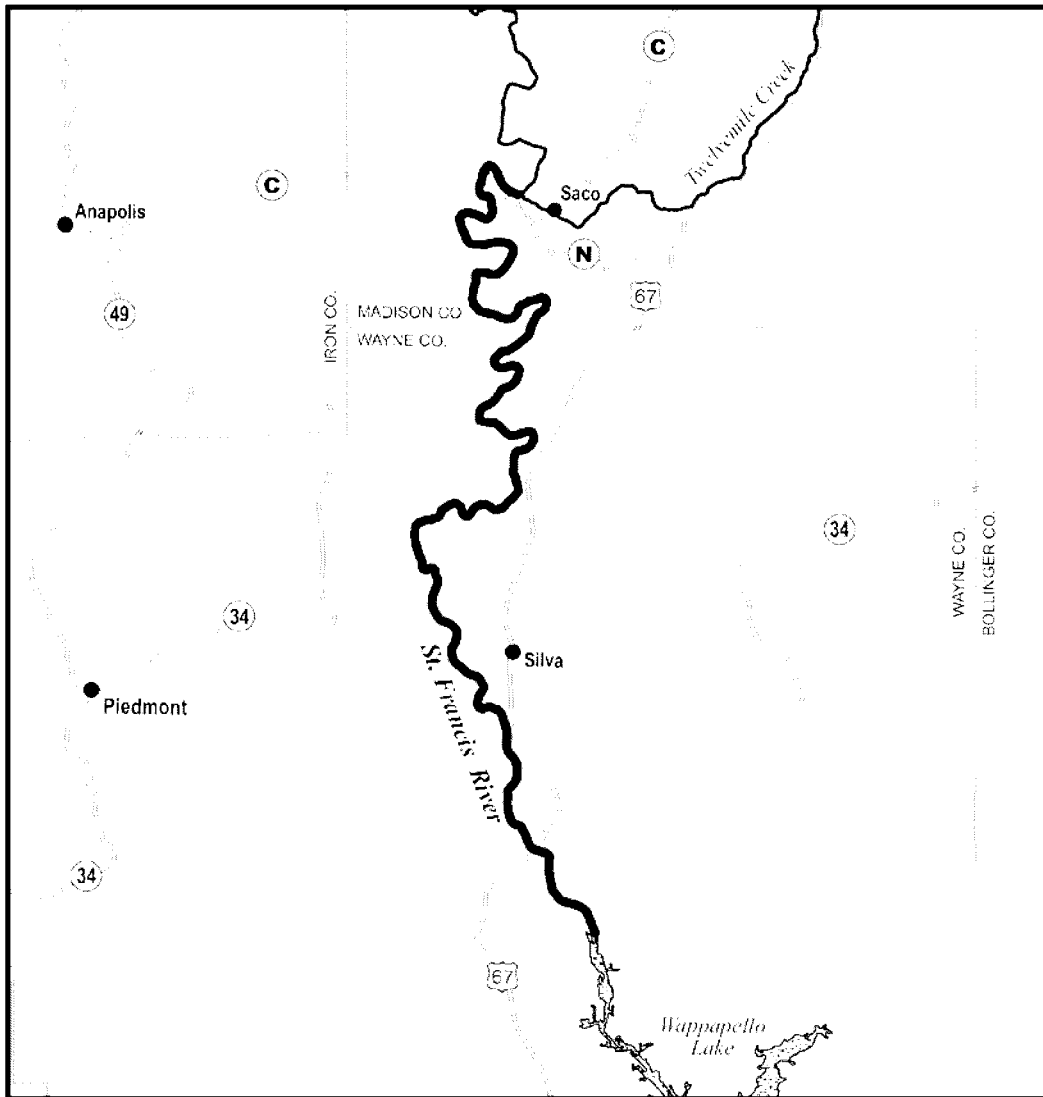
(i) *General Description:* Unit RF13 includes 64.3 rkm (40.0 rmi) of the St.

Francis River from the Twelvemile Creek confluence west of Saco, Madison County, Missouri, downstream to Lake

Wappello (where inundation begins), Wayne County, Missouri.

(ii) Map of Unit RF13 follows:

Map of Unit RF13 (St. Francis River) of critical habitat for Rabbitsfoot



 Critical Habitat



(21) Unit RF14: Big Sunflower River—Sunflower County, Mississippi.

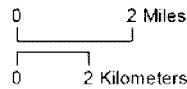
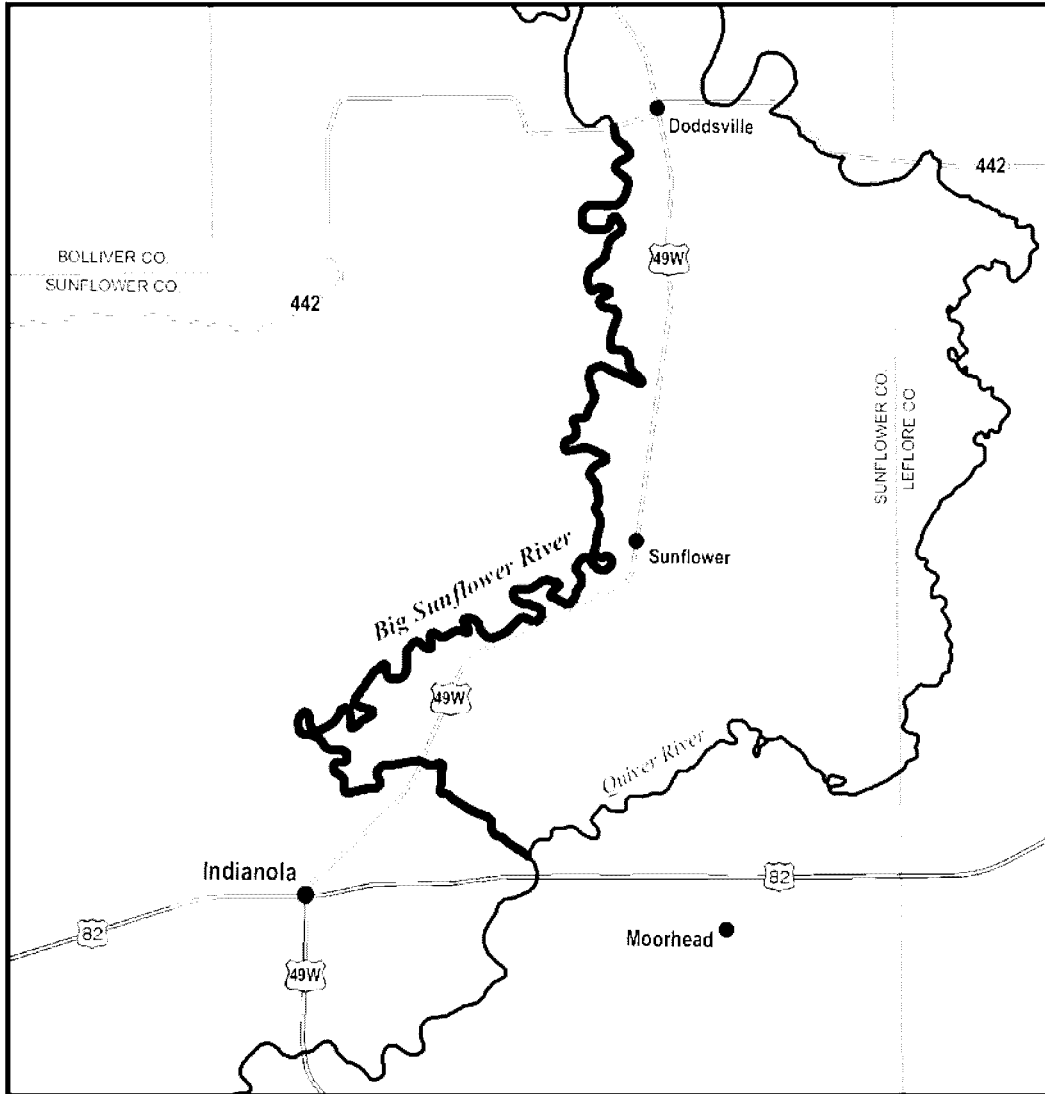
(i) *General Description:* Unit RF14 includes 51.5 rkm (32.0 rmi) of the Big

Sunflower River from Mississippi Highway 442 west of Doddsville, Mississippi, downstream to the Quiver

River confluence east of Indianola, Sunflower County, Mississippi.

(ii) Map of Unit RF14 follows:

Map of Unit RF14 (Big Sunflower River) of critical habitat for Rabbitsfoot



~ Critical Habitat



1:150,000

(22) Unit RF15: Bear Creek—Tishomingo County, Mississippi; and Colbert County, Alabama.

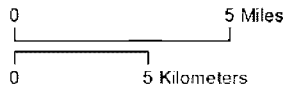
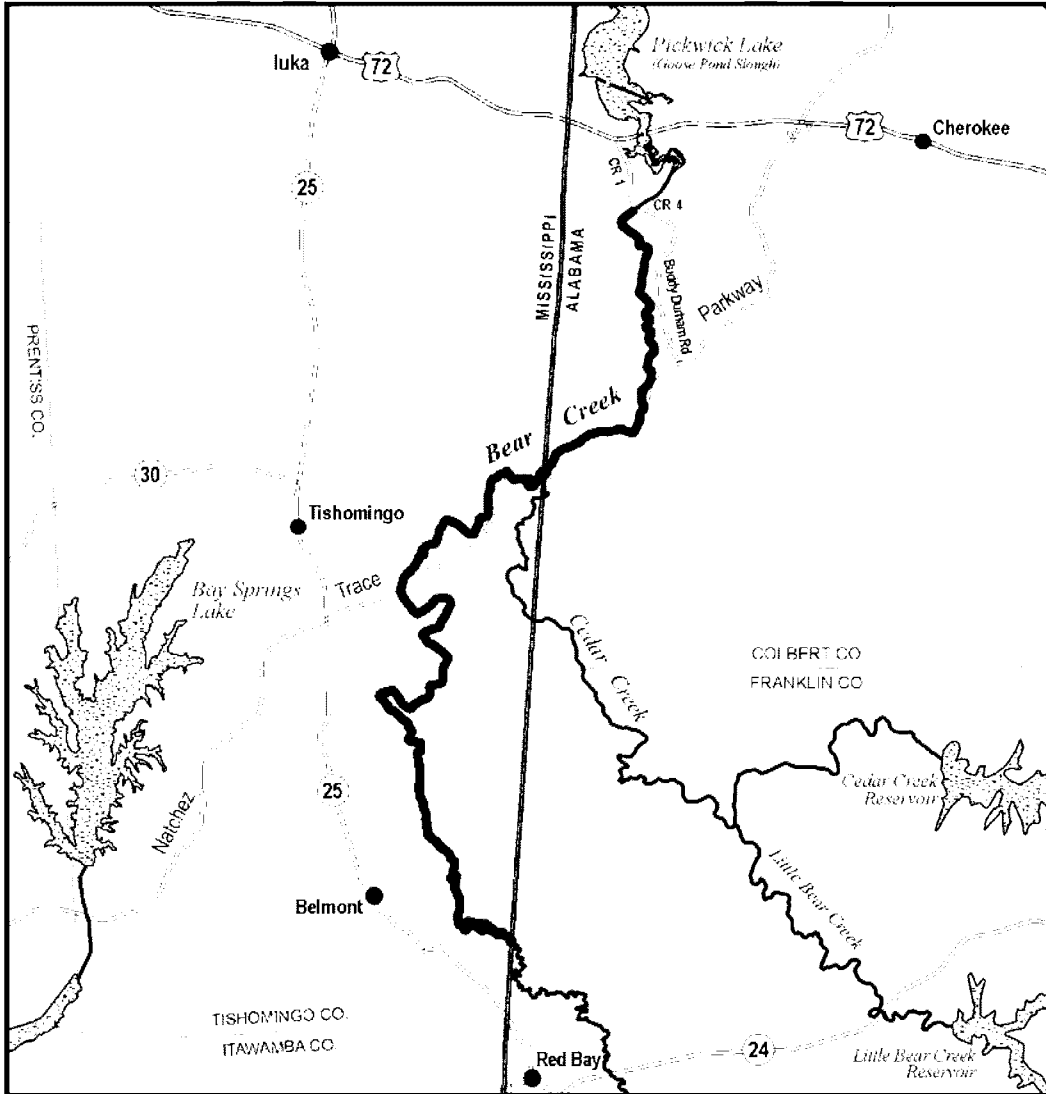
(i) *General Description:* Unit RF15 includes 49.7 rkm (30.9 rmi) of Bear

Creek from the Alabama and Mississippi State line east of Golden, Tishomingo County, Mississippi, downstream to Alabama County Road 4 southwest of

Sutton Hill, Colbert County, Alabama (just upstream of Pickwick Lake).

(ii) Map of Unit RF15 follows:

Map of Unit RF15 (Bear Creek) of critical habitat for Rabbitsfoot



 Critical Habitat



1:200,000

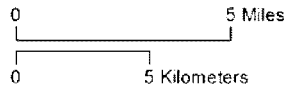
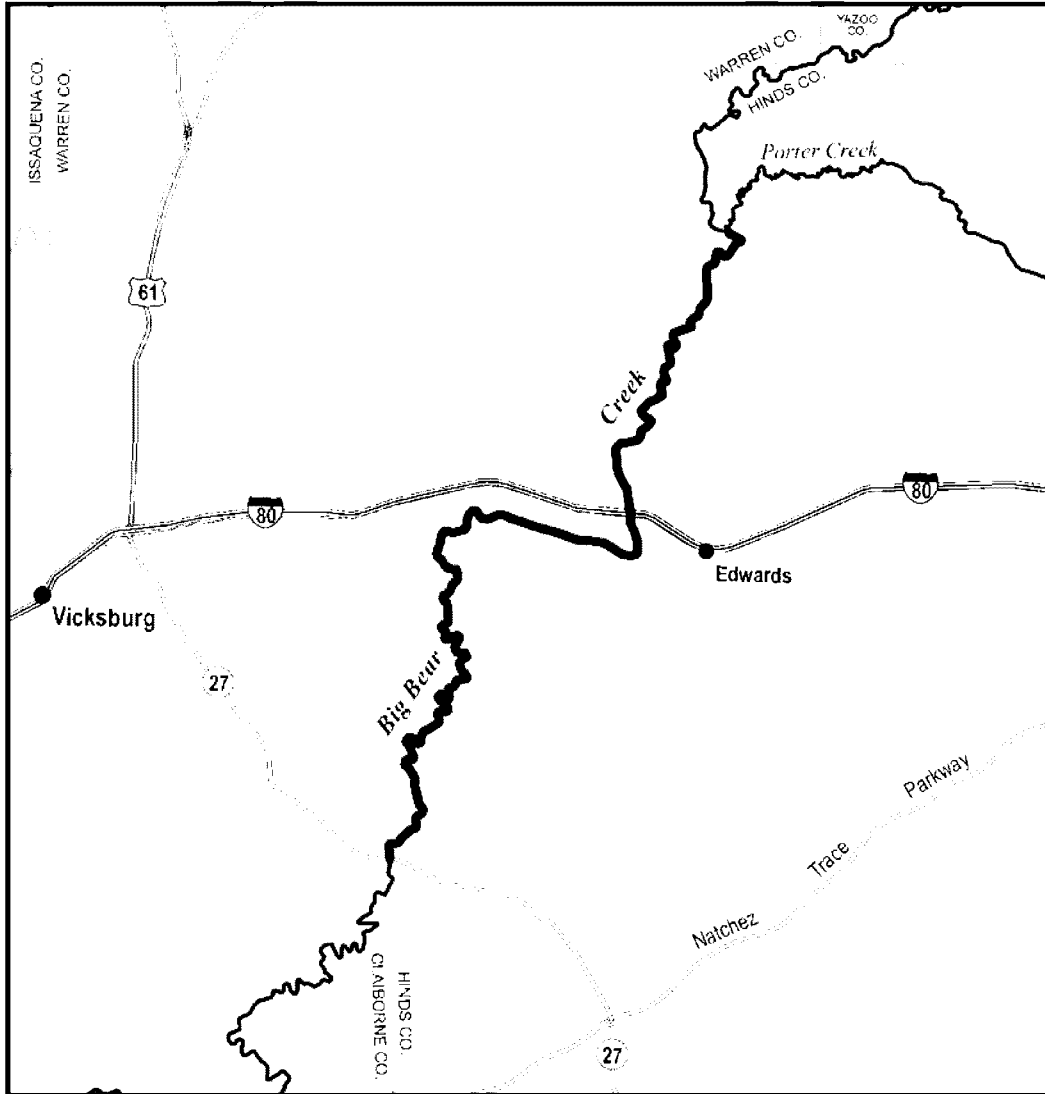
(23) Unit RF16: Big Black River—Hinds and Warren Counties, Mississippi.

(i) *General Description:* Unit RF16 includes 43.3 rkm (26.9 rmi) of the Big Black River from Porter Creek confluence west of Lynchburg, Hinds

County, Mississippi, downstream to Mississippi Highway 27 west of Newman, Warren County, Mississippi.

(ii) Map of Unit RF16 follows:

Map of Unit RF16 (Big Black River) of critical habitat for Rabbitsfoot



 Critical Habitat



1:200,000

(24) Unit RF17: Paint Rock River— Jackson, Madison, and Marshall Counties, Alabama.

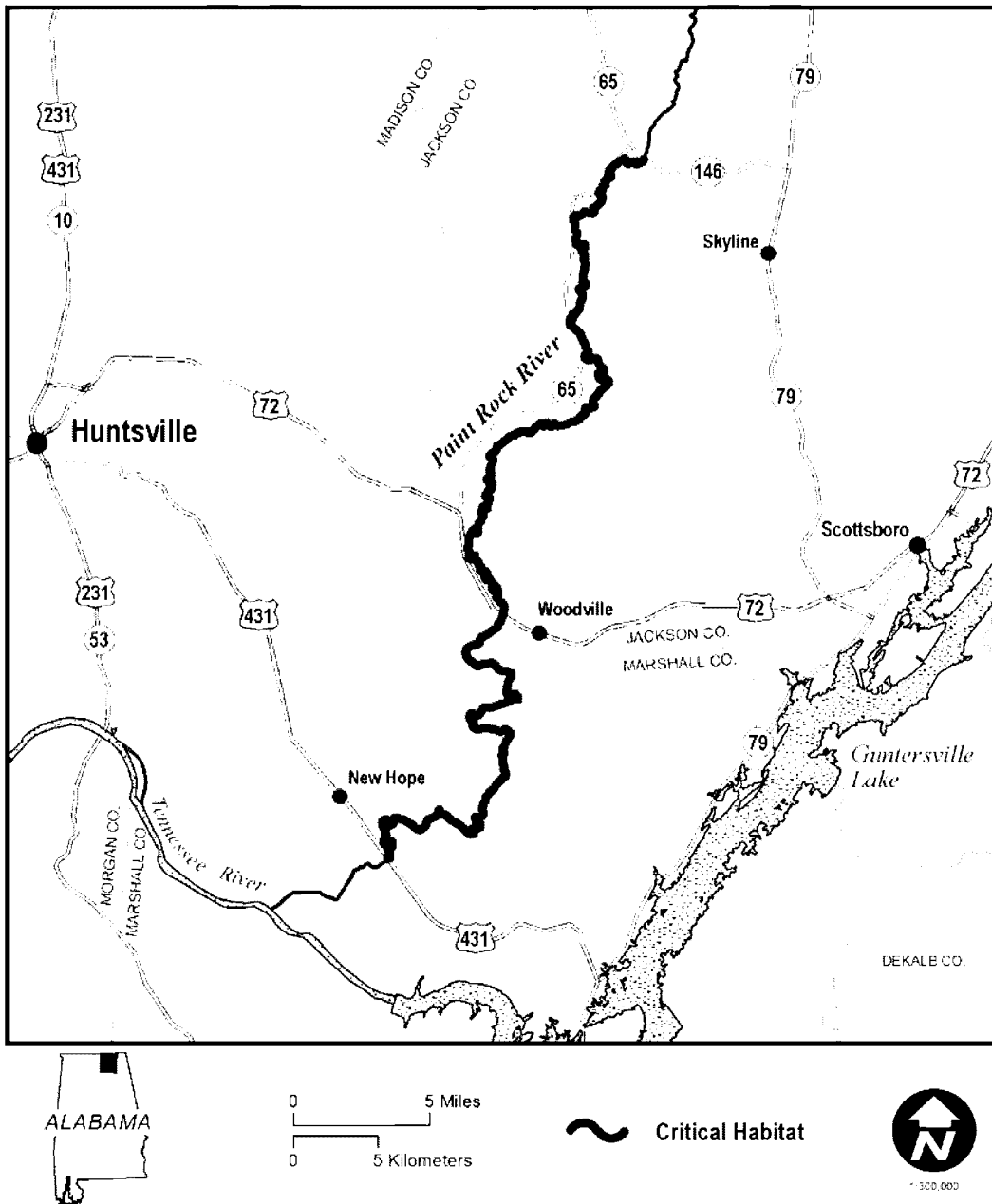
(i) *General Description:* Unit RF17 includes 81.0 rkm (50.3 rmi) of the Paint

Rock River from the convergence of Estill Fork and Hurricane Creek north of Skyline, Jackson County, Alabama, downstream to U.S. Highway 431 south

of New Hope, Madison and Marshall Counties, Alabama.

(ii) Map of Unit RF17 follows:

Map of Unit RF17 (Paint Rock River) of critical habitat for Rabbitsfoot



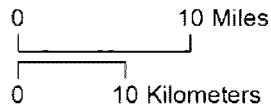
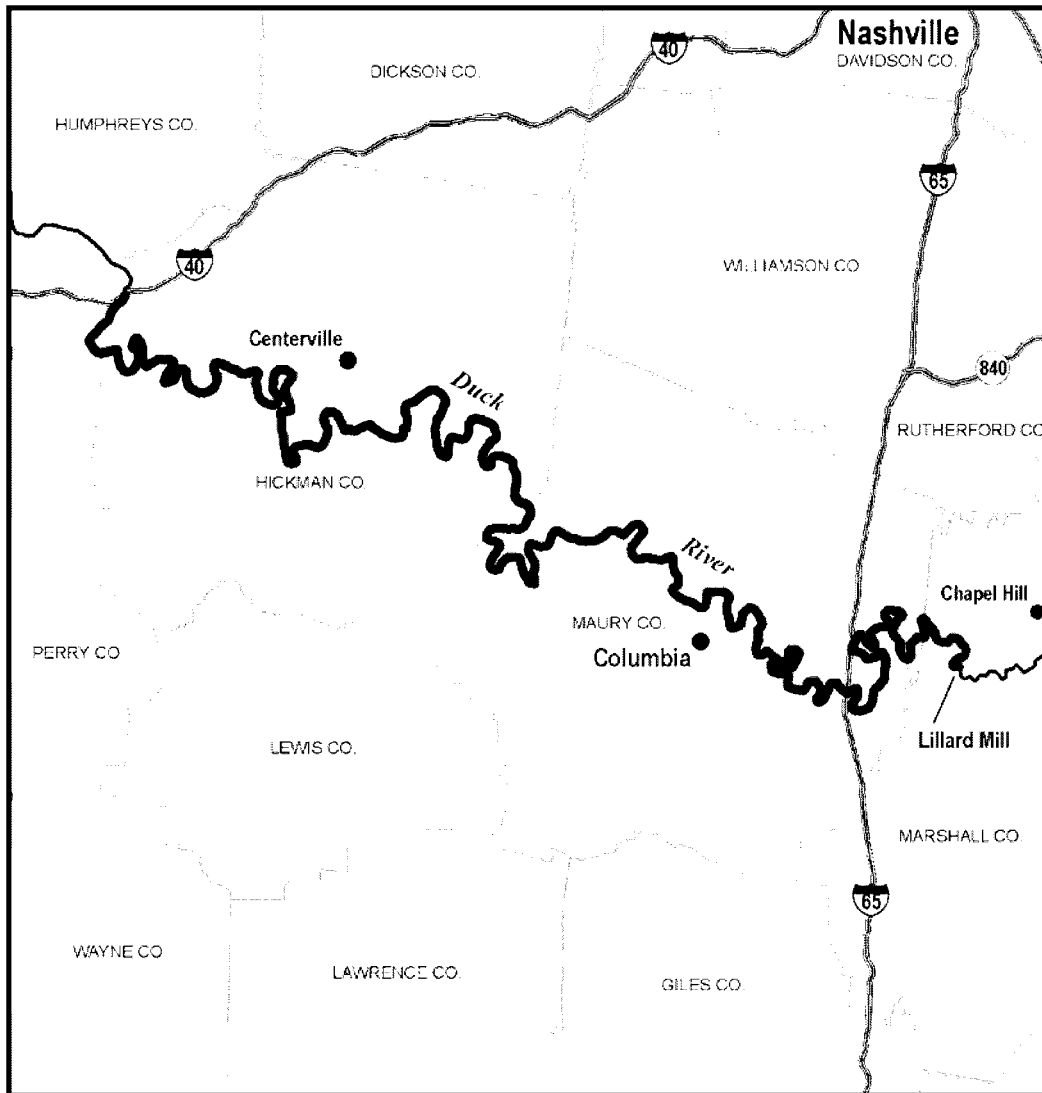
(25) Unit RF18: Duck River—Hickman, Humphreys, Marshall, Maury, and Perry Counties, Tennessee.

(i) *General Description:* Unit RF18 includes 235.3 rkm (146.2 rmi) of the Duck River from Lillard Mill (rkm 288.1; rmi 179) west of Tennessee Highway

272, Marshall County, Tennessee, downstream to Interstate 40 near Bucksnot, Hickman County, Tennessee.

(ii) Map of Unit RF18 follows:

Map for Unit RF18 (Duck River) of critical habitat for Rabbitsfoot



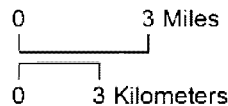
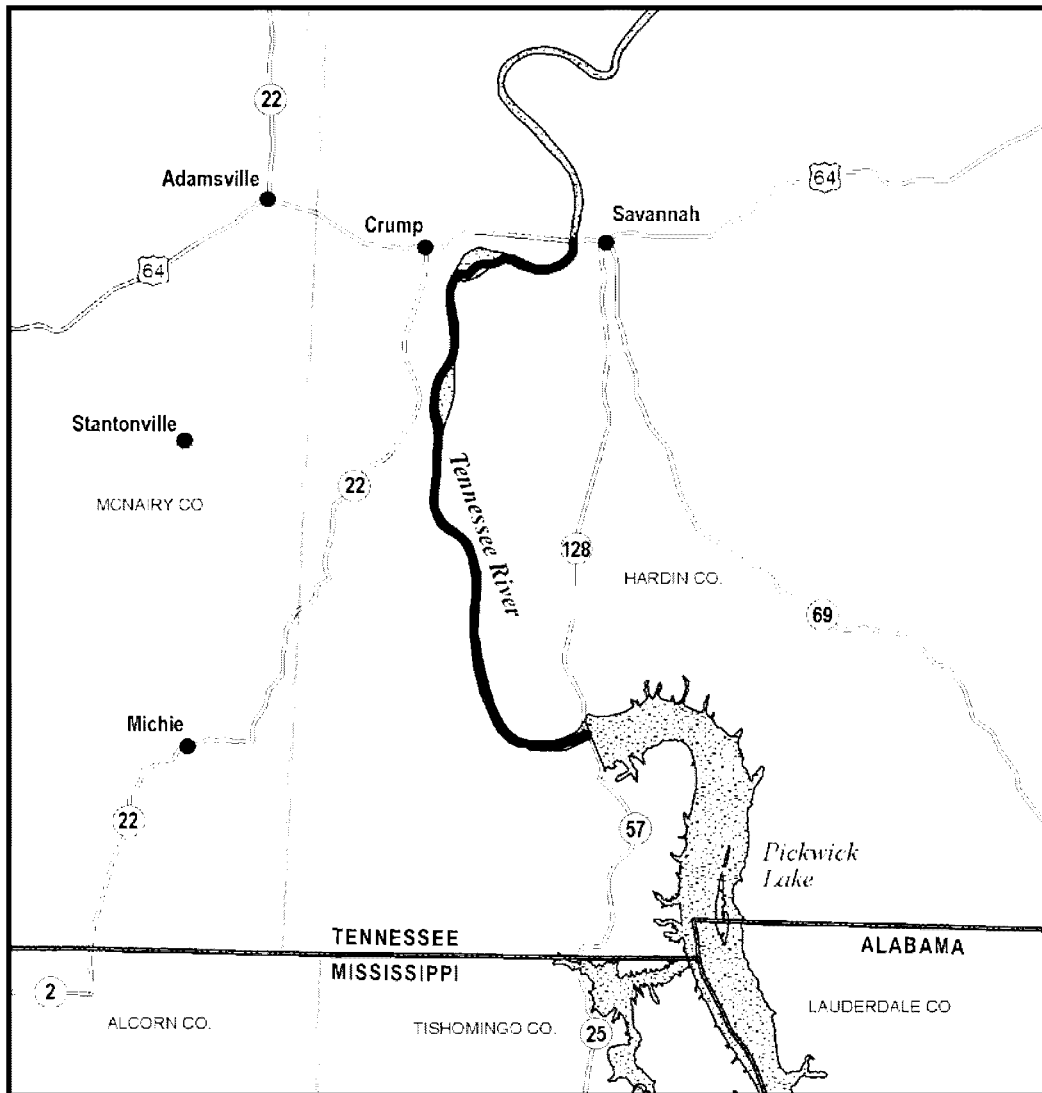
(26) Unit RF19a: Tennessee River—Hardin County, Tennessee.

(i) *General Description:* Unit RF19a includes 26.7 rkm (16.6 rmi) of the

Tennessee River from Pickwick Lake Dam downstream to U.S. Highway 64 near Adamsville, Hardin County, Tennessee.

(ii) Map of Unit RF19a follows:

Map for Unit RF19a (Tennessee River) of critical habitat for Rabbitsfoot



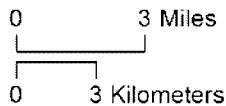
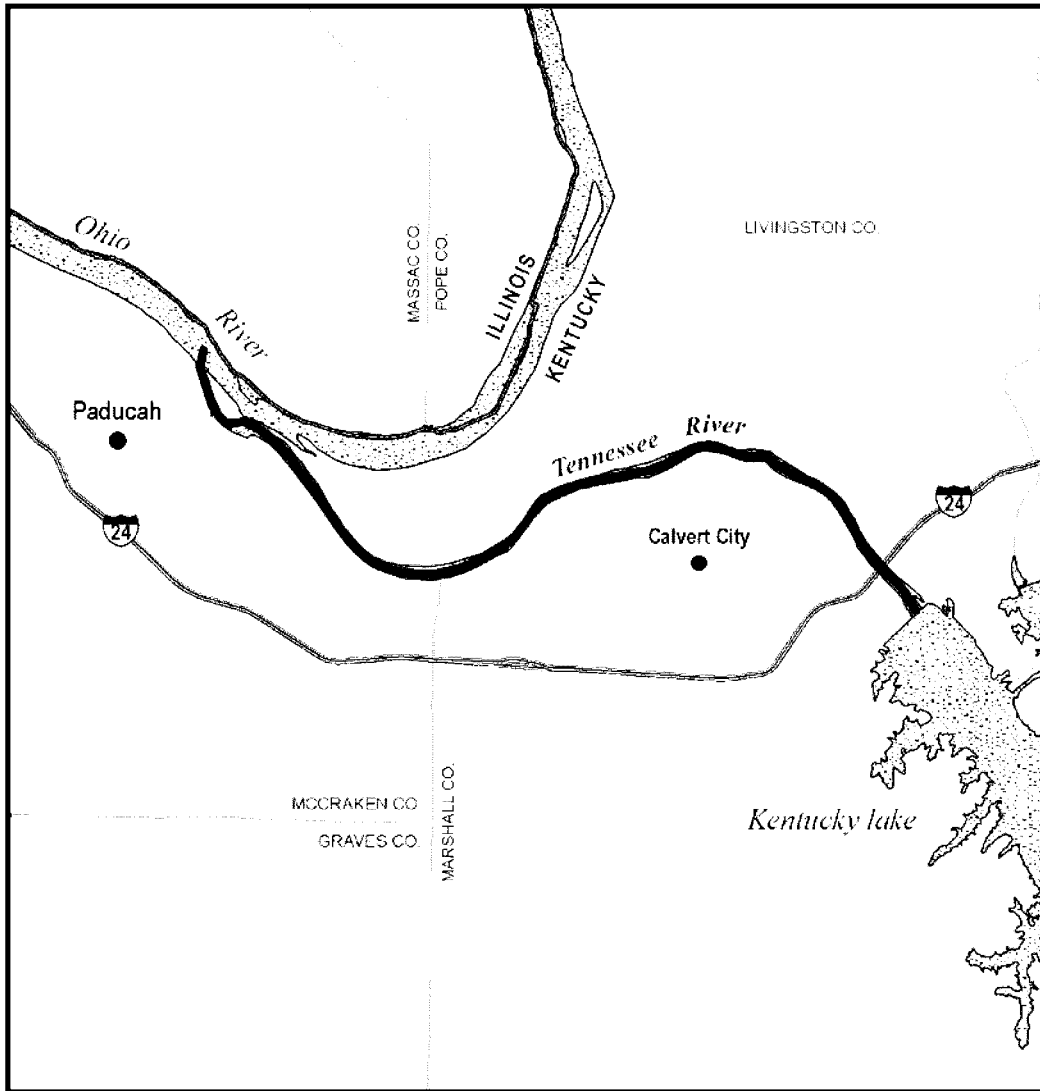
(27) Unit RF19b: Tennessee River—Livingston, Marshall, and McCracken Counties, Kentucky.

(i) *General Description:* Unit RF19b includes 35.6 rkm (22.1 rmi) of the Tennessee River from Kentucky Lake Dam, downstream to its confluence with

the Ohio River, McCracken and Livingston Counties, Kentucky.

(ii) Map of Unit RF19b follows:

Map for Unit RF19b (Tennessee River) of critical habitat for Rabbitsfoot



 Critical Habitat



1:250,000

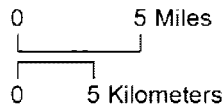
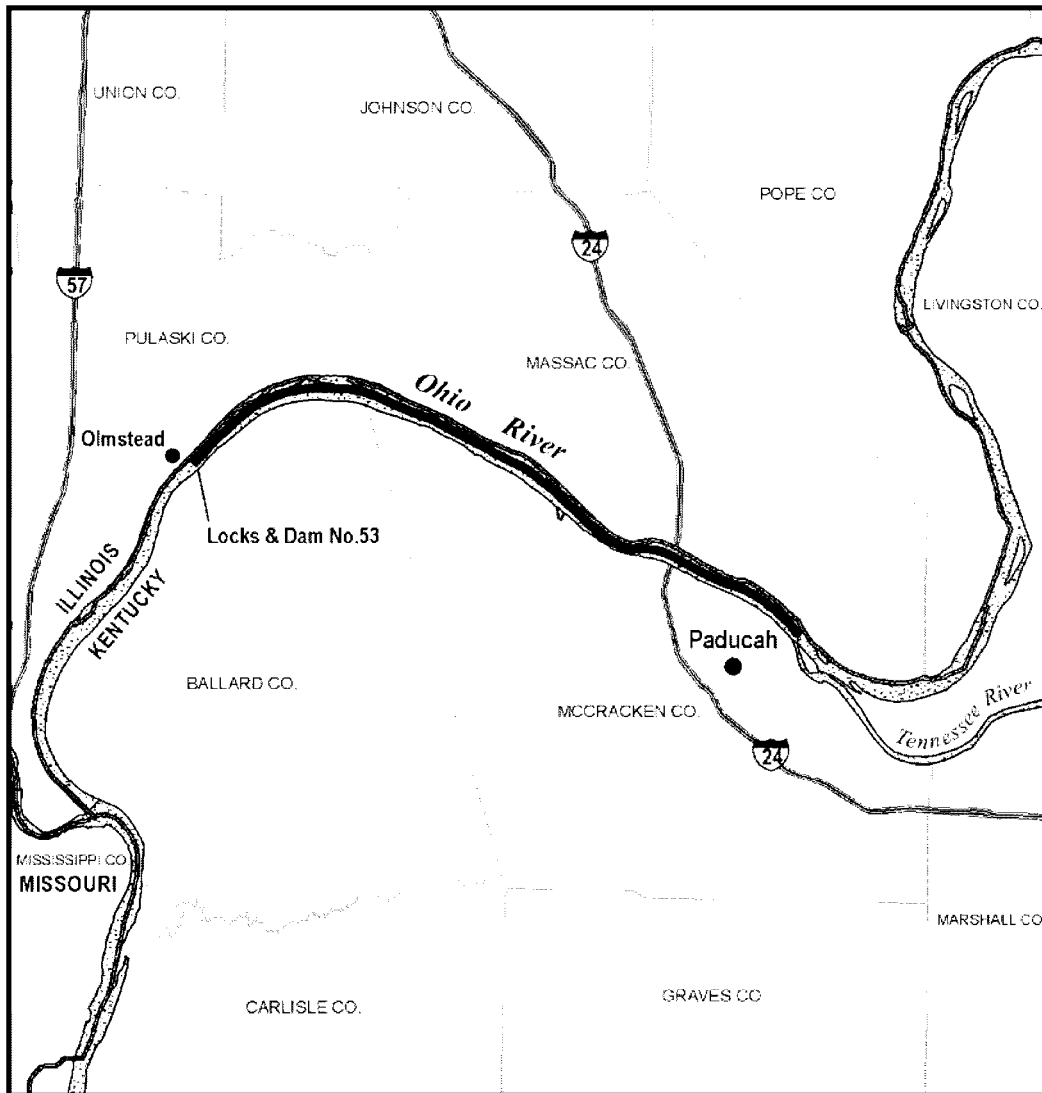
(28) Unit RF20: Ohio River—Ballard, and McCracken Counties, Kentucky; Massac and Pulaski Counties, Illinois.

(i) *General Description:* Unit RF20 includes 45.9 rkm (28.5 rmi) of the Ohio River from the Tennessee River confluence at the downstream extent of

Owens Island downstream to Lock and Dam 53 near Olmstead, Illinois.

(ii) Map of Unit RF20 follows:

Map for Unit RF20 (Ohio River) of critical habitat for Rabbitsfoot



 Critical Habitat



(29) Unit RF21: Green River—Edmonson, Green, Hart, and Taylor Counties, Kentucky.

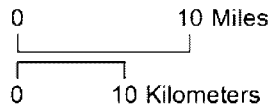
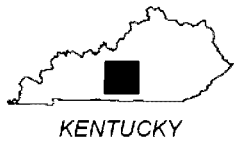
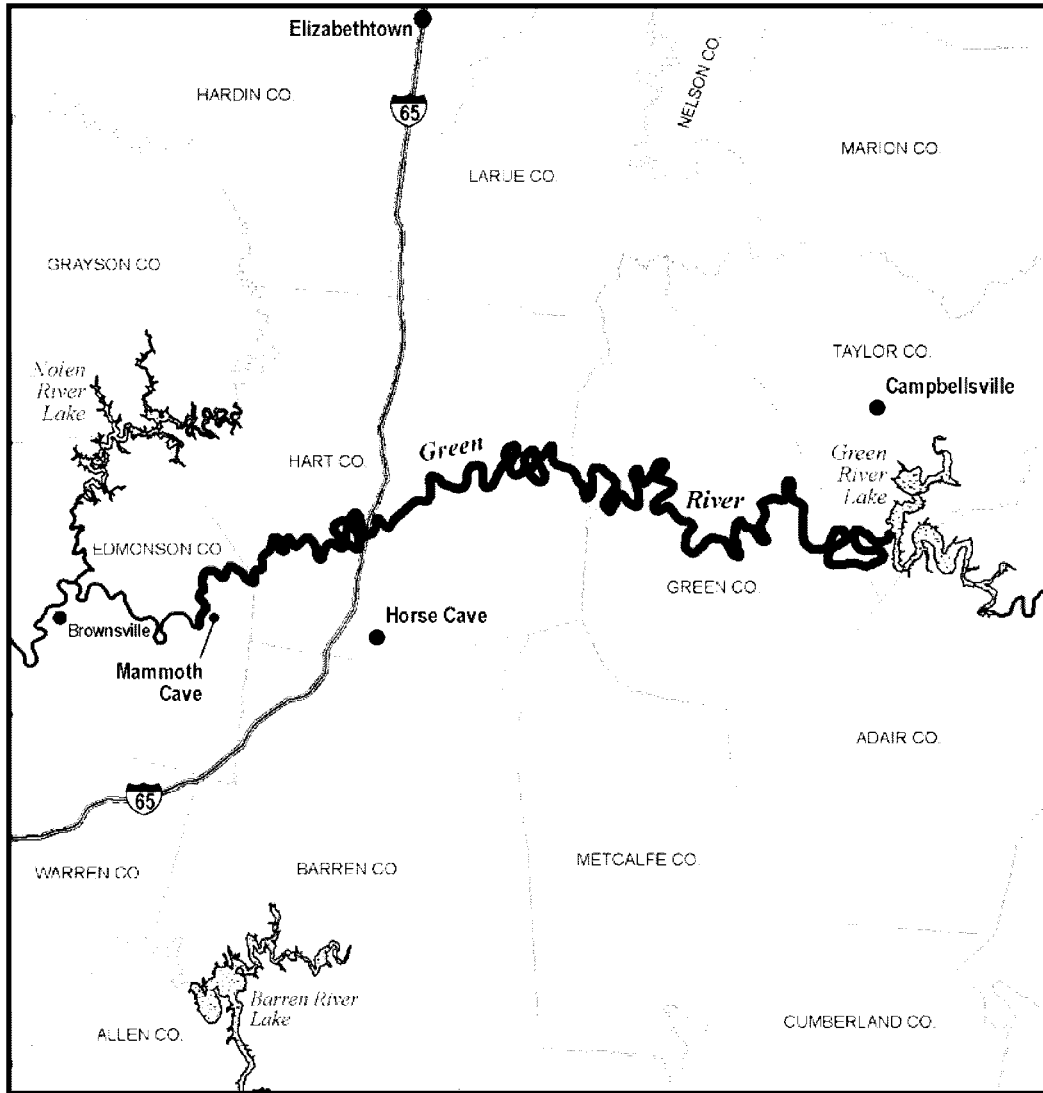
(i) *General Description:* Unit RF21 includes 175.6 rkm (109.1 rmi) of the

Green River from Green River Lake Dam south of Campbellsville, Taylor County, Kentucky, downstream to Mammoth Cave National Park North Entrance Road

in Mammoth Cave National Park, Kentucky.

(ii) Map of Unit RF21 follows:

Map for Unit RF21 (Green River) of critical habitat for Rabbitsfoot



(30) Unit RF22: French Creek—Crawford, Erie, Mercer, and Venango Counties, Pennsylvania.

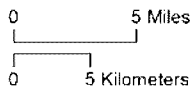
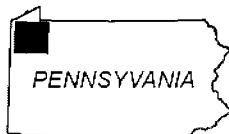
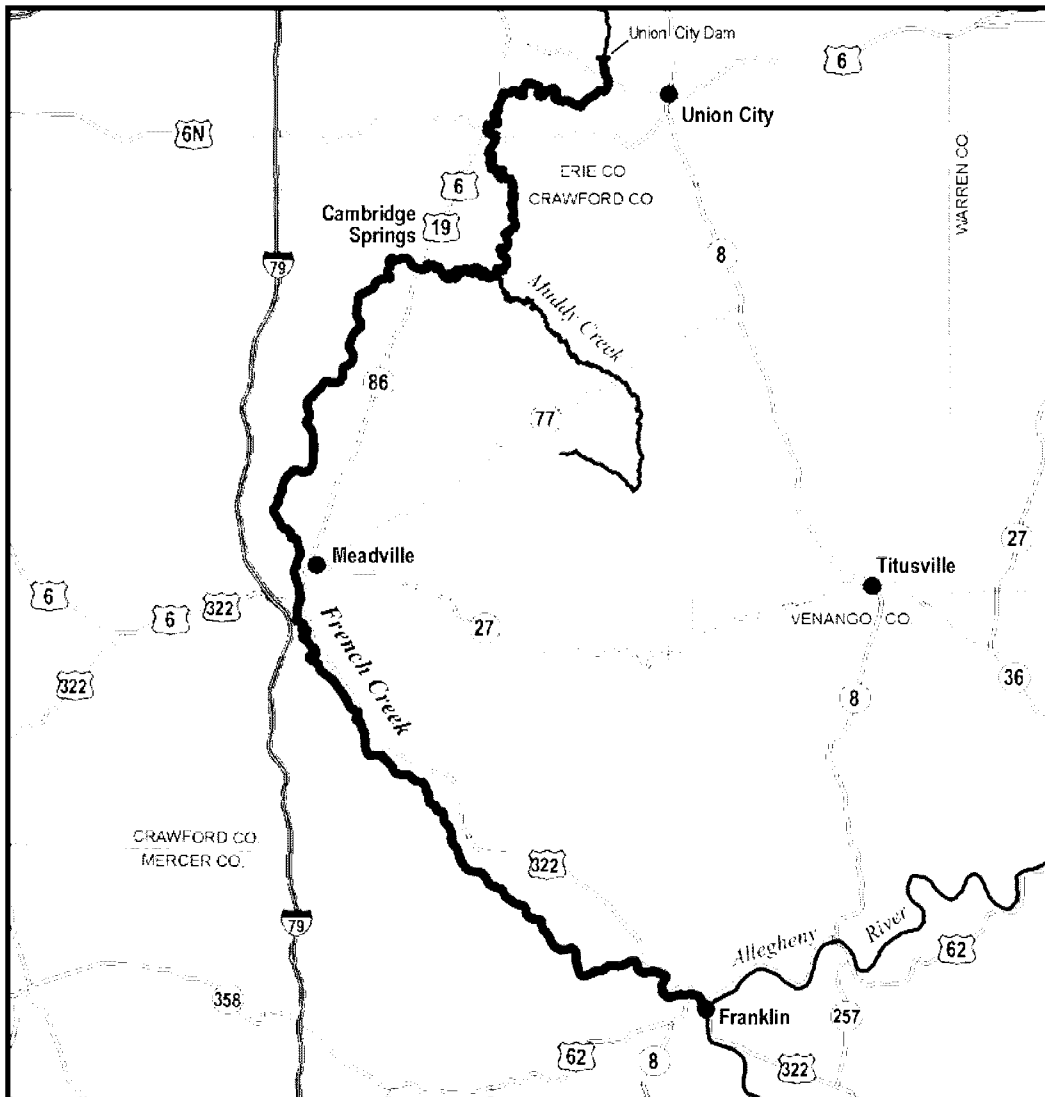
(i) *General Description:* Unit RF22 includes 120.4 rkm (74.8 rmi) of French

Creek from Union City Reservoir Dam northeast of Union City, Erie County, Pennsylvania, downstream to its confluence with the Allegheny River

near Franklin, Venango County, Pennsylvania.

(ii) Map of Unit RF22 follows:

Map for Unit RF22 (French Creek) of critical habitat for Rabbitsfoot



 Critical Habitat



1:350,000

(31) Unit RF23: Allegheny River—Venango County, Pennsylvania.

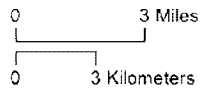
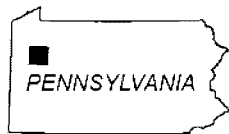
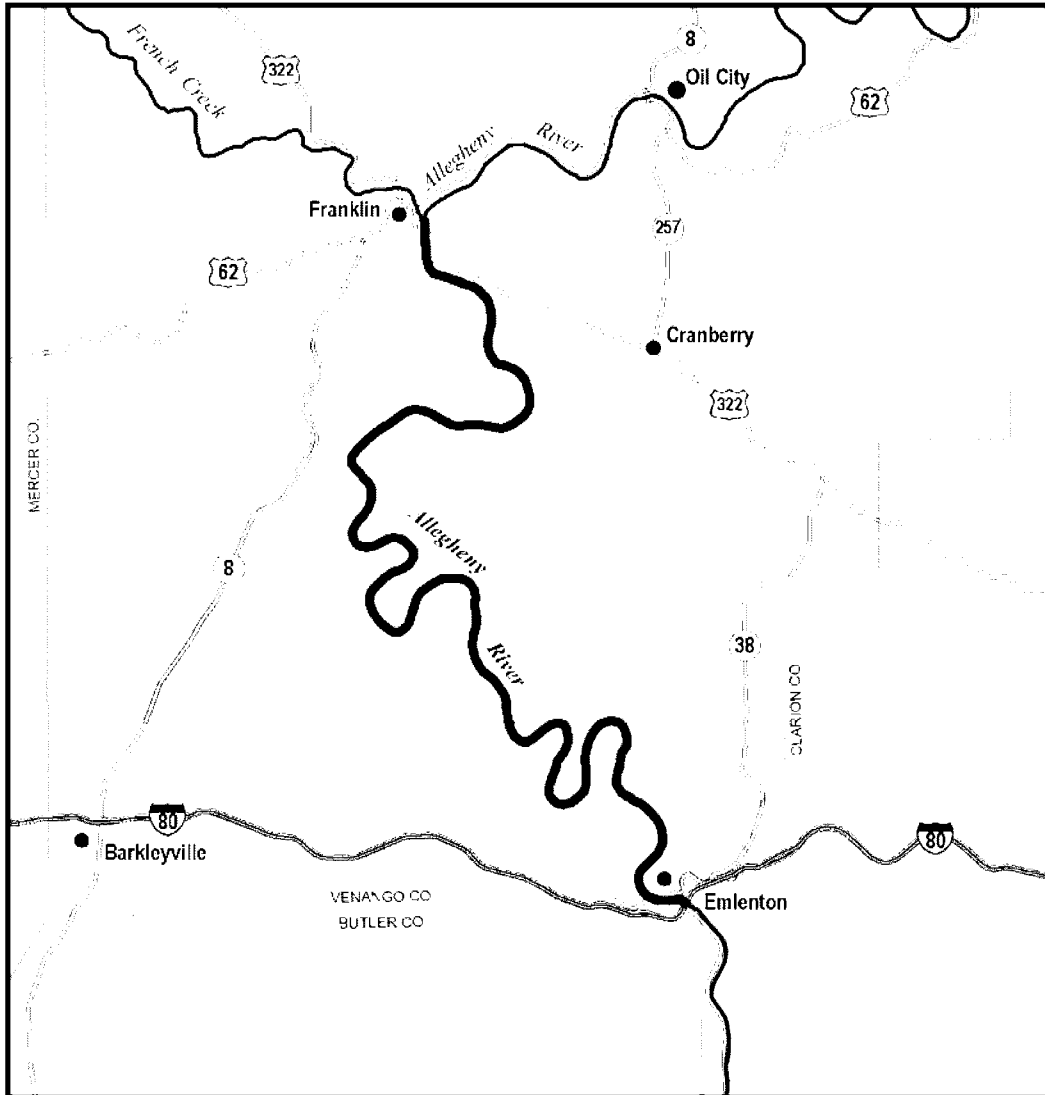
(i) *General Description:* Unit RF23 includes 57.3 rkm (35.6 rmi) of the

Allegheny River from the French Creek confluence near Franklin, Venango County, Pennsylvania, downstream to

Interstate 80 near Emlenton, Venango County, Pennsylvania.

(ii) Map of Unit RF23 follows:

Map of Unit RF23 (Allegheny River) of critical habitat for Rabbitsfoot



 Critical Habitat



(32) Unit RF24: Muddy Creek—
Crawford County, Pennsylvania.

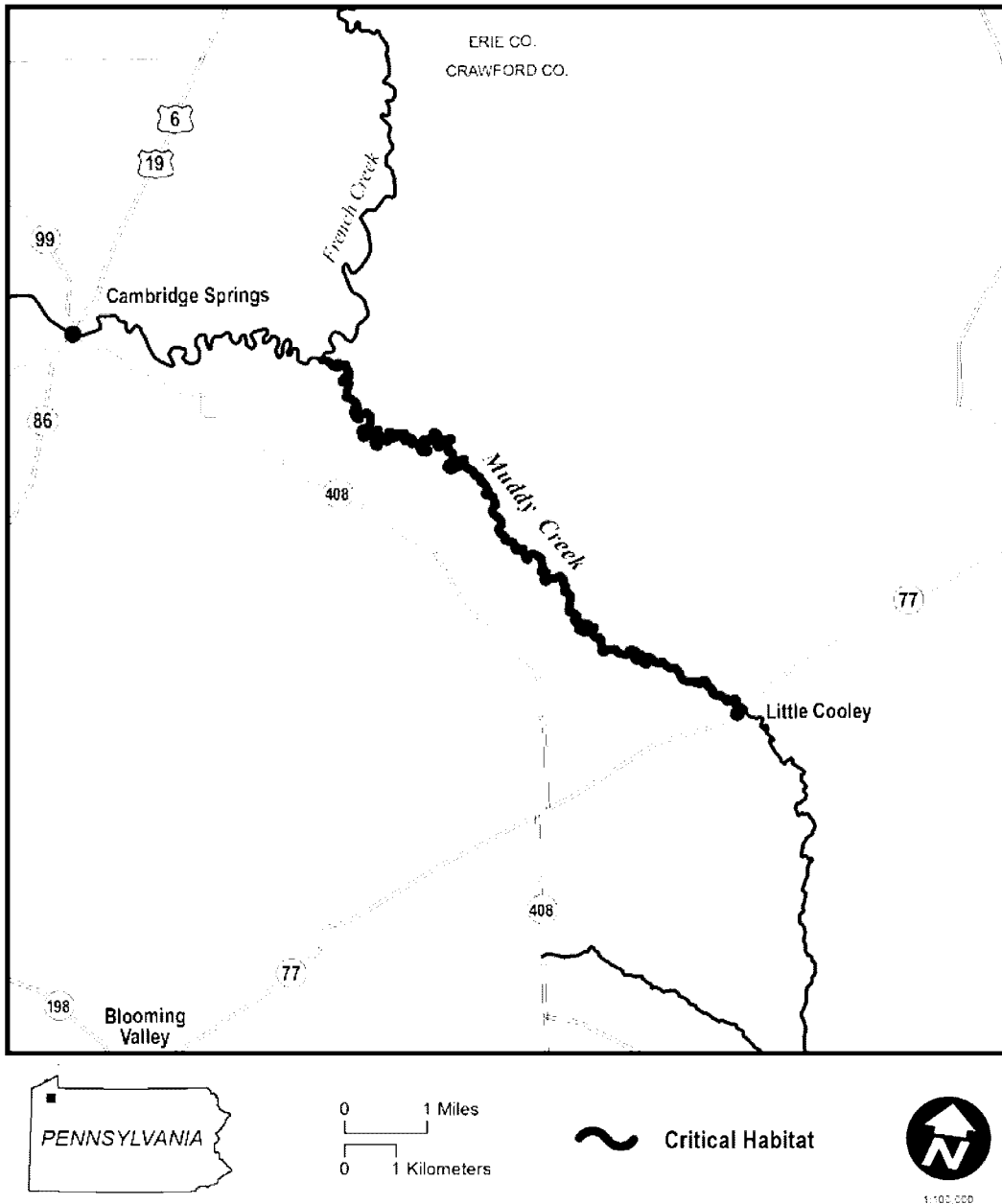
(i) *General Description:* Unit RF24
includes 20.1 rkm (12.5 rmi) of Muddy

Creek from Pennsylvania Highway 77
near Little Cooley, Crawford County,
Pennsylvania, downstream to its
confluence with French Creek east of

Cambridge Springs, Crawford County,
Pennsylvania.

(ii) Map of Unit RF24 follows:

Map of Unit RF24 (Muddy Creek) of critical habitat for Rabbitsfoot



(33) Unit RF25: Tippecanoe River—Carroll, Pulaski, Tippecanoe, and White Counties, Indiana.

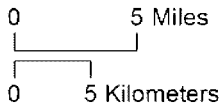
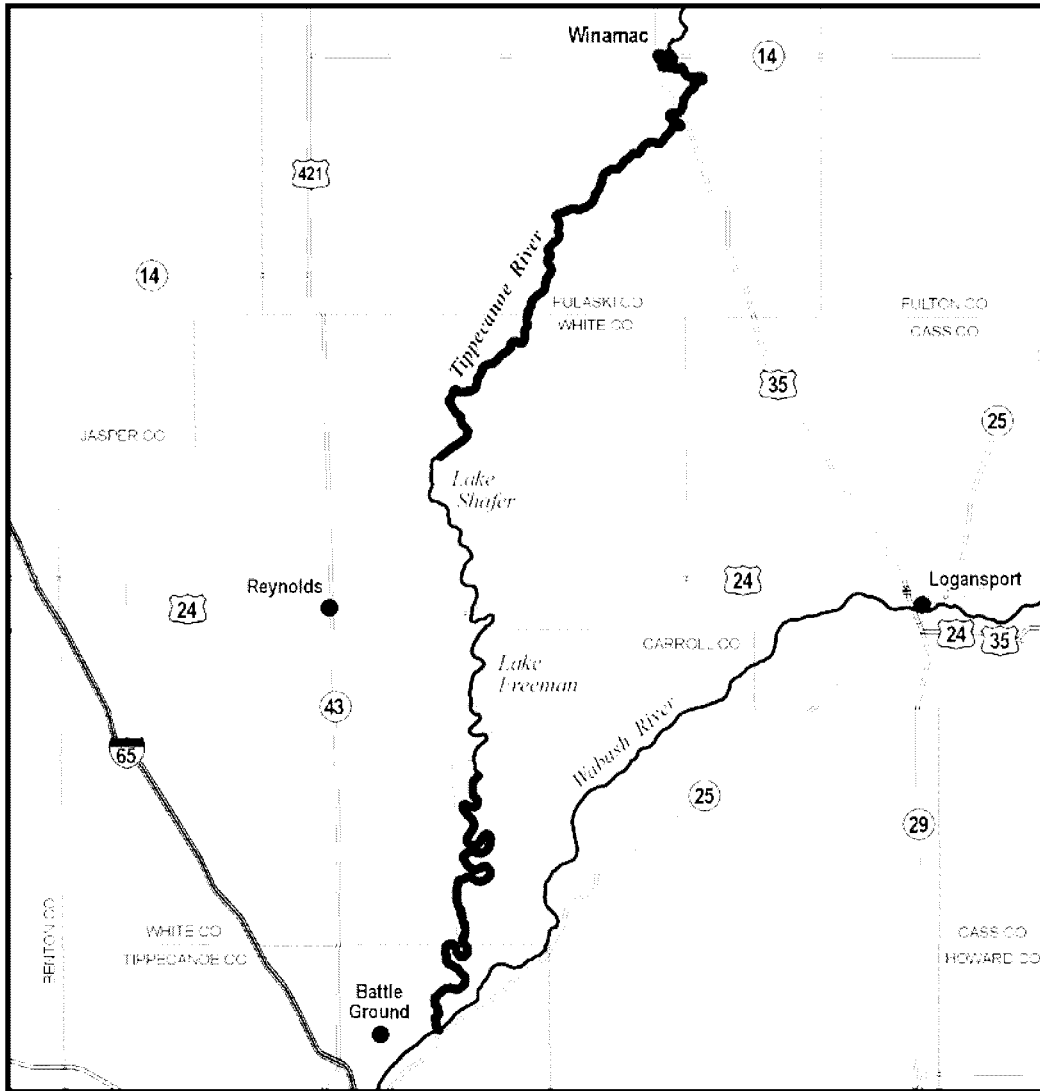
(i) *General Description:* Unit RF25 includes 75.6 rkm (47.0 rmi) of the

Tippecanoe River from Indiana Highway 14 near Winamac, Pulaski County, Indiana, downstream to its confluence with the Wabash River northeast of Battle Ground, Tippecanoe

County, Indiana, excluding Lakes Shafer and Freeman and the stream reach between the two lakes.

(ii) Map of Unit RF25 follows:

Map of Unit RF25 (Tippecanoe River) of critical habitat for Rabbitsfoot



~ Critical Habitat



1:250,000

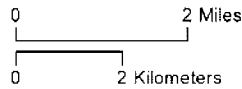
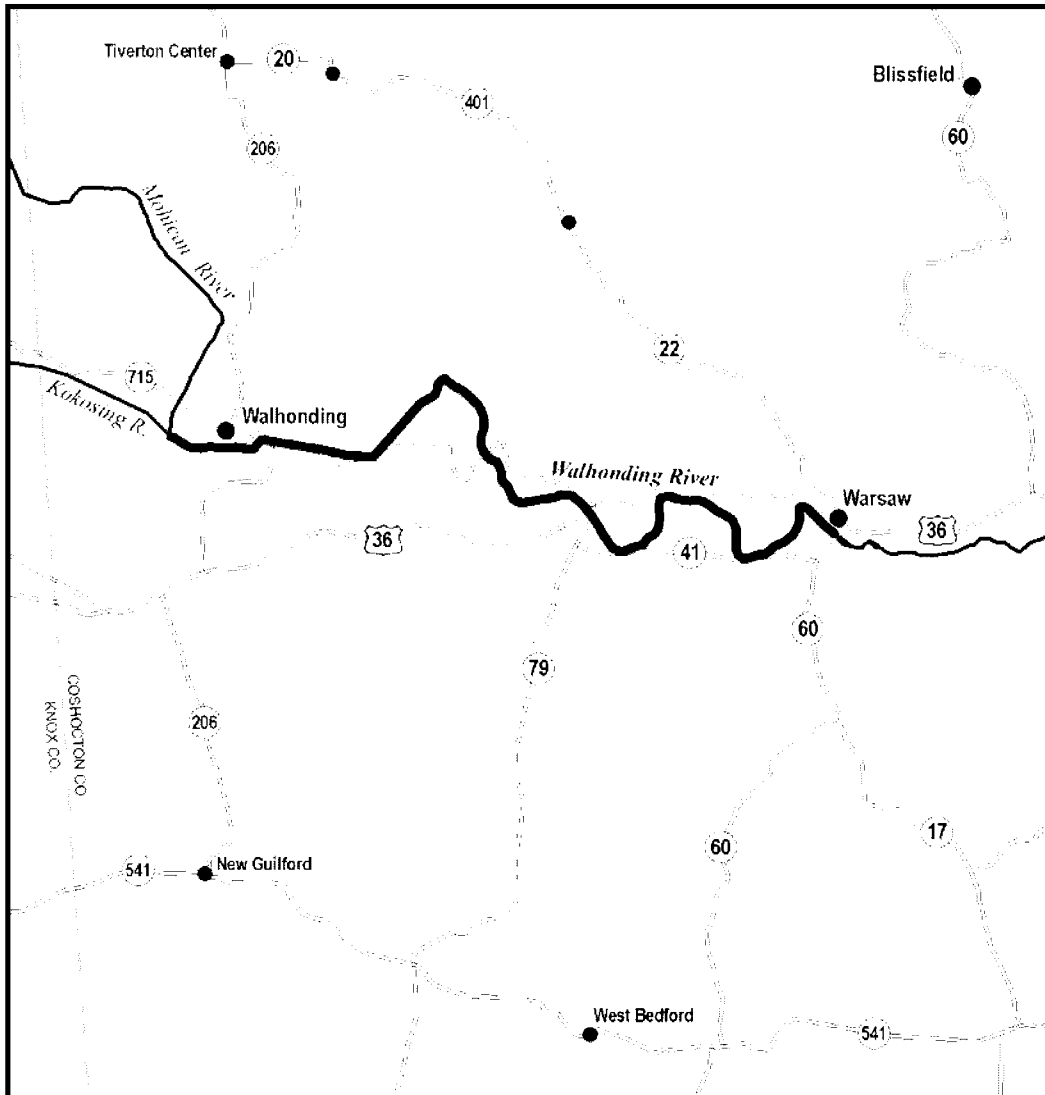
(34) Unit RF26: Walhonding River—Coshocton County, Ohio.

(i) *General Description:* Unit RF26 includes 17.5 rkm (10.9 rmi) of the

Walhonding River from the convergence of the Kokosing and Mohican Rivers downstream to Ohio Highway 60 near Warsaw, Coshocton County, Ohio.

(ii) Map of Unit RF26 follows:

Map of Unit RF26 (Walhonding River) of critical habitat for Rabbitsfoot



 Critical Habitat



1:100,000

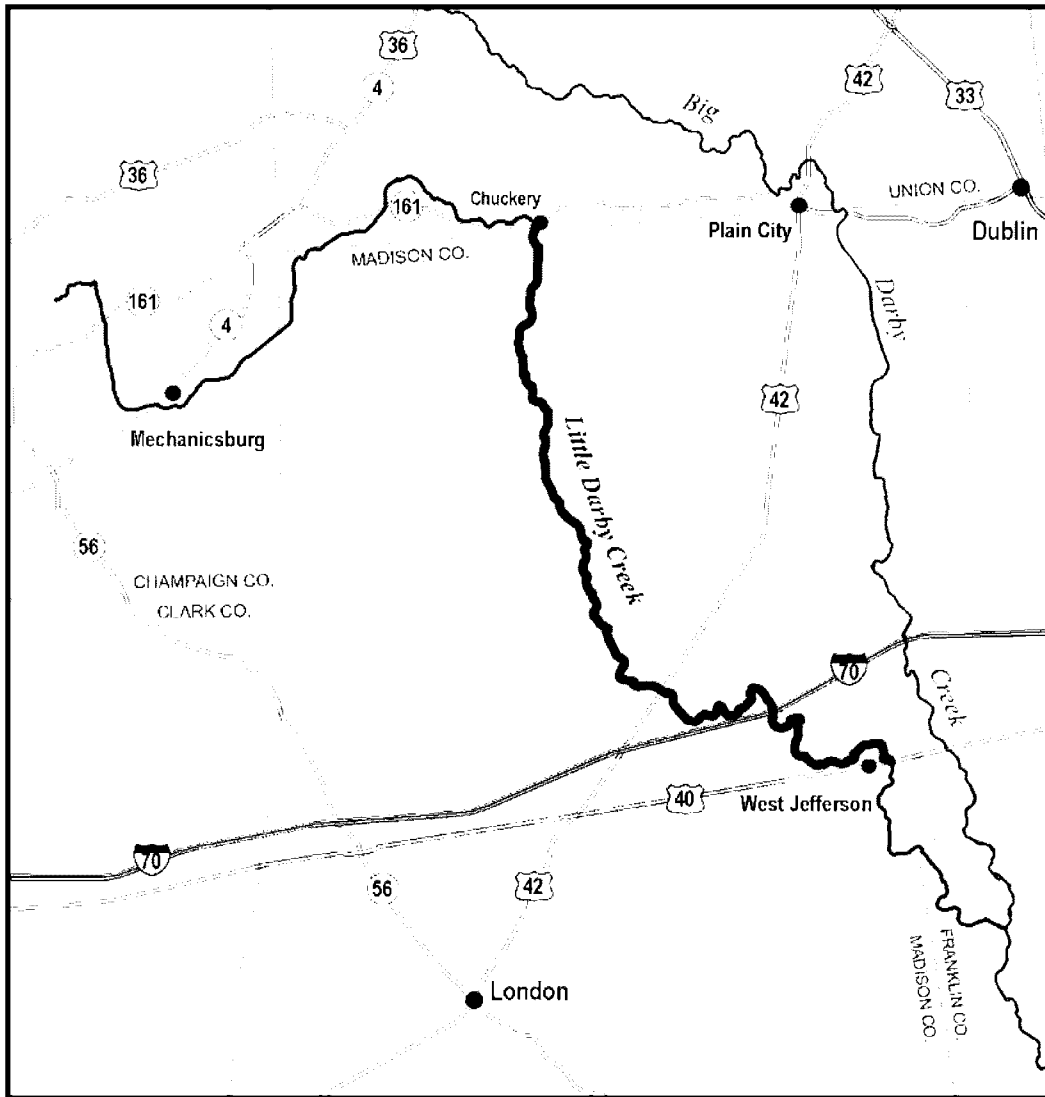
(35) Unit RF27: Little Darby Creek—Madison and Union Counties, Ohio.

(i) *General Description:* Unit RF27 includes 33.3 rkm (20.7 rmi) of Little

Darby Creek from Ohio Highway 161 near Chuckery, Union County, Ohio, downstream to U.S. Highway 40 near West Jefferson, Madison County, Ohio.

(ii) Map of Unit RF27 follows:

Map of Unit RF27 (Little Darby Creek) of critical habitat for Rabbitsfoot



 Critical Habitat



1:250,000

(36) Unit RF28: North Fork Vermilion River and Middle Branch North Fork Vermilion River, respectively—Vermilion County, Illinois.

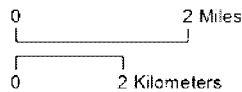
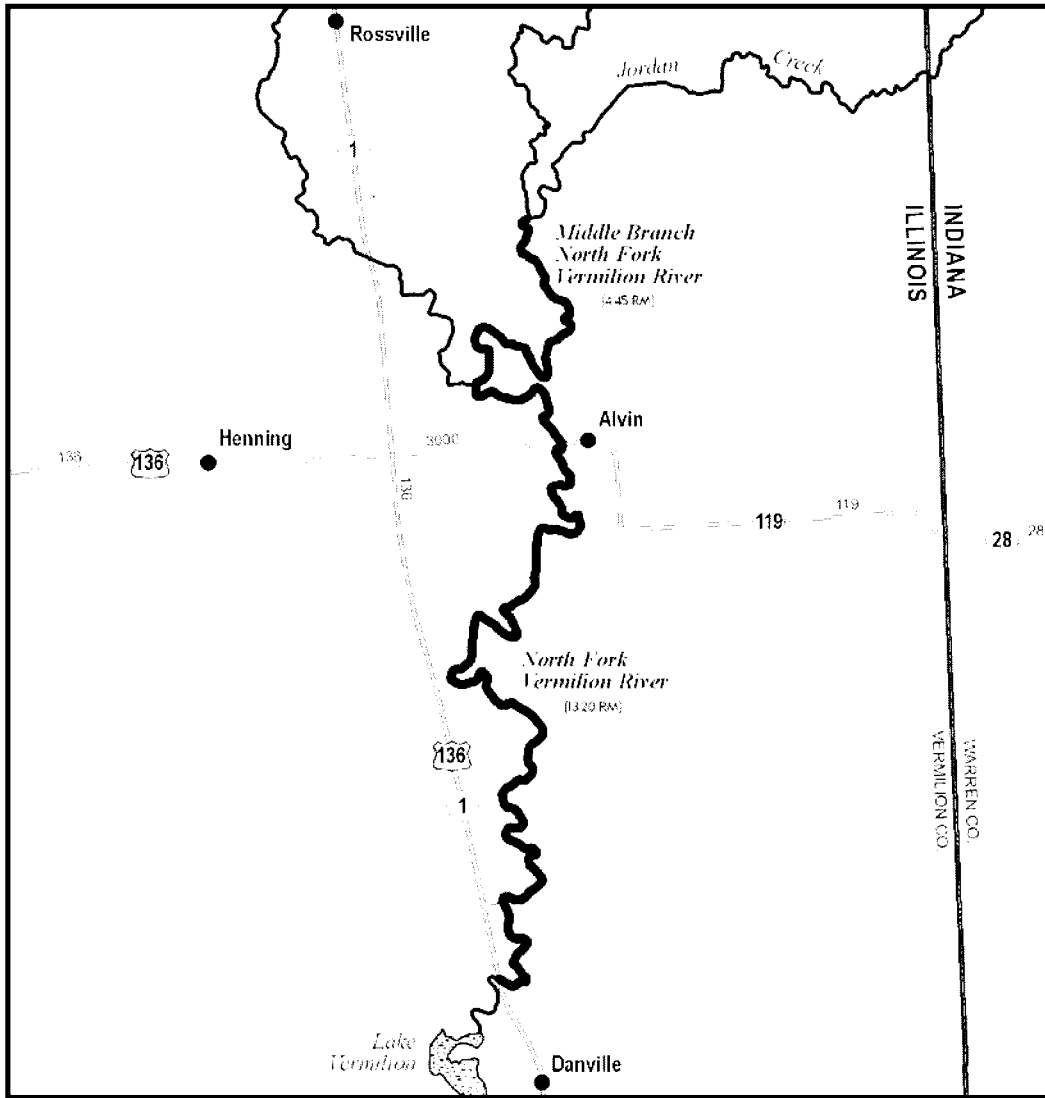
(i) *General Description:* Unit RF28 includes a total of 28.5 rkm (17.7 rmi). Unit RF28 includes 21.2 rkm (13.2 rmi)

of the North Fork Vermilion River from the confluence of Middle Branch North Fork Vermilion River downstream to Illinois Highway 1 and U.S. Highway 136 upstream of Lake Vermilion, Vermilion County, Illinois. Unit RF28 also includes 7.2 rkm (4.5 rmi) of the

Middle Branch North Fork Vermilion River from the Jordan Creek confluence northwest of Alvin, Illinois, downstream to its confluence with North Fork Vermilion River west of Alvin, Vermilion County, Illinois.

(ii) Map of Unit RF28 follows:

Map for Unit RF28 (North Fork Vermilion River and Middle Branch North Fork Vermilion River) of critical habitat for Rabbitsfoot



~ Critical Habitat



1:100,000

(37) Unit RF29: Fish Creek—Williams County, Ohio.

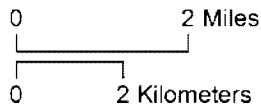
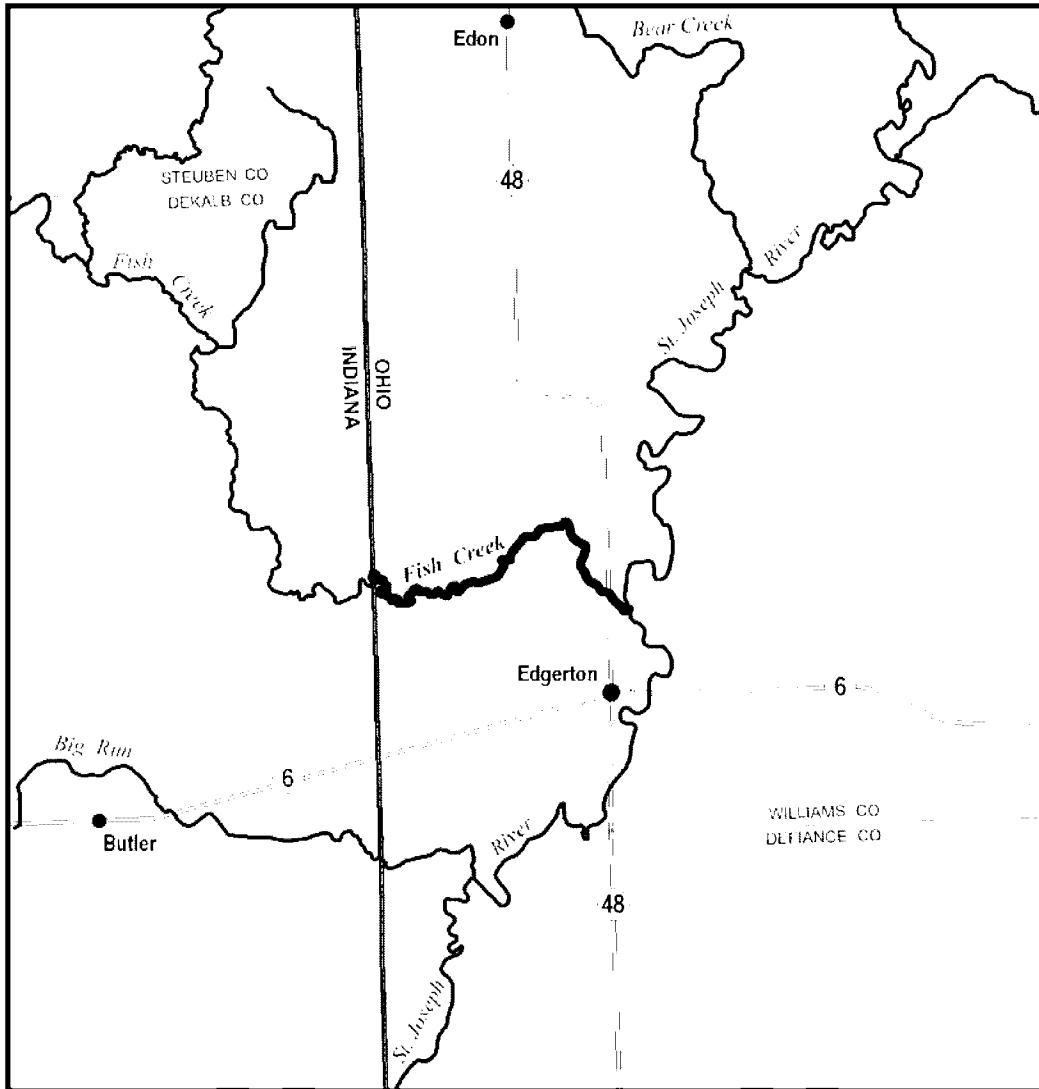
(i) *General Description:* Unit RF29 includes 7.7 rkm (4.8 rmi) of Fish Creek

from Indiana and Ohio State line northwest of Edgerton, Ohio, downstream to its confluence with the

St. Joseph's River north of Edgerton, Williams County, Ohio.

(ii) Map of Unit RF29 follows:

Map of Unit RF29 (Fish Creek) of critical habitat for Rabbitsfoot



1:100,000

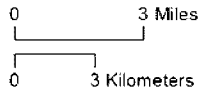
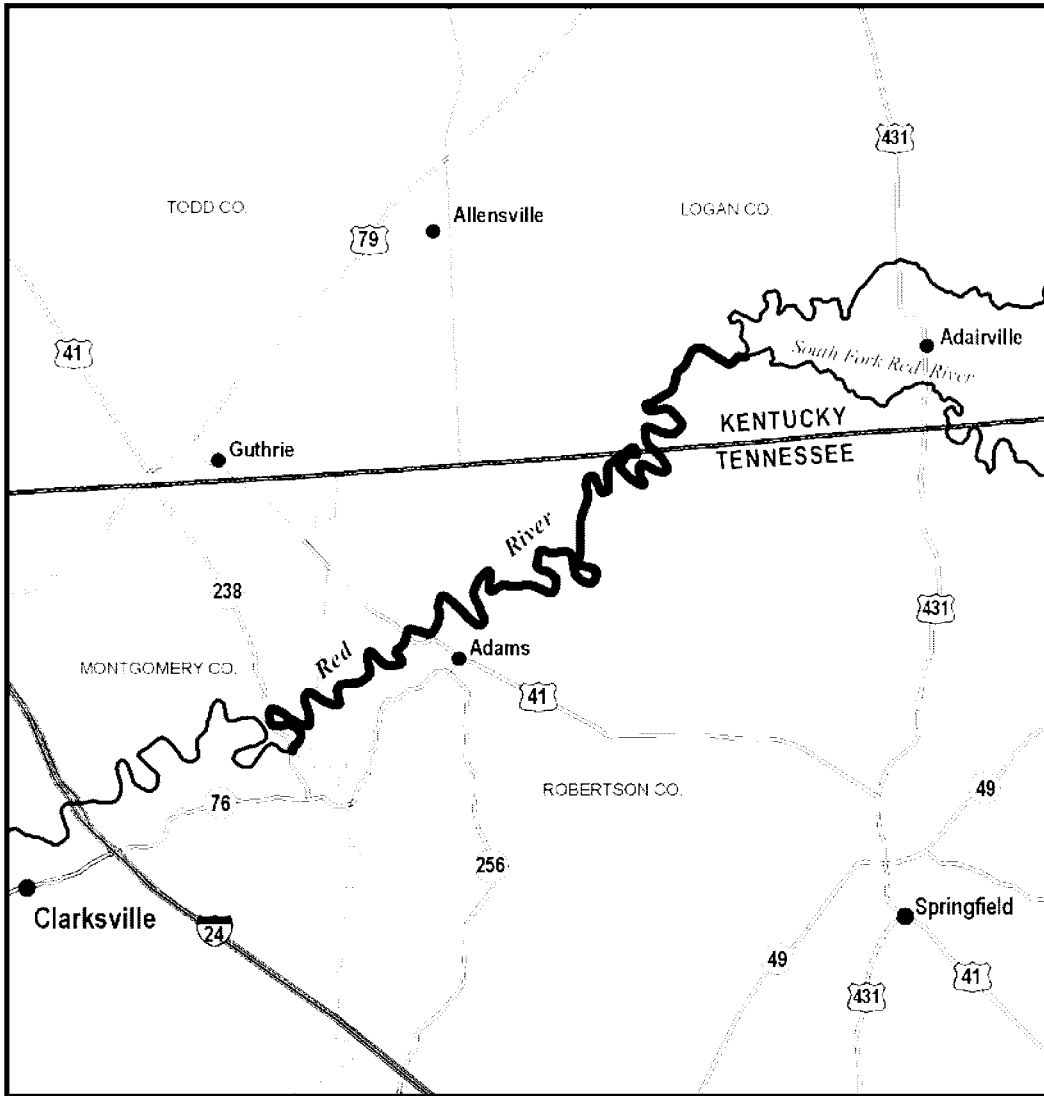
(38) Unit RF30: Red River—Logan County, Kentucky; and Montgomery and Robertson Counties, Tennessee.

(i) *General Description:* Unit RF30 includes 50.2 rkm (31.2 rmi) of the Red River from the South Fork Red River confluence west of Adairville,

Kentucky, downstream to the Sulphur Fork confluence southwest of Adams, Tennessee.

(ii) Map of Unit RF30 follows:

Map of Unit RF30 (Red River) of critical habitat for Rabbitsfoot



 Critical Habitat



1:200,000

(39) Unit RF31: Shenango River—
Mercer County, Pennsylvania.

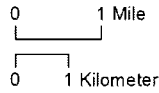
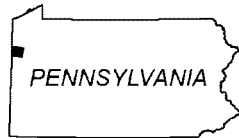
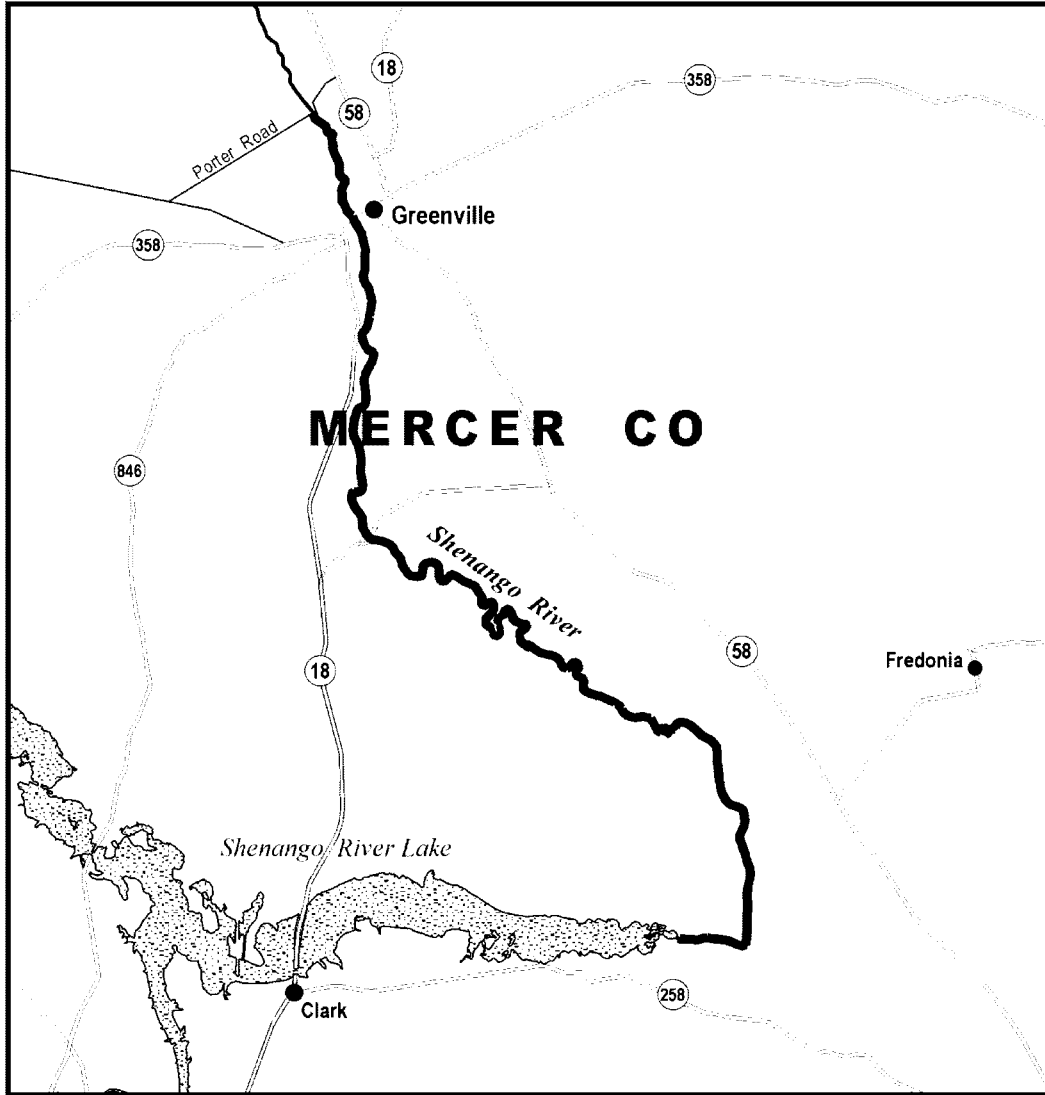
(i) *General Description:* Unit RF31
includes 24.8 rkm (15.4 rmi) of the

Shenango River from Porter Road near
Greenville, Pennsylvania, downstream
to the point of inundation by Shenango

River Lake near Big Bend, Mercer
County, Pennsylvania.

(ii) Map of Unit RF31 follows:

Map of Unit RF31 (Shenango River) of critical habitat for Rabbitsfoot



 Critical Habitat



* * * * *

Dated: February 25, 2015.
Michael J. Bean,
Principal Deputy Assistant Secretary for Fish and Wildlife and Parks.
 [FR Doc. 2015-09200 Filed 4-29-15; 8:45 am]
BILLING CODE 4310-55-P

Appendix D
Endangered Species Survey and U.S. Fish & Wildlife
Service Coordination



U.S. Department
of Transportation
**Federal Highway
Administration**

Arkansas Division

September 1, 2016

700 W. Capitol Ave
Room 3130
Little Rock, AR 72201-3298
501-324-5625(Office)
501-324-6423(Fax)

In Reply Refer To:
HDA-AR

Melvin Tobin
Field Supervisor
U.S. Fish and Wildlife Service
Arkansas Field Office
110 South Amity Road, Suite 300
Conway, Arkansas 72032

Subject: Old Hwy 79 Clarendon Bridge Removal Mussel Survey, Monroe County

Dear Mr. Tobin:

The Arkansas Highway and Transportation Department (AHTD) has constructed a new bridge spanning the White River at U.S. Highway 79 just south of the City of Clarendon that has replaced the old bridge upstream. The new bridge was opened to traffic in mid-August 2016.

Ecological Specialists, Inc. completed a mussel survey within the project area July 12-13, 2016. Enclosed for your review and comment is the final report for that effort. No threatened or endangered mussels were discovered.

We look forward to hearing from your agency regarding further requirements for Section 7 consultation on this project. Should you have questions or require additional information, please contact me at (501) 324-6430 or Josh Seagraves at the AHTD at (501) 569-2522.

Sincerely,

Randal Looney
Environmental Coordinator

Enclosure

**Final Report:
Unionid Survey for the U.S. Hwy 79 Bridge
Demolition, White River, Monroe County,
Arkansas**

Prepared for:

Arkansas State Highway and Transportation Department
Little Rock, Arkansas

Prepared by:

Ecological Specialists, Inc.
a subsidiary of EcoAnalysts, Inc.
O'Fallon, Missouri

August 2016

(ESI Project no. 15-047)

Acknowledgments

The Arkansas State Highway and Transportation Department (AHTD) provided funds for this study. Mr. Josh Seagraves coordinated the project for AHTD. Mr. Ryan Foley was the project manager for Ecological Specialists, Inc. (ESI). Mr. Foley was also the field team leader and primary author of this report. Mr. Kendall Cranney, Mr. Chet Clark, Mr. Jacob McCarthy (ESI), Mr. Mickey Matthews, and Mr. Ben Thesing (AHTD) assisted with the field effort. Ms. Heidi Dunn, Mr. Eric Belt, and Mr. David Ford (ESI) assisted with report preparation.

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1.0 Introduction

The Arkansas State Highway and Transportation Department (AHTD) recently constructed a new U.S. Hwy 79 bridge over the White River approximately 0.5 miles downstream of the existing bridge (approximate RM 99), and plans to demolish and remove the old structure (Figure 1-1). A large freshwater mussel (unionid) bed occurs near the project area and extends both upstream and downstream of the new bridge (Christian, 1995; Harris and Christian, 2000; J. Seagraves, AHTD, personal communication). Christian (1995) collected 20 species near the project area, including the federal endangered *Lampsilis abrupta*. The mussel community in Christian's (1995) survey was dominated by *Leptodea fragilis*, *Quadrula quadrula*, and *Obliquaria reflexa*. Prior to construction of the new U.S. Hwy 79 bridge, unionids were relocated from the footprint of the new bridge piers (J. Seagraves, AHTD, personal communication). Twenty-six (26) species were collected during the relocation, including the federally threatened *Quadrula c. cylindrica* (Table 1-1). An additional survey approximately 23 RM upstream of the project area yielded 21 live species, including one weathered dead federal endangered *Potamilus capax* shell (ESI, 2005). The unionid community within two mussel beds investigated during the 2005 survey was dominated by *Q. quadrula*, *O. reflexa*, and *Potamilus purpuratus* in the downstream bed and *Plectomerus dombeyanus*, *O. reflexa*, and *Q. quadrula* in the upstream bed.

The White River historically harbored species rich unionid communities. Fifty-one (51) species have been recorded from the White River (see Table 1-1). Additionally, 3 federal threatened and endangered (T&E) species (*L. abrupta*, *P. capax*, and *Q. c. cylindrica*) have been collected live since 2000 and one additional federal endangered species, *Epioblasma triquetra*, was collected as a relict shell in 1982.

As federal T&E unionid species are known to occur near the project area, a unionid survey was required prior to the demolition of the old U.S. Hwy 79 bridge to determine if federal T&E unionid species occur within the project area. Ecological Specialists, Inc. (ESI) was contracted to perform the unionid survey. Fieldwork was conducted July 12th and 13th, 2016.

2.0 Methods

The objective of this survey was to determine if federal T&E species occur within the project area. The survey area included the bridge footprint (approximately 10 m long) and extended approximately 30 m upstream of the bridge to approximately 90 m downstream of the bridge, and extended bank to bank (approximately 150 m), for a survey area of approximately 19,500 m². The project area was divided into 10 cells for the initial survey, with 2 of the cells occupying the bridge footprint (Figure 2-1). Six (6) 5-minute qualitative searches were conducted in each of the 10 cells, for 60 total samples (300 minutes total). Depth (m) and substrate composition (visual and tactile estimate by diver) were recorded at the beginning of each sample. At the conclusion of each 5-minute sample, all live and fresh-dead (with or without tissue, nacre shiny, valves still intact, periostracum present; likely dead less than a year) unionids were retrieved, identified to species, classified as juvenile (≤ 5 external annuli) or adult (> 5 external annuli) and enumerated. Weathered dead shells (no tissue, nacre chalky, valves may or may not be intact, periostracum present; likely dead for more than one year) were noted as present. A GPS position was recorded at the beginning of each sample and when divers noted a change in substrate composition. All live unionids were returned to the river near their collection point.

The U.S. Fish & Wildlife Service (USFWS)-approved Scope of Work required 10, 0.25 m² quantitative quadrat samples to be collected if federal T&E species were found during the initial survey. As no federal T&E species were collected during the initial survey, additional qualitative samples were collected within the mussel beds to increase the probability of finding federal T&E species in the project area, if present. As T&E species typically comprise a small percentage of a mussel community, and since the number of species is highly related to the number of individuals collected up a point of diminishing returns, qualitative samples are the most effective method in determining if T&E species are present (Kovalak et al., 1986; Payne et al., 1997).

At the conclusion of the initial survey, unionid and habitat data were used to delineate approximate mussel bed boundaries. To ensure that mussel communities were thoroughly searched and to increase the probability of detecting species that occur at low frequencies, additional qualitative sampling concentrated within the mussel beds was conducted. A series of 5-minute qualitative samples were conducted within the boundaries of the mussel beds. Since the number of species found is highly related to the number of individuals collected, the number of cumulative individuals versus cumulative species was graphed to determine if qualitative sampling effort was sufficient to reach the point of diminishing returns for number of species (6 consecutive samples with no new species). The statistical program *EstimateS* v.9.1.0 (Colwell, 2013) was used to compute expected species accumulation curves. A logarithmic equation was fitted to the expected species accumulation curves to estimate the number of additional individuals that would need to be collected to detect 1 additional species. Qualitative unionid and habitat data were recorded as above.

3.0 Results

3.1 Initial Survey

Habitat throughout the survey cells exhibited a similar pattern; substrate near the bank was composed of heterogeneous substrate constituents, dominated by boulder and silt along the left descending bank and silt and woody debris along the right descending bank, while substrate beyond approximately 20 m of the bank was predominantly loose sand (Figure 3-1). The left descending bank was industrialized with rip rap and loading dolphins installed throughout the survey area, while the right descending bank was heavily wooded. Depths averaged 4.9 m and ranged from 1.5 m to 7.6 m. Depths increased with distance from the bank and the depth increases appeared to coincide with the shift towards sand substrate (Figure 3-2). Current velocities increased with distance from the bank.

A total of 256 live unionids of 18 species were collected during the initial survey (Table 3-1). *Quadrula nobilis* (18.8% of total), *O. reflexa* (14.8%), and *Q. quadrula* (11.7%) were the most commonly collected species. Additional species collected include *Amblema plicata*, *Arcidens confragosus*, *Ellipsaria lineolata*, *Lampsilis cardium*, *Lampsilis siliquoidea*, *Lampsilis teres*, *L. fragilis*, *Megaloniais nervosa*, *O. reflexa*, *Obovaria olivaria*, *P. dombeyanus*, *Potamilus ohioensis*, *P. purpuratus*, *Quadrula nodulata*, *Quadrula p. pustulosa*, *Tritogonia verrucosa*, and *Truncilla truncata*. *Fusconaia ebena* was represented by a single weathered dead shell. Catch per unit effort (CPUE) was 51.2 live unionids/hr. Unionid distribution was consistent with distribution of heterogeneous substrate, as unionids were concentrated within two strips within approximately 20 m from the banks (Figure 3-3).

3.2 Qualitative Survey within Mussel Beds

Two (2) mussel beds were identified and delineated based on the results of the initial survey; Bed 1 and Bed 2 were located along the left and right descending banks, respectively (Figure 3-4). Both beds were similar in shape and each consisted of an approximately 20 m wide swath of unionids.

A total of 265 live unionids of 20 species were collected within Bed 1. *Quadrula nobilis* (26.8% of total), *Q. quadrula* (15.5%), and *O. reflexa* (10.9%) were the most commonly collected species (see Table 3-1). Live species collected in Bed 1 diminishing return samples not collected in the initial survey include *F. ebena*, *Fusconaia flava*, and *Lasmigona c. complanata*. A total of 20 5-minute qualitative samples (100 minutes) were needed to collect 6 consecutive samples with no new species, for a CPUE of 159.0 live unionids/hr (Figure 3-5).

A total of 281 live unionids of 17 species were collected within Bed 2. *Obliquaria reflexa* (27.0% of total), *Q. nobilis* (12.8%), and *Lampsilis teres* (12.5%) were the most commonly collected species (see Table 3-1). *Potamilus ohioensis* was the only species not previously collected during the initial survey or in the Bed 1 qualitative samples. A total of 29 5-minute qualitative samples (145 minutes) were needed to collect 6 consecutive samples with no new species, for a CPUE of 116.3 live unionids/hr (Figure 3-6).

4.0 Discussion

The unionid community in the project area is concentrated into 2 narrow, species-rich and high-density mussel beds along both the left and right descending banks. A total of 802 live unionids of 22 species were collected through all phases of the survey, for a total CPUE of 88.3 live unionids/hr. A total of 265 live individuals of 20 species were collected in Bed 1. A model based on the Bed 1 species area curve ($y=4.8556\ln[x]-6.6375$) estimates that an additional 32 individuals could yield an additional species (see Figure 3-5). A total of 281 live individuals of 17 species were collected in Bed 2. A model based on the Bed 2 species area curve ($y=3.2871\ln[x]-1.3274$) estimates that an additional 77 individuals could yield 1 additional species (see Figure 3-6).

Species composition was similar to previous surveys in this reach of the White River, as *Q. nobilis*, *O. reflexa*, and *Q. quadrula* were the most commonly collected species. *Quadrula nobilis* was first noted in the White River by John L. Harris (ADHT-retired) in 2010 based on a study that supported *Q. nobilis* as a valid taxon (Serb et al., 2003), field observations, and discussions amongst experienced malacologists. Characteristics that differentiate *Q. nobilis* and *Q. quadrula* include shelf-like pustules rather than tear drop-shaped pustules, elongation in shell shape, particularly among older individuals, and a deep mahogany periostracum color rather than a lighter tan/yellow color generally exhibited by *Q. quadrula*. As many individuals of *Q. nobilis*/*Q. quadrula* exhibited a gradient of morphological characteristics, for the purpose of this study, all individuals that exhibited shelf-like pustules, rather than tear drop pustules associated with *Q. quadrula*, were identified as *Q. nobilis*.

The project area lies within designated Critical Habitat Unit RF8b for *Q. c. cylindrica*, which encompasses 42.8 RM of the White River from HWY 79 in Clarendon, Arkansas to Arkansas HWY 1 in St. Charles, Arkansas (USFWS, 2015). Critical Habitat is defined as specific geographic area(s) that contain features essential for the conservation of a threatened or endangered species that may require special management and protection. These include, but are not limited to (1) space for individual and population growth and for normal behavior, (2) food, water, air, light, minerals, or other nutritional or physiological requirements, (3) cover or shelter, (4) sites for breeding, reproduction, or rearing (or development) of offspring, and (5) habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species (USFWS, 2015). Unit RF8b contains all or some components of these features, and exhibits a hydrological flow regime necessary to maintain benthic habitats, water and sediment quality necessary to sustain natural physiological processes for normal behavior, growth, and viability of all life stages, the occurrence of natural fish assemblages and abundance of fish hosts necessary for recruitment, and competitive or predaceous invasive (nonnative) species in quantities low enough to have minimal effect on survival of freshwater mussels (USFWS, 2015). *Quadrula c. cylindrica* is historically associated with small- to medium-sized streams and some larger rivers, and usually occurs in shallow areas along the bank and adjacent to runs and riffles with gravel and sand substrates where the water velocity is reduced (Parmalee and Bogan, 1998; Williams et al., 2008; Watters et al., 2009; USFWS, 2015). Habitat within the project area was composed primarily of loose sand (see Figure 3-1). Unionids were concentrated in strips dominated by boulder and silt substrate along the left descending bank and silt and woody debris along the right descending bank. The White River in the project area was unregulated and deep, and current

velocities increased sharply with distance from shore. No shoal or riffle habitat was present.

A large mussel bed is known to occur within and beyond the project area that harbors federal T&E species (Christian, 1995; Harris and Christian, 2000, J. Seagraves, AHTD, personal communication). While *L. abrupta* has been reported from the project area, it has not been recorded live since a single individual in 1995 (Christian, 1995). *Lampsilis abrupta* is considered to be rare though widely distributed throughout the White River (Harris and Christian, 2000). *Potamilus capax*, while known to occur within the White River, was most recently collected as a weathered dead individual approximately 22 RM upstream of the project area (ESI, 2005). Eleven (11) of the 3,635 individuals collected during a 2010 relocation approximately 0.5 RM downstream of the project area were *Q. c. cylindrica* (J. Seagraves, AHTD, personal communication). Many of these individuals were collected in boulder-dominated substrate along the left descending bank. Despite patches of similar substrate within the project area, and that *Q. c. cylindrica* is typically found unburied on top of the substrate (USFWS, 2015), and thus more conspicuous, *Q. c. cylindrica* was not collected during this survey. Although 3 federal T&E species have been collected within or near the study area, no federal T&E species were collected during this survey. Both beds were thoroughly searched and over 800 individuals were collected without finding a federal T&E species.

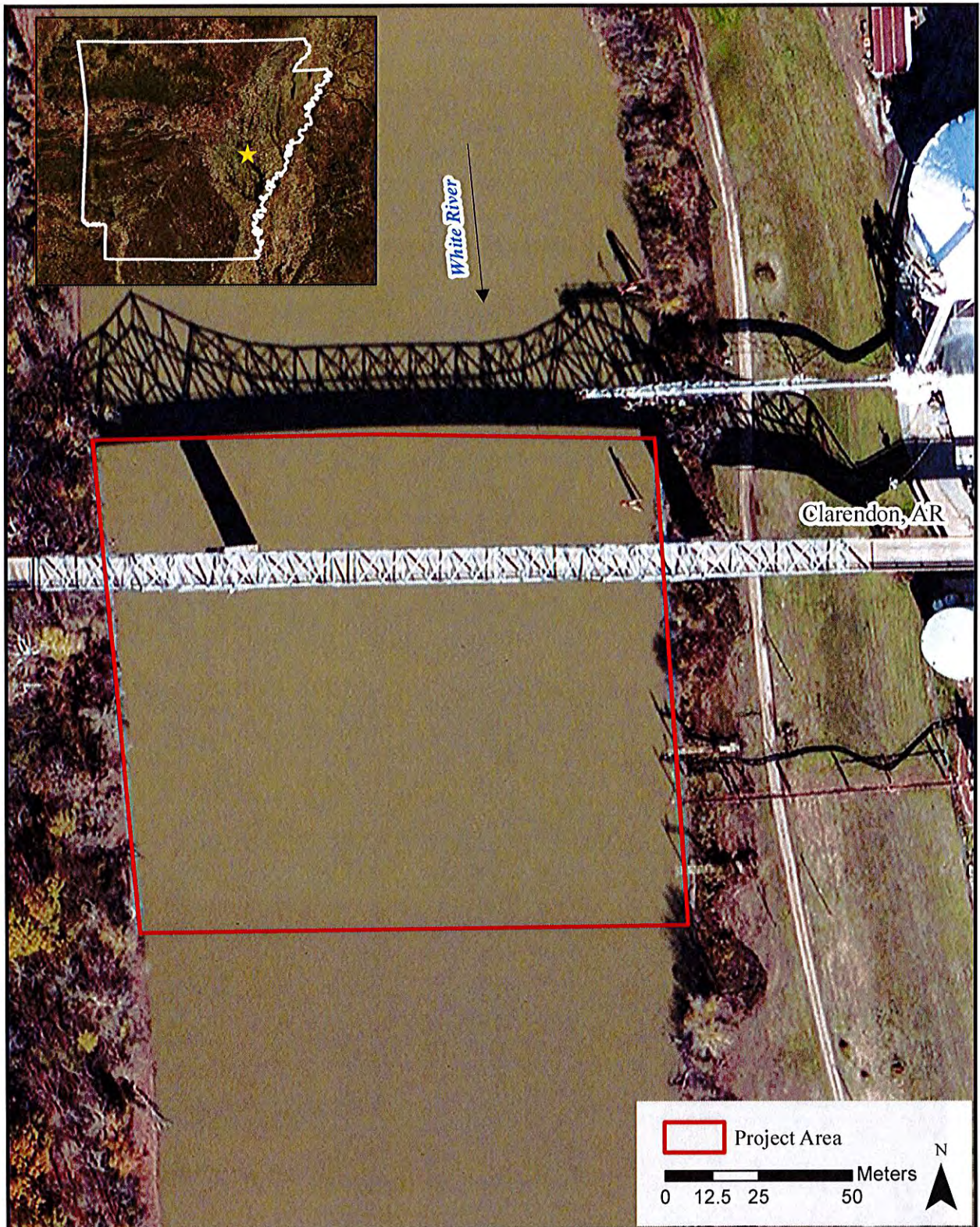
5.0 Literature Cited

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Williams, J.D., A.E. Bogan, and J.T. Garner. 2008. Freshwater mussels of Alabama and the Mobile basin in Georgia, Mississippi and Tennessee. The University of Alabama Press, Tuscaloosa, AL. 908pp.



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Figure 1-1. Survey area overview, White River, Monroe County, Arkansas, July 2016.

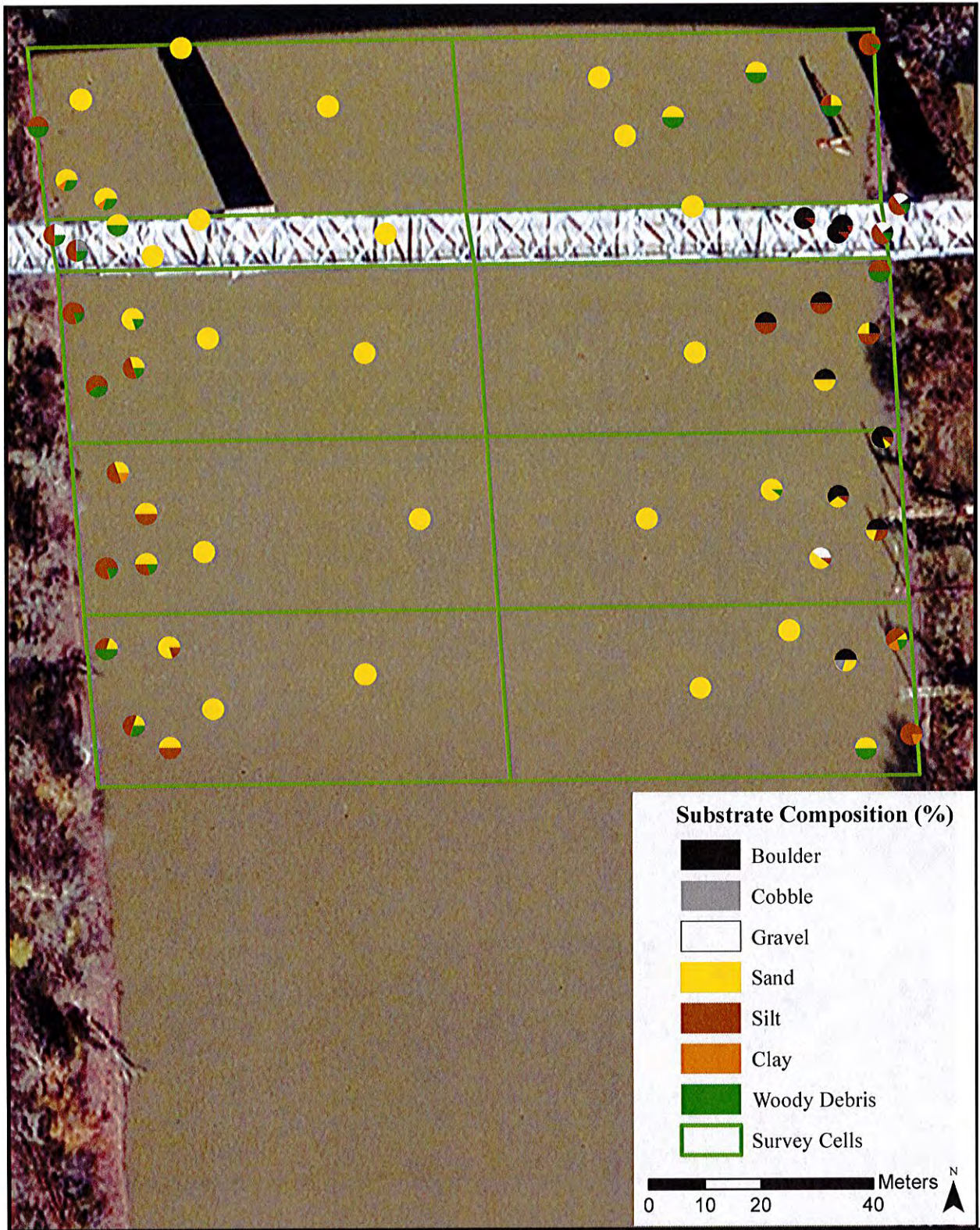
ESI



ECOLOGICAL
SPECIALISTS, INC.

Figure 2-1. Initial survey cells, White River, Arkansas, July 2016.

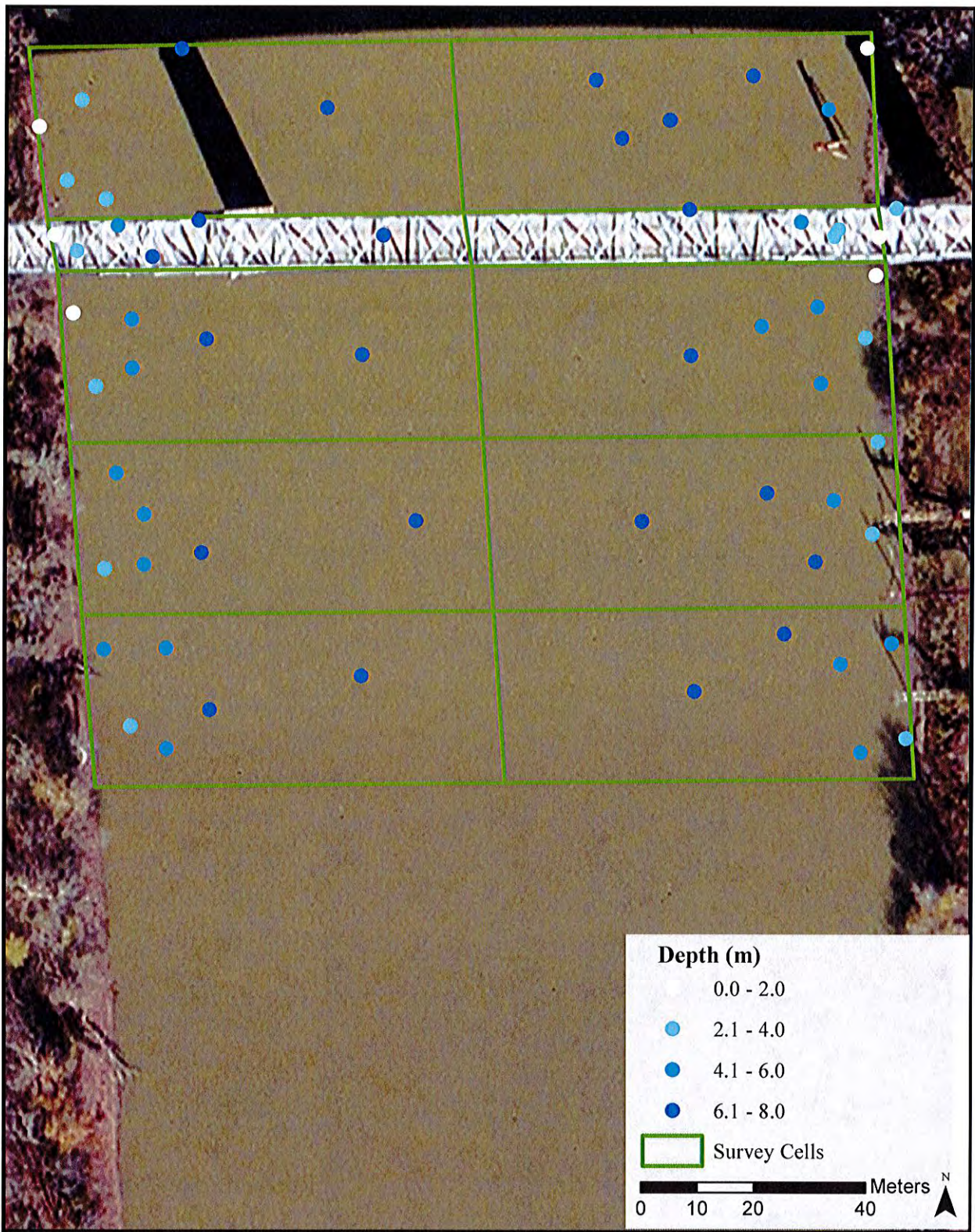
ESI



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Figure 3-1. Substrate composition, initial survey cells, White River, Arkansas, July 12, 2016.

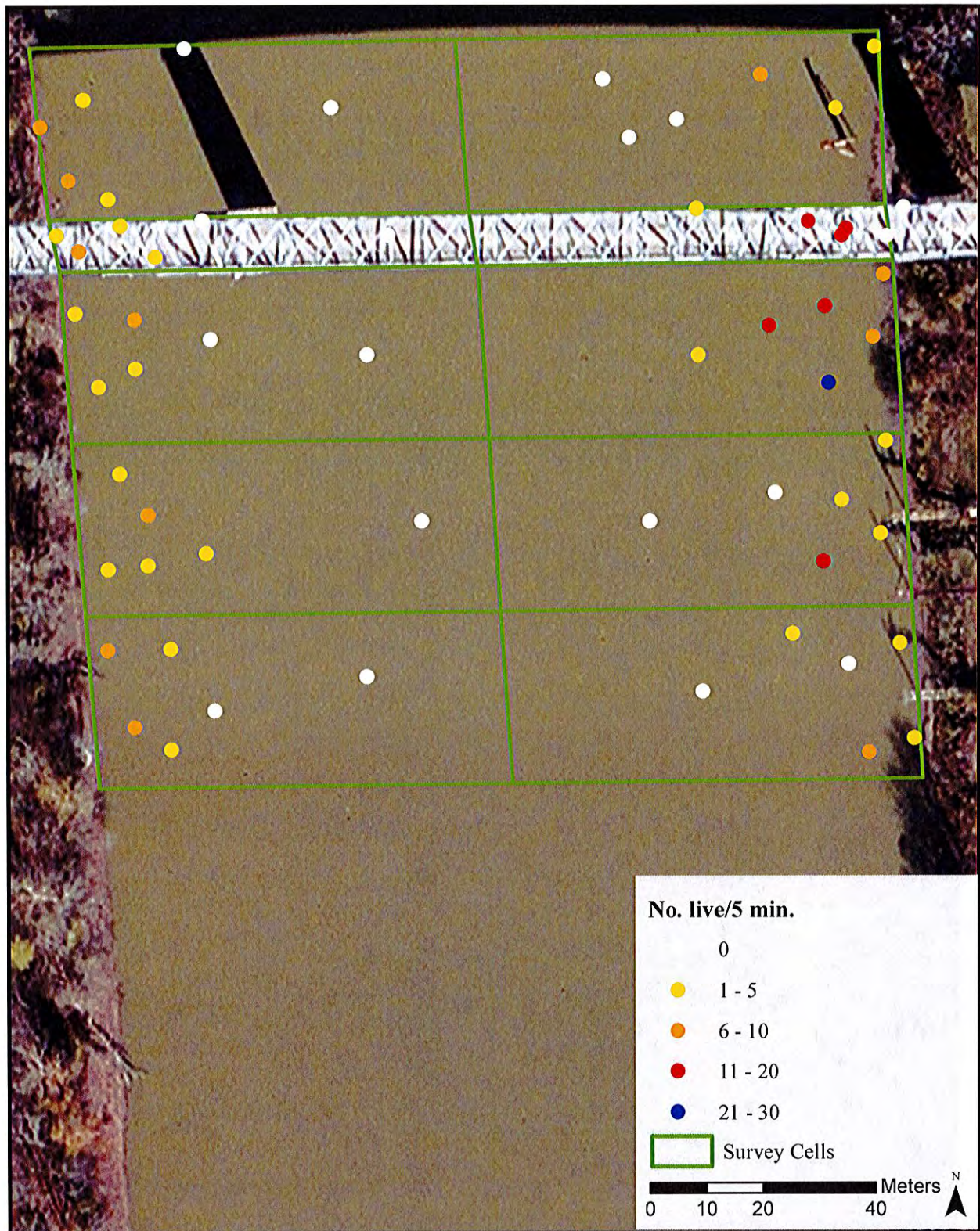
ESI

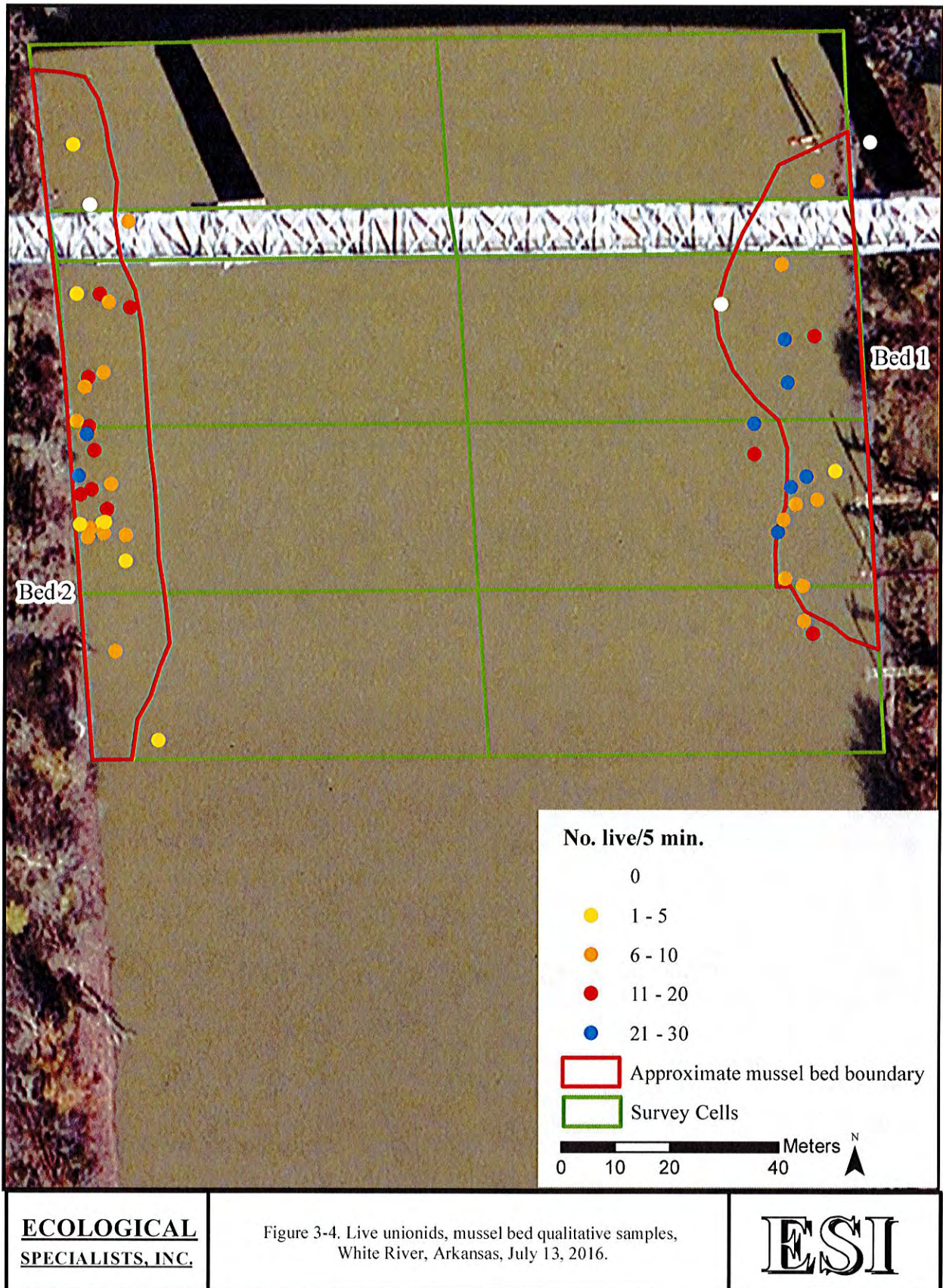


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Figure 3-2. Depth, initial survey cells, White River, Arkansas,
July 12, 2016.

ESI





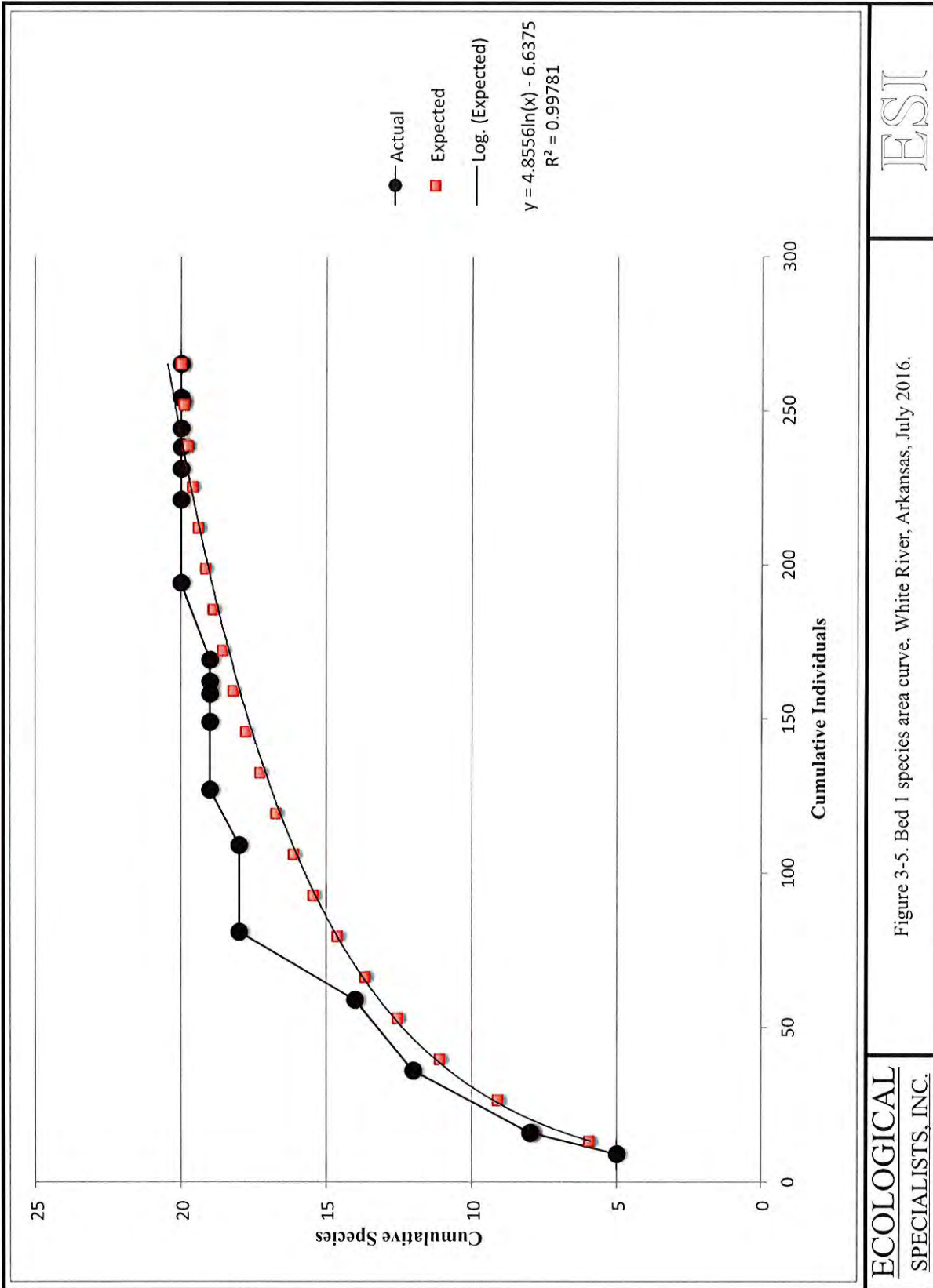


Figure 3-5. Bed 1 species area curve, White River, Arkansas, July 2016.

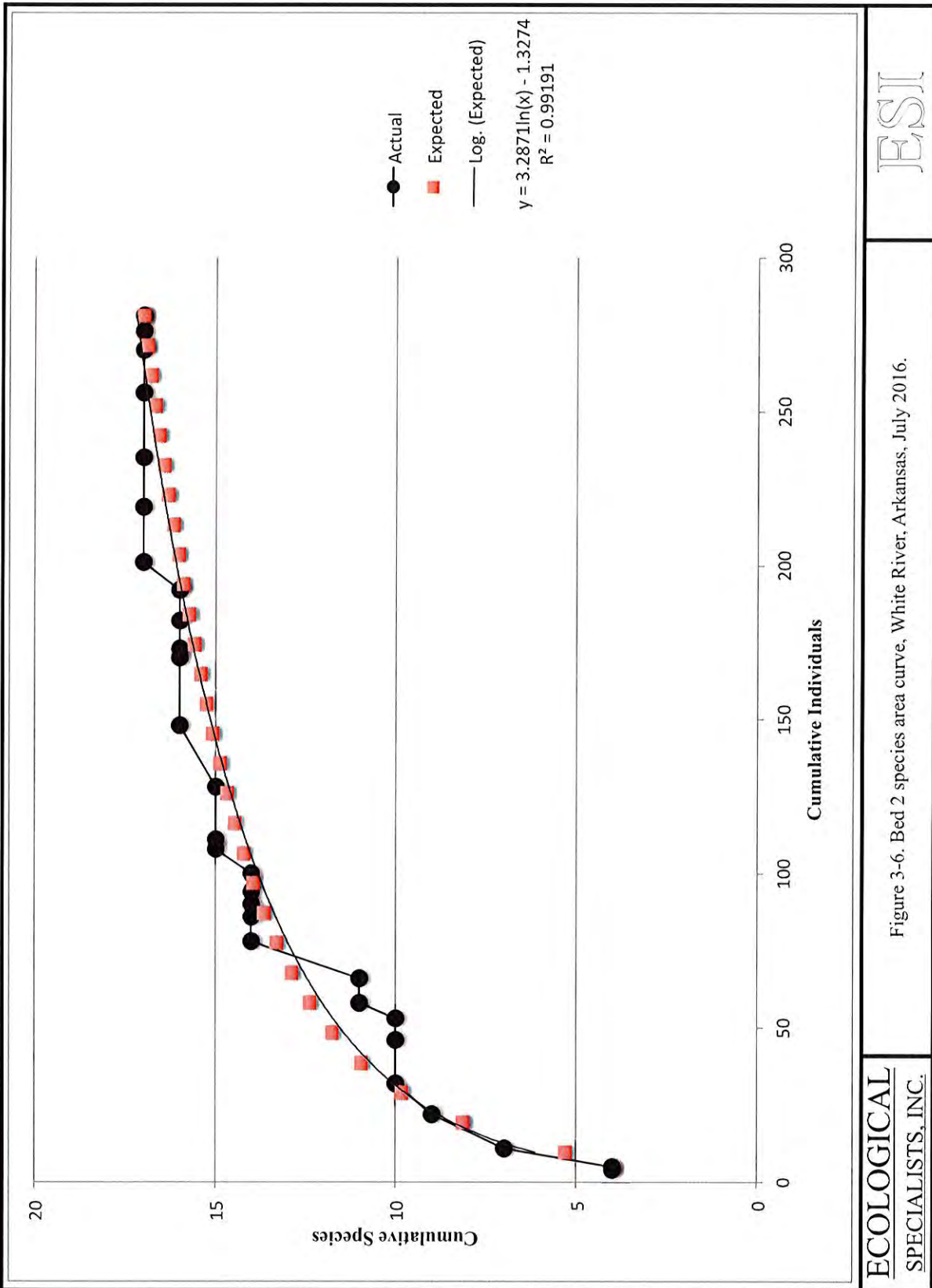


Figure 3-6. Bed 2 species area curve, White River, Arkansas, July 2016.

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Table 1-1. Unionid species reported from the White River.

Tribe	Species	Status ¹	1982 ²	1995 ³	2000 ⁴	2005 ⁵	2010 ⁶
Amblemini	<i>Amblema plicata</i>		x	x	x	x	x
Pleurobemini	<i>Elliptio dilatata</i>		x	x			
	<i>Fusconaia ebena</i>		x	x	x	x	x
	<i>Fusconaia flava</i>		x	x	x	WD	x
	<i>Fusconaia ozarkensis</i>		x				
	<i>Pleurobema cordatum</i>		x				
	<i>Pleurobema rubrum</i>			R	x		
	<i>Pleurobema sintoxia</i>			x			
	<i>Unio merus tetrasmus</i>		x				
Quadrulini	<i>Cyclonaias tuberculata</i>		R	x	x		
	<i>Cyprogenia aberti</i>		x	x	x		
	<i>Megalonaias nervosa</i>		x	x	x	x	x
	<i>Plectomerus dombeyanus</i>		x	x	x	x	x
	<i>Quadrula apiculata</i>						x
	<i>Quadrula c. cylindrica</i>	FT	x	x	x		x
	<i>Quadrula metanevra</i>		x	x	x		
	<i>Quadrula nobilis</i>						x
	<i>Quadrula nodulata</i>		x	x	x	x	x
	<i>Quadrula p. pustulosa</i>		x	x	x	x	x
	<i>Quadrula quadrula</i>		x	x	x	x	x
	<i>Tritogonia verrucosa</i>		x	x	x	x	x
Anodontini	<i>Anodonta suborbiculata</i>		x				
	<i>Arcidens confragosus</i>		x	x		x	x
	<i>Lasmigona c. complanata</i>		R	x	x	x	x
	<i>Lasmigona costata</i>		x	x			
	<i>Pyganodon grandis</i>		x	x	x	x	x
	<i>Strophitus undulatus</i>		x	x			
	<i>Utterbackia imbecillis</i>		x	x			x
Lampsilini	<i>Actinonaias ligamentina</i>		x	x	x		
	<i>Ellipsaria lineolata</i>		x	x	x	x	x
	<i>Epioblasma triquetra</i>	FE	R				
	<i>Lampsilis abrupta</i>	FE	x	x	x		
	<i>Lampsilis cardium</i>		x	x	x	x	x
	<i>Lampsilis reeveiana</i>		x				
	<i>Lampsilis siliquoidea</i>		x			x	
	<i>Lampsilis teres</i>		x	x	x	x	x
	<i>Leptodea fragilis</i>		x	x	x	x	x
	<i>Ligumia recta</i>		x	x	x		x
	<i>Ligumia subrostrata</i>		x				
	<i>Obliquaria reflexa</i>		x	x	x	x	x
	<i>Obovaria olivaria</i>		x	x	x	x	x
	<i>Potamilus capax</i>	FE			x	WD	
	<i>Potamilus ohioensis</i>		R	x	x	x	x
	<i>Potamilus purpuratus</i>		x	x	x	x	x
	<i>Ptychobranthus occidentalis</i>		x				
	<i>Toxolasma lividus</i>		x				
	<i>Toxolasma parvus</i>		x	R			
	<i>Truncilla donaciformis</i>			x		WD	x
	<i>Truncilla truncata</i>		x	x	x	x	x
	<i>Venustaconcha pleasii</i>		x				
Total live species			40	34	29	21	27
Total species			44	36	29	24	27

¹FE = Federal Endangered, FT = Federal Threatened (USFWS, 2016)²Gordon, 1982³Christian, 1995⁴Harris and Christian, 2000⁵ESI, 2005⁶J. Seagraves, AHTD, personal communication

R = Relict, WD = Weathered Dead

Table 3-1. Unionids collected, White River, Arkansas, July 2016.

Tribe	Species	Survey Cells		Mussel Bed Diminishing Returns				Total	
		No. Live	%	No. Live	%	Bed 1	Bed 2	No. Live	%
Amblemini	<i>Amblema plicata</i>	4	1.6	2	0.8	8	2.8	14	1.7
Pleurobemini	<i>Fusconata ebena</i>	WD	—	2	0.8	—	—	2	0.2
	<i>Fusconata flava</i>	—	—	1	0.4	—	—	1	0.1
Quadrulini	<i>Megaloniaias nervosa</i>	18	7.0	26	9.8	7	2.5	51	6.4
	<i>Plectomerus dombeyanus</i>	10	3.9	5	1.9	23	8.2	38	4.7
	<i>Quadrula nobilis</i>	48	18.8	71	26.8	36	12.8	155	19.3
	<i>Quadrula nodulata</i>	10	3.9	11	4.2	5	1.8	26	3.2
	<i>Quadrula p. pustulosa</i>	7	2.7	12	4.5	10	3.6	29	3.6
	<i>Quadrula quadrata</i>	30	11.7	41	15.5	25	8.9	96	12.0
	<i>Tritogonia verrucosa</i>	14	5.5	23	8.7	2	0.7	39	4.9
Anodontini	<i>Arcidens confragosus</i>	4	1.6	2	0.8	2	0.7	8	1.0
	<i>Lasmigona c. complanata</i>	—	—	2	0.8	1	0.4	3	0.4
Lampsilini	<i>Ellipsaria lineolata</i>	1	0.4	2	0.8	—	—	3	0.4
	<i>Lampsilis cardium</i>	6	2.3	6	2.3	12	4.3	24	3.0
	<i>Lampsilis siliquoidea</i>	1	0.4	—	—	—	—	1	0.1
	<i>Lampsilis teres</i>	21	8.2	4	1.5	35	12.5	60	7.5
	<i>Leptodea fragilis</i>	17	6.6	8	3.0	20	7.1	45	5.6
	<i>Obliquaria reflexa</i>	38	14.8	29	10.9	76	27.0	143	17.8
	<i>Obovaria olivaria</i>	5	2.0	2	0.8	1	0.4	8	1.0
	<i>Potamilus ohioensis</i>	—	—	—	—	1	0.4	1	0.1
	<i>Potamilus purpuratus</i>	20	7.8	13	4.9	17	6.0	50	6.2
	<i>Truncilla truncata</i>	2	0.8	3	1.1	—	—	5	0.6
No. Live		256	100.0	265	100.0	281	100.0	802	100.0
No. Live Species		18		20		17		22	
Total No. Species		19		20		17		22	
Effort (min)		300		100		145		545	
CPUE (No. live/hr)		51.2		159.0		116.3		88.3	

WD = Weathered Dead

NBIP File Review Checklist – PY 2017

Structure No.: **00000000015612**

Review Date: 08/08/2016

Item 1 - State: **56-Arkansas**

Review Performed by: Terry W. Daniel

Item 7 - Feature Carried: **CORD 3-H District 6**

Item 6A - Feature Crossed: **CYPRESS CREEK RELIEF**

Item 27 - Year Built: **1972**

Item 90 - Most Recent NBIS Insp. Date: **August 2015**

Metrics assessed in file review:

M13	M14	M15	M16	M17	M18	M19	M21	M23
P	I	P	-	-	-	-	-	P

Metric 14 – Inspection Procedures, Post or Restrict

NBI Data

Item 41:	P-Posted For Load			Item 31:	2-H15			
Item 59:	5	Item 62:	N	Item 70:	0	Item 103:	0	
Item 63 – Oper. Rating Method:	2-AS			Item 64 – Oper. Rating:	9.1 mT (10.1 Ton)			
Item 65 – Inv. Rating Method:	2-AS			Item 66 – Inv. Rating:	6.4 mT (7.1 Ton)			

Review Observations

Confirmation of posting/closure in bridge file (Y/N):	Y
Posting/closure is consistent with Items 41 & 70 (Y/N):	Y
Posting/closure is consistent with load rating (Y/N):	Y

Metric 14 Notes:

- Required Posting: 7-8-12 was in bridge file.
- Field Posting: 7-8-12 was documented by 08/04/2015 photos in bridge file.
- Item 41 = P and Item 70 = 0 (OR > 39.9% below legal loads) are consistent.
- Posting is consistent with the 7-8-12 load rating.

Assessment – Does this bridge meet the metric criteria (Y/N)?

Y

NBIP File Review Checklist – PY 2017

Structure No.: 00000000002707

Review Date: 08/10/2016

Review Performed by: Terry W. Daniel

Item 7 - Feature Carried: SH 8

District 8

Item 6A - Feature Crossed: Smith Creek

Item 27 - Year Built: 1951

Item 90 - Most Recent NBIS Insp. Date: December 2015

Metrics assessed in file review:

M13	M14	M15	M16	M17	M18	M19	M21	M23
P	I	P	-	-	-	-	-	P

Metric 14 – Inspection Procedures, Post or Restrict

NBI Data

Item 41:	P-Posted For Load		Item 31:	2-H15				
Item 59:	6	Item 62:	N	Item 70:	3	Item 103:	0	
Item 63 – Oper. Rating Method:			1-LF		Item 64 – Oper. Rating:		29.9 mT (33.2 Ton)	
Item 65 – Inv. Rating Method:			1-LF		Item 66 – Inv. Rating:		19.1 mT (21.2 Ton)	

Review Observations

Confirmation of posting/closure in bridge file (Y/N):	Y
Posting/closure is consistent with Items 41 & 70 (Y/N):	Y
Posting/closure is consistent with load rating (Y/N):	Y

Metric 14 Notes:

Load Rating Date in InspectTech: 10/08/2007 Load Rater: Dennis Vire

AHTD POSTING VEHICLES	TONS	REQUIRED POSTING	12-30-2015 POSTING PHOTOS		Updated Inspect Tech Agency inventory page shows both ends posted.
			<u>A</u>	<u>B</u>	
CODE 4	27	None	—		
CODE 9	33	None	—		
CODE 5	36	36	36		

Item 70 = 3 (10-20% below legal loads) [OK bridge is posted (Item 41) & Item 70 should be 4 or less]

Posting of - - 36 is consistent with load rating of 27-33-36.

Assessment – Does this bridge meet the metric criteria (Y/N)?

Y

NBIP File Review Checklist – PY 2017

Structure No.: 00000000002707

Review Date: 08/10/2016

Review Performed by: Terry W. Daniel

Item 7 - Feature Carried: **SH 8**

District 8

Item 6A - Feature Crossed: **Smith Creek**

Item 27 - Year Built: **1951**

Item 90 - Most Recent NBIS Insp. Date: **December 2015**

Metrics assessed in file review:

M13	M14	M15	M16	M17	M18	M19	M21	M23
P	I	P	-	-	-	-	-	P

Metric 14 – Inspection Procedures, Post or Restrict

NBI Data

Item 41:	P-Posted For Load		Item 31:	2-H15				
Item 59:	6	Item 62:	N	Item 70:	3	Item 103:	0	
Item 63 – Oper. Rating Method:			1-LF		Item 64 – Oper. Rating:		29.9 mT (33.2 Ton)	
Item 65 – Inv. Rating Method:			1-LF		Item 66 – Inv. Rating:		19.1 mT (21.2 Ton)	

Review Observations

Confirmation of posting/closure in bridge file (Y/N):	Y
Posting/closure is consistent with Items 41 & 70 (Y/N):	Y
Posting/closure is consistent with load rating (Y/N):	Y

Metric 14 Notes:

Load Rating Date in InspectTech: 10/08/2007 Load Rater: Dennis Vire

AHTD POSTING VEHICLES	TONS	REQUIRED POSTING	12-30-2015 POSTING PHOTOS		Updated Inspect Tech Agency inventory page shows both ends posted.
			A	B	
CODE 4	27	None	—		
CODE 9	33	None	—		
CODE 5	36	36	36		

Item 70 = 3 (10-20% below legal loads) [OK bridge is posted (Item 41) & Item 70 should be 4 or less]

Posting of - - 36 is consistent with load rating of 27-33-36.

Condition Ratings: 6-6-7

Assessment – Does this bridge meet the metric criteria (Y/N)?

Y



IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE

110 South Amity Road, Suite 300

Conway, Arkansas 72032

Tel.: 501/513-4470 Fax: 501/513-4480



September 15, 2016

Randal J. Looney
FHWA – Arkansas Division Office
700 West Capitol Ave., Rm 3130
Little Rock, AR 72201-3298

Dear Mr. Looney:

The U.S. Fish and Wildlife Service (Service) has reviewed your letter and the report for the Old Hwy 79 Clarendon Bridge Removal Mussel Survey conducted in Monroe County, Arkansas. Our comments and recommendations are submitted in accordance with the National Environmental Policy Act of 1969 and the Endangered Species Act of 1973 (Public Law 93-205, as amended).

The Service believes that the survey and the findings of this report are adequate and complete. No additional surveys are necessary and we do not have any further recommendations at this time.

We look forward to reviewing your assessment and determinations for this action. If you have any questions, please contact Lindsey Lewis at (501) 513-4489 or lindsey_lewis@fws.gov.

Sincerely,

Melvin L. Tobin
Field Supervisor

c (w/o encl)

Arkansas Highway and Transportation Department, Little Rock, Arkansas
Central Arkansas National Wildlife Refuge Complex, Augusta, Arkansas

C:\Users\lilewis\Documents\PROJECTS\FY2016\AHTD\Clarendon Bridge\Mussell Survey Comments.docx



United States Department of the Interior

FISH AND WILDLIFE SERVICE

110 South Amity Road, Suite 300
Conway, Arkansas 72032
Tel.: 501/513-4470 Fax: 501/513-4480



IN REPLY REFER TO:

November 18, 2016

Mr. Randal Looney
Federal Highway Administration
Arkansas Division
700 West Capitol Avenue
Room 3130
Little Rock, Arkansas 72201-3298

Re: Biological Assessment (Reassessment), November 2016, AHTD Job 110123, White River & Relief Strs. & Apprs. (Clarendon) PE. Monroe County, Arkansas

Dear Mr. Looney,

This letter provides U.S. Fish and Wildlife Service (Service) comments on the above referenced biological assessment (BA) developed by the Arkansas Highway and Transportation Department (AHTD) and the Federal Highway Administration (FHWA). Our comments are submitted in accordance with the Endangered Species Act (ESA) of 1973 (Act; 87 stat. 884, as amended; 16 U.S.C. 1531 et seq.). Comments from the Service were solicited by letter dated November 14, 2016.

Project Description

The AHTD constructed a bridge (and ~4.5 miles of elevated roadway and associated approaches and bridges) on a new location south of the existing Arkansas Highway 79 Bridge crossing the White River at Clarendon, Monroe County, Arkansas. The project was separated into three construction jobs and one demolition job. AHTD Job Number 110503 consisted of the replacement of the bridge over Roc Roe Bayou and approaches and installation of a flood relief bridge. That project was completed September 27, 2013. Construction of the western approach spans of the White River Bridge (AHTD Job Number 110394) and White River Bridge main span and eastern approaches (AHTD Job Number 110395) began in July and November 2010, respectively, and were opened to traffic on August 15, 2016.

The remainder of the project will consist of the demolition of two bridges over Old River Lake and one bridge over the White River, removal of approximately 2,000 linear feet of roadway embankment, planting of the former rights-of-way in native bottomland hardwood trees, rehabilitation of a Service National Wildlife Refuge road, and installation of a boat ramp at Old River Lake. These restoration efforts will meet all obligations set forth in the Service Refuge compatibility determination December 6, 2007. A more detailed description of the specific construction and demolition activities can be found in Section 5.1 of the BA.

Our comments herein pertain to the entire action area described in the BA which encompasses the construction limits of the entire project area. This includes a 0.5 km (0.3 mi) area surrounding the construction limits to account for noise and smoke associated with project construction for terrestrial species. Generally, a 30.5 m (100 ft.) area upstream and 91.4 m (300 ft.) area downstream of the bridges were also taken into account for aquatic disturbances. This action area was determined by AHTD/FHWA through coordination with the Service.

Consultation History

Previously, an informal consultation concurrence letter was submitted by the Service dated June 21, 2006. In that letter, the Service provided concurrence with AHTD/FHWA's determination of may affect, not likely to adversely affect the federally endangered Ivory Billed Woodpecker (*Campephilus principalis*; IBWO), endangered Fat Pocketbook mussel (*Potamilus capax*), and endangered Pink Mucket mussel (*Lampsilis abrupta*). Extensive search criteria for these species during the preceding assessment indicated it was highly unlikely any of the aforementioned species were present in the action area. Reinitiation of consultation is not necessary, unless new information reveals that the agency action may affect listed species or critical habitat in a manner or to an extent not previously considered, the agency action is subsequently modified in a manner that causes an effect to the listed species not previously considered, or a new species is listed or critical habitat designated within the action area prior to project completion.

The Rabbitsfoot mussel (*Quadrula cylindrica cylindrica*) was listed as a candidate species for protections under the Endangered Species Act on November 6, 2009. During the relocation of mussels (August 2010) within the footprint of the new bridge location (AHTD Job Number 110395), 11 Rabbitsfoot mussels were collected and translocated. Subsequently, the Rabbitsfoot mussel was listed as threatened by the Service on September 17, 2013, and critical habitat designated in the White River on April 30, 2015 (effective June 1, 2015; 80 FR 24692).

In October 2015, the AHTD/FHWA reinitiated informal consultation through discussions on conducting further surveys and a reassessment of the demolition portion of the action. This was due, in part, to the time elapsed since the previous assessment and mussel survey. In addition, it was necessary to reinitiate consultation related to the new listing for Rabbitsfoot and its critical habitat. Based upon ongoing discussions, new data, species known ranges, and known habitat types, AHTD/FHWA and the Service determined what species needed to be reassessed along with the focal area requiring additional survey. This reassessment would include a review of the previous assessment and a new assessment for Fat Pocketbook, Pink Mucket, and Rabbitsfoot, along with its designated critical habitat. No additional species were identified as being either affected by the action or requiring reinitiation and, as such, the original determination remains valid for all other species identified in those documents. Those species will not be discussed further.

This assessment for Fat Pocketbook, Pink Mucket, and Rabbitsfoot, along with its designated critical habitat was based upon the known range for these species, their general habitat types, and the designated critical habitat for Rabbitsfoot. The survey and assessment area was focused on the only available habitat with the action area and was based on the known habitat types identified for these species. This focal area encompasses the existing bridge to be demolished

and the 30.5 m (100 ft.) area upstream and 91.4 m (300 ft.) area downstream within the main channel of the White River near Clarendon, Arkansas.

Effects Analysis

Direct Effects for Pink Mucket, Fat Pocketbook and Rabbitsfoot

- (Text in italics as stated within the BA.) *“Under Section 7 of the Endangered Species Act, effects of the action are defined as “direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.” [50 CFR §402.02]. The majority of the ~2.5 mile project will have no direct effects on the Pink Mucket, Fat Pocketbook, Rabbitsfoot mussel or its critical habitat. Any direct effects will be associated with the demolition of the 720’ bridge over the White River. Potential direct effects to these species could be crushing, displacement via scour around material dropped into the river, displacement via construction equipment and/or bridge sections during removal from the river, or being subjected to temporarily unfavorable water quality conditions, such as increased turbidity caused by the displacement of sediments by falling debris and construction equipment. However, based on the negative results of the survey, any potential effects are discountable.”*

Temporary impacts to water quality are common during highway construction activities. The most common impact is associated with increases in fine sediments as a result in sediment laden stormwater runoff or the suspension of sediments from within the stream bed. These impacts can be lessened with the proper implementation of best management practices (BMPs) for erosion control. The NPDES Permit requires the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP will include specifications and BMPs needed for control of erosion and sedimentation. Specific erosion control measures can be found on the plans and will include the use of temporary silt fence, sand bag ditch checks, temporary and permanent seeding, and the use of clean rock fill for temporary access roads.

...Based on the results of the Peck (2010) study, it is expected that the demolition activities associated with the White River Bridge demolition project at Clarendon may result in a slight increase in fine sediments; however, those increases are not likely to result in changes to the physiological condition of the mussels or changes in mussel community metrics...”

Service Comment: The Service agrees with this assessment and conclusion. Based on the negative results of the survey, any potential effects to these species are unlikely and discountable since none of these species were found within the surveyed area. Furthermore, any effects to these species outside of the survey area are also unlikely and discountable due to the use of BMPs, similar habitat type, distance, and lack of records for these species in the vicinity of the action. Additionally, we agree with the applicability of the Peck (2010) study in support of AHTD/FHWA conclusions related to the effects from demolition and sediment transport.

Critical Habitat for Rabbitsfoot (Unit RF8b)

“The physical or biological features essential to the conservation of the species are listed as water quality, sediment quality, stable habitat, health of fish hosts, diet of all life stages, and periodic flooding of floodplain habitat. The primary constituent elements, defined as the elements of the physical or biological features that when laid out in the appropriate quantity and spatial arrangement to provide for a species’ life-history processes are essential to the conservation of the Rabbitsfoot. The primary constituent elements (PCE) are: 1) Geomorphically stable river channels and banks (channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation) with habitats that support a diversity of freshwater mussels and native fish (such as, stable riffles, sometimes with runs, and mid-channel island habitats that provide flow refuges consisting of gravel and sand substrates with low to moderate amounts of fine sediment and attached filamentous algae); 2) A hydrologic flow regime (the severity, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats where the species are found and to maintain connectivity of rivers with the floodplain, allowing the exchange of nutrients and sediment for maintenance of the mussels and fish host’s habitat, food availability, spawning habitat for native fishes, and the ability for newly transformed juveniles to settle and become established in their habitats; 3) Water and sediment quality (including, but not limited to, conductivity, hardness, turbidity, temperature, pH, ammonia, heavy metals, and chemical constituents) necessary to sustain natural physiological processes for normal behavior, growth, and viability of all life stages; 4) The presence and abundance (currently unknown) of fish hosts necessary for recruitment of the Rabbitsfoot. The occurrence of natural fish assemblages, reflected by fish species richness, relative abundance, and community composition, for each inhabited river or creek will serve as an indication of appropriate presence and abundance of fish hosts until appropriate host fish can be identified, and; 5) Either no competitive or predaceous invasive nonnative species, or such species in quantities low enough to have minimal effect on survival of freshwater mussels.”

Service Comment: This is an accurate description of the critical habitat PCEs. No further comment is necessary.

- PCE 1: *“This unit is listed as missing PCE 1.”*

Service Comment: The Service agrees with this assessment. The habitat and channel within this area is a U.S Army Corps of Engineers maintained deep water navigation channel comprised of silt, sand, and rip rap and is devoid of gravel, riffles, and other habitat features described for this PCE. Habitat surveys and numerous site visits to this area have confirmed this description. No further comment is necessary.

- PCE 2: *“The direct effects of the project may temporarily alter PCEs 2 by causing localized changes in hydrology while the bridge is in the river; however, time constraints in the USCG Bridge Permit and USACE Section 404 Permit will limit the potential local hydrologic changes to a period of only a few days.”*

Service Comment: The Service agrees with this assessment. Based on the description of the action and the permit requirements, the effects to PCE 2 from this action on the “hydrologic flow regime necessary to maintain benthic habitats where the species are found and to maintain connectivity of rivers with the floodplain, allowing the exchange of nutrients and sediment for maintenance of the mussels and fish host's habitat, food availability, spawning habitat for native fishes, and the ability for newly transformed juveniles to settle and become established in their habitats” will be minimal and only effected locally and temporarily by this action.

- PCE 3: *“One conclusion that could be made is that because surveys did not find Rabbitsfoot at this location, although other surveys have found them at other locations both upstream and downstream, that there is some unknown variable preventing their occurrence at this particular location. As previously discussed, the Peck (2010) study indicates that although it is expected that the demolition activities associated with the White River Bridge demolition project at Clarendon may result in a slight increase in fine sediments, those increases are not likely to result in changes to the physiological condition of the mussels or changes in mussel community metrics. Therefore, any changes to water and sediment quality are not expected to rise above that necessary to sustain natural physiological processes for normal behavior, growth, and viability of all life stages. Furthermore, it is concluded that given the percentage of critical habitat in the action area (0.004% of the total, and 0.145% of the unit), the temporal nature of the construction activities, and the results of the Peck (2010) study that any potential effects are not likely to adversely affect PCE 3.”*

Service Comment: The Service agrees with this assessment. Our opinion is based on the negative survey result, type of habitat identified at the site, the limited effects to water quality and sediment identified, the temporary nature of the action, and the minimal amount of habitat being affected. The Service does not believe that this action will alter “water and sediment quality (including, but not limited to, conductivity, hardness, turbidity, temperature, pH, ammonia, heavy metals, and chemical constituents) necessary to sustain natural physiological processes for normal behavior, growth, and viability of all life stages.”

- PCE 4: *“The presence and abundance of the Rabbitsfoot host fish (PCE 4) could be temporarily altered in the local vicinity of the project area during construction. The movements, sounds, and vibrations created by construction equipment and the falling bridge may induce fish to leave the area temporarily. Some fish could also be crushed by falling debris or killed in the concussion of the controlled explosions. Of the species known as potential host fish for the Rabbitsfoot, only the Emerald Shiner and Blacktail Shiner are known to occur within this critical habitat unit (Robison and Buchanan 1988). These species are both described as being tolerant of turbidity and siltation (Robison and Buchanan 1988); therefore, it is unlikely that the suspension of sediments during construction would have an impact on the host fish. Additionally, both species are listed as being common; therefore, any impacts would not result in a measurable change in the presence or abundance of the Rabbitsfoot host fish in the unit.”*

Service Comment: The Service agrees with this assessment. Effects would be localized, minimal, and temporary, in an area where the survey produced no Rabbitsfoot mussels. Furthermore, we agree with the assessment that both host species found in the action area are common and tolerant of turbidity and siltation. Therefore, it is unlikely that the suspension of sediments movements, sounds, and vibrations related to construction would result in a measurable change in the presence or abundance of the Rabbitsfoot host fish in the action area.

- PCE 5: *“Zebra mussels are already known from within the action area; therefore, the action will not introduce or proliferate invasive species or have any beneficial effects for invasive species. Thus the project will have no effect on PCE 5.”*

Service Comment: The Service agrees with this assessment. We do not have any reason to believe or literature to support that this action would in any way contribute to the proliferation of “competitive or predaceous invasive nonnative species” in any quantity.

Indirect Effects

- Altered Host Relationships

“...Both vibrations and sedimentation are common during construction activities. Any disturbances associated with this demolition that may reduce the number of fish within the action area have the potential to reduce mussel/host interactions. However, no Pink Mucket, Fat Pocketbook, or Rabbitsfoot mussels were found in the action area; therefore, the project is not expected to alter mussel/host interactions for these species.”

Service Comment: The Service agrees with this assessment. Based on the negative results of the survey, any potential effects to these species are unlikely and discountable since none of these species were found within the surveyed area. Additionally, any effects would be local and temporary in nature.

- Long-Term Habitat Alteration

“Two piers within the wetted width of the channel and banks will be removed. The change in removal of these piers will create a different flow within the channel. Additionally, removal of road embankment will likely leave a different flood flow regime after construction has been completed. The USFWS determined that the removal of the abandoned roadway within the refuge boundaries, including the embankment and the bridges, was required to be compatible with the refuge mission. This decision included an effects determination in which the USFWS determined that the Compatibility Determination and the stipulations necessary to ensure compatibility were “not likely to adversely affect” endangered species. They then stated that the “restoration of former right-of-way, acquisition of adjacent agricultural properties with subsequent reforestation, and substantially longer elevated spans for all bridges will improve hydrologic functions (as demonstrated by the US Geological Survey Water-Resources Investigations Report 02-4256).”

Service Comment: The Service agrees with this assessment. We maintain our previous conclusions related to this action and have nothing further to add at this time.

Effect Determination for Listed Species

No Effect Determinations

- *“Due to the distance to the nearest recent collections of the Scaleshell (158 river miles), pondberry (45 miles), and Red-cockaded Woodpeckers (13 miles) from this project it was determined that the project will have no effect on these species, since these distances are well outside of our ~21,000 m2 action area.”*

Service Comment: The Service does not have any information or knowledge that suggests this action will affect these species. Furthermore, we maintain our previous conclusions related to this action and have nothing further to add at this time.

May Affect, Not Likely to Adversely Affect

- *“Historic surveys up and downstream of the project area identified Rabbitsfoot, Fat Pocketbook and Pink Mucket individuals; however, no living (or shell material of) Rabbitsfoot, Fat Pocketbook, or Pink Mucket were collected during sampling of the action area on July 12-13, 2016, with standard USFWS approved survey methodologies. Therefore, because these species were not detected within the action area, a “may affect, not likely not be adversely affect” determination has been made for these species.”*

Service Comment: The Service believes that sufficient information was provided to determine the effects of the proposed project to federally listed species and to conclude whether this project is likely to adversely affect those species. We, therefore, concur with your "may affect, not likely to adversely affect" determination for Rabbitsfoot, Fat Pocketbook, and Pink Mucket.

Effect Determination for Critical Habitat

- *“It is concluded that given the percentage of critical habitat in the action area (0.004% of the total, and 0.145% of the unit), the temporary nature of the construction activities, and the minimal or discountable affects anticipated to each of the primary constituent elements of the physical and biological features of the critical habitat that the project may affect but is not likely to adversely affect critical habitat for the Rabbitsfoot mussel.”*

Service Comment: The Service believes that sufficient information was provided to determine the effects of the proposed project to federally designated critical habitat for the Rabbitsfoot mussel. We, therefore, concur with your determination that this action "may affect but is not likely to adversely affect critical habitat for the Rabbitsfoot mussel."

This concludes informal consultation in accordance with 50 CFR 402.13. However, this action must be reassessed and reinitiation of consultation under the ESA may be necessary if new

information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered, the agency action is subsequently modified in a manner that causes an effect to the listed species that was not previously considered, or a new species is listed or critical habitat is designated within the action area prior to project completion.

Thank you for allowing our agency the opportunity to comment on the proposed project. For future correspondence on this matter, please contact Lindsey Lewis at (501) 513-4489 or lindsey_lewis@fws.gov.

Sincerely,



Melvin L. Tobin
Field Supervisor

c (w/o encl)

Arkansas Natural Heritage Commission, Little Rock, Arkansas
Arkansas Natural Resources Commission, Little Rock, Arkansas
Arkansas Game and Fish Commission, Little Rock, Arkansas
Arkansas Department of Environmental Quality, Little Rock, Arkansas
Arkansas Department of Parks and Tourism, Little Rock, Arkansas
Central Arkansas National Wildlife Refuge Complex, Augusta, Arkansas
Environmental Protection Agency, Dallas, Texas

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REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203-0867
www.swl.usace.army.mil/

November 15, 2017

Regulatory Division

STANDARD PERMIT MODIFICATION NO. MVM 2008-00267-3

Mr. John Fleming
Division Head, Environmental Division
Arkansas Highway and Transportation Department
PO Box 2261
Little Rock, Arkansas 72203-2261

Dear Mr. Fleming:

This is in regard to your request for an extension and modification of Department of the Army (DA) Permit No. **MVM 2008-00267**. The project is located on the White River at river mile 99.1, in sections 21, 22, 28, and 29, T. 1 N., R. 3 W., Monroe County, Arkansas. The extension is hereby authorized. The new date for completion of the project is **December 31, 2020**. In accordance with Section 404 of the Clean Water Act (33 U.S. Code 1344) and Section 10 of the Rivers and Harbors Act (33 U.S. Code 403), you are hereby authorized to modify the existing plans as follows and in accordance with the following **Special Condition Nos. 9-12**. The old White River Bridge will be dropped into the river with explosives. Approximately 5,800 cubic yards of concrete will be deposited into the river and the concrete will be recovered with excavators or clamshell buckets. All steel, detectable rebar and concrete debris larger than two inches in diameter will be recovered. Any asphalt will be removed prior to demolition and disposed at an approved upland site. Loading ramps will be constructed on one or both banks of the river to transport the debris from the river to an approved upland site. The impacts to the adjacent wetlands have not changed since the issuance of **MVM 2008-00267**. A vicinity map, project location maps and profile of the old White River Bridge are enclosed.

Special Conditions:

9. The AHTD agrees to remove all demolition debris fragments greater than 2 inches in diameter from the White River Channel. Debris removal will begin immediately after demolition.

10. The AHTD agrees to remove all steel and detectable rebar from the White River Channel. Magnetic equipment will be used to sweep the channel after all concrete debris has been removed.

11. The AHTD agrees to conduct a post-demolition multi-beam hydrographic survey of the river channel to ensure that debris removal is in accordance with Special Condition Numbers 9 and 10. The survey will encompass the area 200 feet upstream and 200 feet downstream from the White River Bridge.

12. The AHTD will notify the Corps of Engineers, Transportation Program Manager, when demolition begins so that periodic compliance inspections can be performed.

This letter becomes a part of and should be attached to your original permit. Please read the attached "Notification of Administrative Appeal Options and Process and Request for Appeal" which describes your options regarding this action. You have 60 days from the date that you receive this letter to appeal **Special Condition Nos. 9-12** listed above. All conditions of the original permit (**MVM 2008-00267**) remain in effect. The project shall be constructed and maintained as described in the permit. It is your responsibility to understand and comply with the conditions of the permit and to make your employees or agents involved in the operation continuously aware of the permit conditions. If changes are proposed in the design or location of the roadway, you are required by law to submit revised plans to the District Engineer for approval before construction of the change is begun.

Enclosed you will find a copy of the Section 401 Water Quality Certification special conditions, which are conditions of your permit. If you have questions concerning compliance with the conditions of the 401 certification, you should contact Ms. Lazendra Hairston with the Arkansas Department of Environmental Quality, 5301 Northshore Drive, North Little Rock, Arkansas 72118, telephone number (501) 682-0645. For your information, we have also enclosed a copy of the Section 408 evaluation letter.

Your cooperation in the Regulatory Program is appreciated. If you have any questions, please contact Mr. Johnny McLean, Transportation Program Manager, at (501) 324-5295 and refer to DA Permit No. **MVM 2008-00267-3**.

Sincerely,



M. Elaine Edwards
Chief, Regulatory Division

Enclosures

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Copy Furnished:

Memphis District Hydraulics Section, Andy Gaines, w/cy dwgs

Memphis District Regulatory Division, Roger Allan, w/cy dwgs

USF&WS White River NWR, Jeff Denman, w/cy dwgs

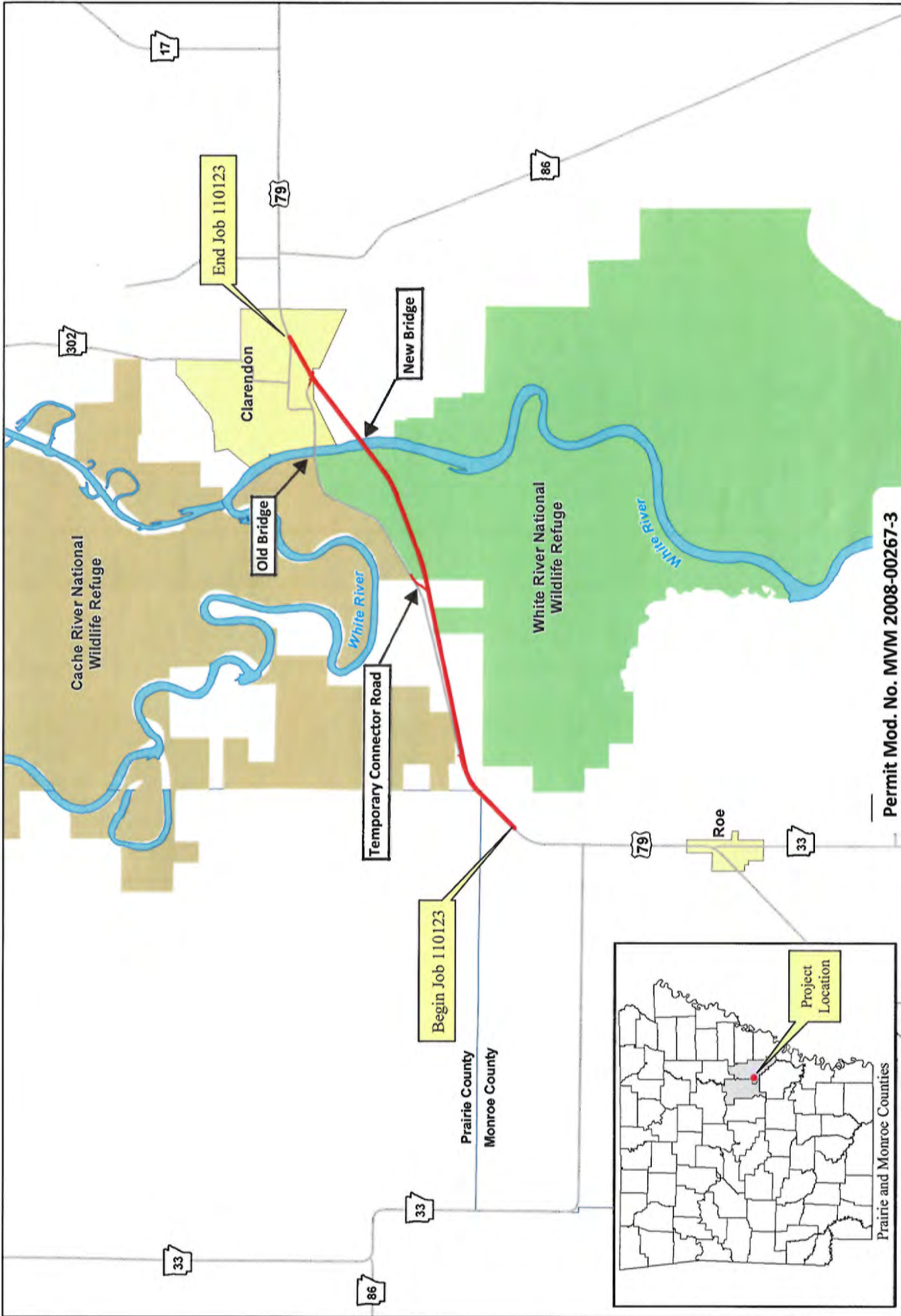
USF&WS Conway Office, Lindsey Lewis, w/cy dwgs

USCG, Eric Washburn and David Orzechowski, w/cy dwgs

FHWA, Randal Looney, w/cy dwgs

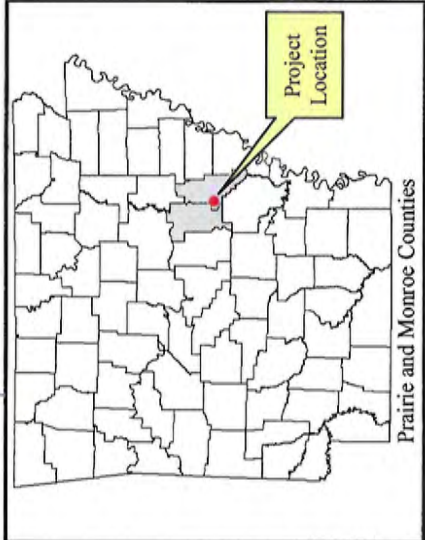
ADEQ, Lazendra Hairston, w/cy dwgs

EPA, Wanda Boyd, w/cy dwgs



Permit Mod. No. MVM 2008-00267-3
 Ark. Hwy. & Transportation Dept.
 White River, mile 99.1 (Clarendon)
 Bridge Demolition-Debris Removal
 November 2017 Sheet 1 of 4

Project Area

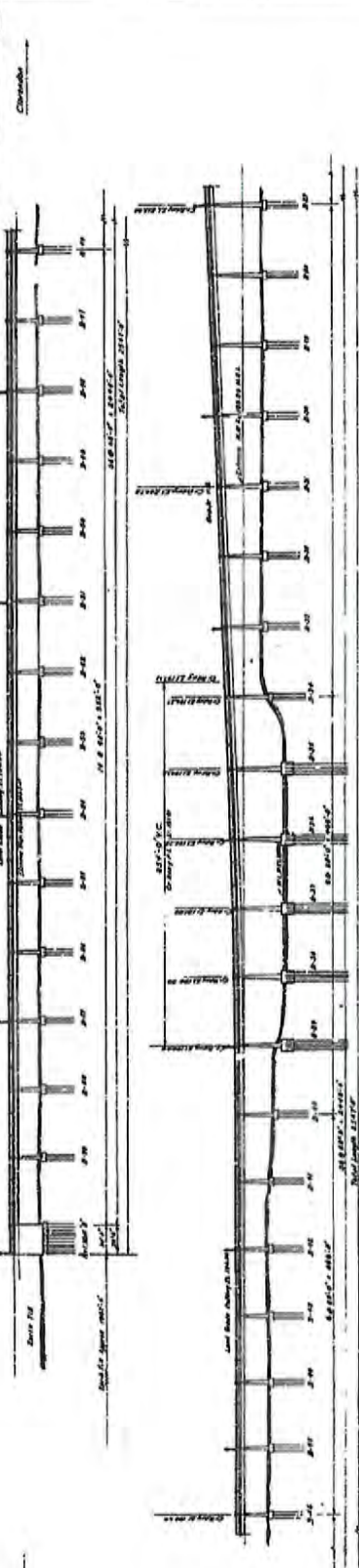


AHTD - Environmental GIS - Reed
 May 20, 2008

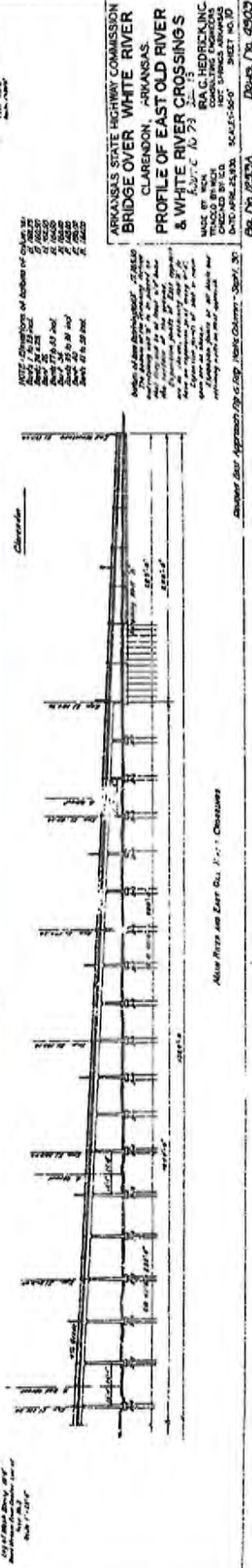
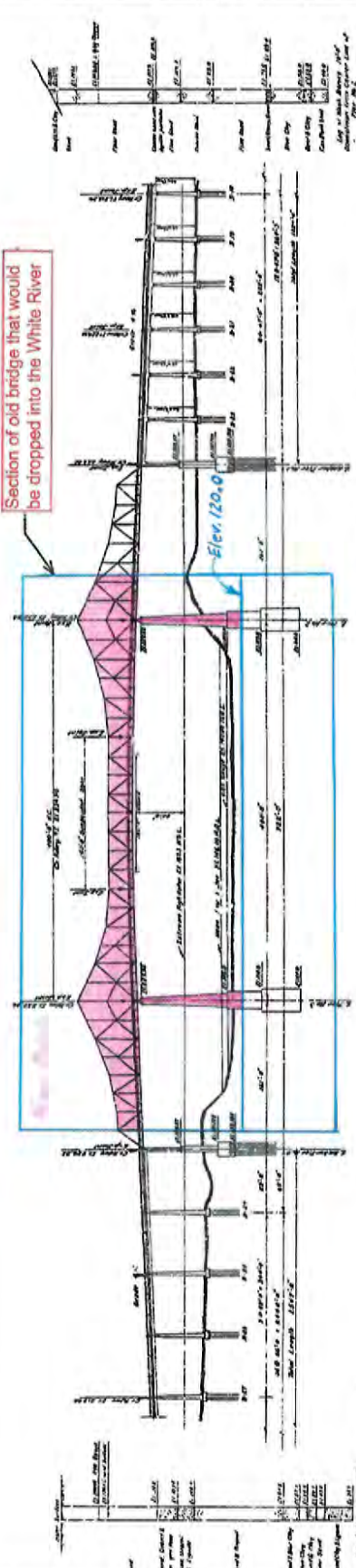


332

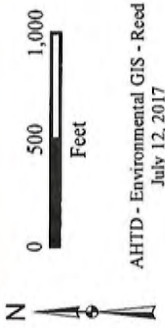
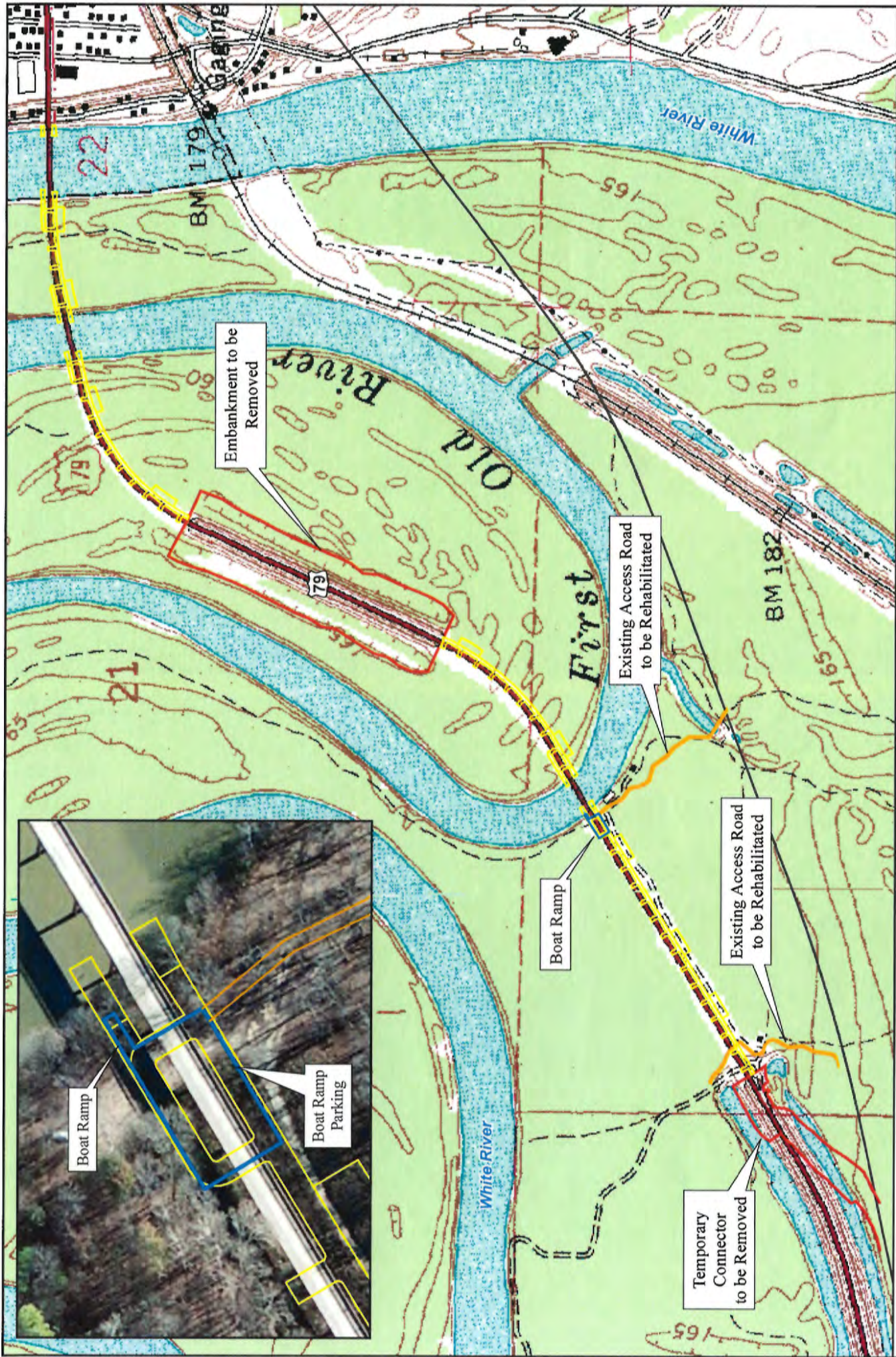
DATE	BY	CHECKED	APPROVED
1934
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1950



Section of old bridge that would be dropped into the White River

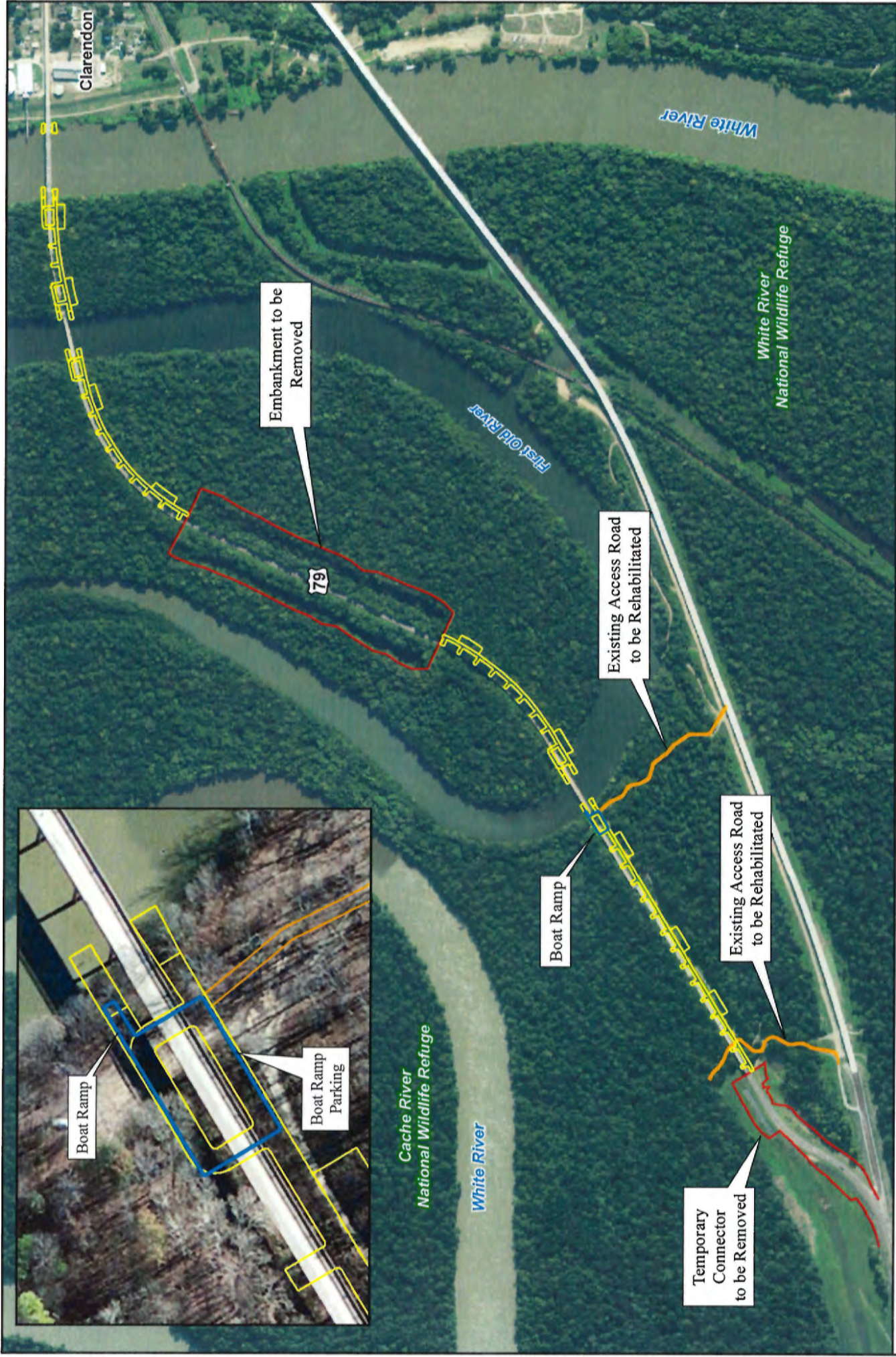


ARKANSAS STATE HIGHWAY COMMISSION
 BRIDGE OVER WHITE RIVER
 CLARENDON, ARKANSAS
 PROFILE OF EAST OLD RIVER
 & WHITE RIVER CROSSINGS
 MADE BY W.C. HEDRICK, INC.
 6207-C No. 73
 15
 100-100-500
 SHEET NO. 10
 DATE APR. 1934
 DRAWN BY W.C. HEDRICK, INC.
 100-100-500
 SHEET NO. 10
 DATE APR. 1934
 DRAWN BY W.C. HEDRICK, INC.



Job 110540
 White River Strs. Demo. & Removal
 (Clarendon)
 Monroe County

AHTD - Environmental GIS - Reed
 July 12, 2017

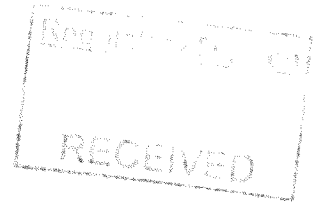


Job 110540
 White River Strs. Demo. & Removal
 (Clarendon)
 Monroe County

— Work Road
— Construction Limits

ADEQ

ARKANSAS
Department of Environmental Quality



December 8, 2016

Colonel Robert G. Dixon, District Commander
Little Rock District Corps of Engineers
P. O. Box 867
Little Rock, Arkansas 72203-0867

RE: 401 Water Quality Certification: **MVM 2008-00267-3** Arkansas Highway and
Transportation Department (AHTD) Job No. 110123 White River Bridge Demolition,
Monroe County, Arkansas

Dear Colonel Paul:

The Arkansas Department of Environmental Quality ("ADEQ") has completed its review of the above referenced project for Mr. John Fleming. The Arkansas Highway and Transportation Department (AHTD) has requested a modification and extension of their existing permit which authorizes the placement of dredged and fill material into waters of the United States (WOTUS) associated with replacing the bridges and approaches over the White River and its adjacent floodplain at Clarendon. The modification would include the discharges into the White River associated with the existing (old) bridge demolition. The permit extension includes continued authorization for fill material previously placed in wetlands for construction of the temporary connector road, the placement of fill material for construction of a boat ramp at Old River Lake and parking areas, and the placement of fill material for temporary work roads and loading ramps for demolition. The project is located on the White River and its adjacent wetlands at river mile 99.1, in Sections 21, 22, 28, and 29, T 1 N, R 3 W, Monroe County, Arkansas.

ADEQ has determined that there is a reasonable assurance that this activity will be conducted in a manner which, according to the Arkansas Pollution Control and Ecology Commission's Regulation No.2, will not physically alter a significant segment of the waterbody and will not violate the water quality criteria.

Pursuant to §401(a)(1) of the Clean Water Act, the ADEQ hereby issues water quality certification for this project: **Public Notice MVM 2008-00267-3**, contingent upon the following conditions:

- 1) The applicant shall implement all practicable best management practices (BMPs) to avoid excessive impacts of sedimentation and turbidity to the surface waters.
- 2) The applicant will take all reasonable measures to prevent the spillage or leakage of any chemicals, oil, grease, gasoline, diesel or other fuels. In the unlikely event such spillage or leakage occurs, the applicant must contact ADEQ immediately.
- 3) All reasonable measures shall be taken to prevent the spillage or leakage of any chemicals, oil, grease, gasoline, diesel or other fuels into any streams in the project area. In the unlikely event such spillage or leakage occurs, the applicant must contact ADEQ immediately.

ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY

5301 NORTHSHORE DRIVE / NORTH LITTLE ROCK / ARKANSAS 72118-5317 / TELEPHONE 501-682-0744 / FAX 501-682-0880

www.adeq.state.ar.us

- 4) If a construction site will disturb equal to or greater than one (1) acre and less than five (5) acres, the applicant shall comply with the requirements in Reg. 6.203 for Stormwater discharge associated with a small construction site, as defined in APC&EC Regulation No. 6. If the construction site will disturb five (5) acres or more, the applicant shall comply with the terms of the Stormwater Construction General Permit Number ARR150000 prior to the start of construction. BMPs must be implemented regardless of the size. More information can be obtained by contacting the NPDES Stormwater Section of ADEQ at (501) 682-0621.

In issuing this certification, ADEQ does not assume any liability for the following:

- a. Damages to the proposed project, or uses thereof, as a result of other permitted or unpermitted activities or from natural causes.
- b. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity specified in this certification.
- c. Design or construction deficiencies associated with this proposed project.

Please contact Ms. Lazendra Hairston, of the Water Division, at (501) 682-0946 if you have any questions regarding this certification.

Sincerely,



Caleb J. Osborne
Associate Director, Office of Water Quality

cc: John Fleming, AHTD
Johnny McLean, USACE, Little Rock District
Wanda Boyd, EPA
Melvin Tobin, USFWS
Jennifer Sheehan, AGFC
Gary Williamson, AHTD



DEPARTMENT OF THE ARMY
MEMPHIS DISTRICT CORPS OF ENGINEERS
167 NORTH MAIN STREET B-202
MEMPHIS, TENNESSEE 38103-1894

AUG 10 2017

Subject: Section 408 Permit #WhtRvr_RCA_170703

Mr. Charles R. Ellis, P.E.
Bridge Division Head
Arkansas State Highway and Transportation Dept.
P.O. Box 2271
Little Rock, Arkansas, 72203

Dear Mr. Ellis:

The Memphis District of the U.S. Army Corps of Engineers (USACE) performed an evaluation of Arkansas State Highway and Transportation Department's (AHTD) Section 408 request to demolish the Clarendon Bridge over the navigation channel in the White River located in Monroe County, Arkansas and to remove a pier from the levee embankment. The Memphis District evaluated this request pursuant to Section 14 of the Rivers and Harbors Act of 1899, 33 USC 408 (Section 408) and in accordance with Engineer Circular (EC) 1165-2-216.

The Memphis District grants the request, with stipulations, to alter the White River and Clarendon Levee System by demolishing the Clarendon Bridge over the navigation channel and removing a pier from the levee embankment. AHTD must meet the following stipulations: 1) Pier 2 must be cut off in the river bank between 4 feet to 5 feet deep similar to the method used for removal of the pier from the levee embankment. The Memphis District does not grant permission to an excavation greater than 5 feet deep as a deeper excavation into the bank may cause stability problems with the adjacent levee embankment; 2) AHTD remains responsible for correcting any bank slope stability problems that may occur from this demolition, removal, or any other activities related to AHTD's application; 3) All piers to remain within the limits of the White River must be cut off at a minimum elevation of 120.0 feet mean sea level or 5 feet below existing channel, whichever is lower; 4) All debris greater than 2 inches in diameter, including reinforcing steel, must be removed from the White River; 5) AHTD must perform a hydrographic survey of the White River channel to ensure all debris has been removed; 6) After AHTD completes the demolition, debris removal, and hydrographic survey, AHTD must contact the Memphis District and set up a joint site visit to go over the hydrographic survey and to confirm AHTD met all conditions described in these stipulations; 7) AHTD must provide the Memphis District the final demolition plans prior to starting the demolition; 8) AHTD must notify the Memphis District at least ten (10) business days prior to performing any work, including demolition. USACE will need to remove all USACE gage equipment in from the bridge prior to the demolition; and 9) AHTD remains solely responsible for any action needed to correct any deficiency in the design or construction and/or any other activities regarding this requested alteration to demolish the Clarendon Bridge and remove a pier from the levee embankment in accordance with applicable state and federal laws.

For any questions regarding this evaluation, please contact Ms. Tanya Wells, Inspection of Completed Works Manager/408 Coordinator, at 901-544-0897 or [Tanya.L.Wells @usace.army.mil](mailto:Tanya.L.Wells@usace.army.mil).

Sincerely,

A handwritten signature in black ink, appearing to read "M. Ellicott". The signature is fluid and cursive, with a large initial "M" and a long horizontal stroke extending to the right.

Michael A. Ellicott
Colonel, Corps of Engineers
District Commander

Copies Furnished:
Mr. Allen James, Clarendon Levee District