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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R4–ES–2015–0133; 4500030113]

RIN 1018–BB05

Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Kentucky Arrow Darter

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), designate critical habitat for the Kentucky arrow darter (*Etheostoma spilotum*) under the Endangered Species Act (Act). In total, approximately 398 stream kilometers (skm) (248 stream miles (smi)) fall within the boundaries of the critical habitat designation.

DATES: This rule becomes effective on [**INSERT DATE 30 DAYS AFTER DATE OF**

FEDERAL REGISTER PUBLICATION].

ADDRESSES: This final rule is available on the internet at <http://www.regulations.gov> and <http://www.fws.gov/frankfort/>. Comments and materials we received, as well as supporting documentation we used in preparing this proposed rule, are available for public inspection at <http://www.regulations.gov> in Docket No. FWS–R4–ES–2015–0133. 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, Kentucky Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

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/frankfort/>, at <http://www.regulations.gov> at Docket No. FWS–R4–ES–2015–0133, and at the Kentucky Ecological Services Field Office) (see **FOR FURTHER INFORMATION CONTACT**). Any additional tools or supporting information that we may develop for this critical habitat designation will also be available at the Fish and Wildlife Service website and field office set out above, and may also be included at <http://www.regulations.gov>.

FOR FURTHER INFORMATION CONTACT: Virgil Lee Andrews, Jr., 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, x108; facsimile 502–695–1024. If you use a telecommunications device for the deaf (TDD),

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 of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA or Act), when we determine that a species is threatened or endangered, we must designate critical habitat to the maximum extent prudent and determinable. Designations of critical habitat can only be completed by issuing a rule.

On October 8, 2015, we published in the **Federal Register** a proposed critical habitat designation for the Kentucky arrow darter (80 FR 61030). Section 4(b)(2) of the Act states that the Secretary shall designate 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.

This document consists of a final rule to designate critical habitat for the Kentucky arrow darter. We list the Kentucky arrow darter as a threatened species elsewhere in this **Federal Register**.

Summary of the rule. The critical habitat areas we are designating in this rule constitute our current best assessment of the areas that meet the definition of critical habitat for Kentucky arrow darter. Here we are designating approximately 398 stream kilometers (skm) (248 stream miles (smi)) in Breathitt, Clay, Harlan, Jackson, Knott, Lee, Leslie, Owsley, Perry, and Wolfe Counties, Kentucky.

Economic analysis. We have prepared an economic analysis of the designation of critical habitat. In order to consider economic impacts, we have prepared an incremental effects memorandum (IEM) and screening analysis which, together with our narrative and interpretation of effects, constitute our draft economic analysis (DEA) of the proposed critical habitat designation and related factors (Abt Associates 2015). The analysis, dated September 11, 2015, was made available for public review from October 8, 2015, through December 7, 2015 (80 FR 61030). Following the close of the comment period, 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. We have incorporated the comments into this final determination.

Peer review and public comment. We sought comments from seven independent specialists to ensure that our designation was based on scientifically sound data, assumptions, and analyses. We received comments from five of the seven peer reviewers. The peer reviewers 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 into this final revised designation. We also considered all comments and information received from the public during the comment period.

Previous Federal Actions

We proposed listing the Kentucky arrow darter as threatened under the Act (80 FR 60902) and designation of critical habitat for the species (80 FR 61030) on October 8,

2015. For a complete history of all Federal actions related to the Kentucky arrow darter, please refer to the October 8, 2015, proposed listing rule (80 FR 60902).

Summary of Comments and Recommendations

We requested written comments from the public on the proposed designation of critical habitat for the Kentucky arrow darter and associated DEA during a comment period that opened with the publication of the proposed rule (80 FR 60962) on October 8, 2015, and closed on December 7, 2015. We also contacted appropriate Federal, State, and local agencies, scientific organizations, and other interested parties, and invited them to comment on the proposed rule and DEA during the comment period. We did not receive any requests for a public hearing.

During the comment period, we received 3,897 comment letters in response to the proposed critical habitat designation: 5 from peer reviewers and 3,892 from organizations or individuals. Of these, 3,882 were nonsubstantive form letters submitted by one nongovernmental organization in support of the proposed critical habitat designation. None of the comment letters objected to the proposed designation of critical habitat for the Kentucky arrow darter. All substantive information provided during the comment period has either been incorporated directly into this final determination or is addressed below.

Peer Review

In accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited expert opinions from seven knowledgeable individuals with scientific expertise that included familiarity with the species, the geographic region in

which the species occurs, and conservation biology principles. We received responses from five of the peer reviewers.

We reviewed all comments received from the peer reviewers for substantive issues and new information regarding critical habitat for the Kentucky arrow darter. All of the peer reviewers generally concurred with our methods and conclusions and provided additional information, clarifications, and suggestions to improve the final critical habitat rule. Peer reviewer comments are addressed in the following summary and incorporated into the final rule as appropriate.

Peer Reviewer Comments

(1) *Comment:* One peer reviewer stated that the Service should substantiate its claim in the *Physical or Biological Features* section of the preamble that the Kentucky arrow darter requires relatively clean, cool, flowing water to successfully complete its life cycle.

Our Response: We made this claim based on the best and most current scientific data available, and we have added supporting references (Thomas 2008, entire; Service 2014, entire; Hitt et al. 2016, pp. 46–52) under the *Food, Water, Air, Light, Minerals, or Other Nutritional or Physiological Requirements* section of this final critical habitat determination. These references describe the general water quality and habitat conditions of streams occupied by Kentucky arrow darters.

(2) *Comment:* One peer reviewer commented that he had observed Kentucky arrow darters in streams with conductivities exceeding 980 microsiemens (μS)/cm, even though the Service concluded that Kentucky arrow darters are generally absent when conductivity levels exceed 350 μS /cm.

Our Response: We concur with the peer reviewer that Kentucky arrow darters are sometimes observed in streams with conductivity values greater than 350 $\mu\text{S}/\text{cm}$; however, we consider all of these individuals to be transients that have simply migrated from a nearby source stream (or refugium) where conductivity levels are lower. This is not common and likely occurs as dispersing individuals move through an area in search of better habitat conditions. The best and most current scientific data available to the Service indicate the species' abundance decreases sharply as conductivities exceed 261 $\mu\text{S}/\text{cm}$ (Hitt et al. 2016, pp. 46–52), and the species is generally absent when conductivities exceed 350 $\mu\text{S}/\text{cm}$ (Service 2012, pp. 1–4).

(3) *Comment:* One peer reviewer stated that the Service should include any new information on growth, feeding, reproduction, or spawning of the Kentucky arrow darter obtained from recent captive-propagation efforts by Conservation Fisheries, Inc. (CFI) in Knoxville, Tennessee.

Our Response: New observations on spawning behavior and the growth and viability of eggs and larvae were made by CFI during recent captive-propagation efforts (2010 to present). We have incorporated language summarizing these findings under the *Sites for Breeding, Reproduction, or Rearing (or Development) of Offspring* section of this final rule.

(4) *Comment:* Two peer reviewers recommended that we discuss the detectability of the Kentucky arrow darter during survey efforts and how this could affect our conclusions regarding its occurrence and distribution and our delineation of critical habitat areas. The peer reviewers raised the issue of imperfect detection, which is the inability of the surveyor to detect a species (even if present) due to surveyor error, low

density or rareness of the target species, or confounding variables such as environmental conditions (e.g., stream flow). The peer reviewers asked the Service to explain how it accounted for imperfect detection when evaluating the species' current distribution and status.

Our Response: We recognize the importance and significance of imperfect detection when conducting surveys for rare or low-density species, and we agree with the peer reviewer that it is possible a species can go undetected within a particular survey reach when it is actually present, especially when a species is in low numbers. However, we are also required, by statute and regulation, to base our determinations solely on the basis of the best scientific data available. We are confident that the survey data available to us at the time we prepared our proposed critical habitat designation represented the best scientific and commercial data available.

These data were collected by well-trained, professional biologists, who employed similar sampling techniques (single-pass electrofishing) across the entire potential range of the Kentucky arrow darter, which included historical darter locations, random locations, and locations associated with regulatory permitting, such as mining or transportation. Nearly 245 surveys were conducted for the species between 2007 and 2015, and the results of these surveys provided an accurate depiction of the species' current range and revealed a clear trend of habitat degradation and range curtailment for the species. Kentucky arrow darters may have gone undetected in a few sampling reaches, but the species' overall decline and pattern of associated habitat degradation (e.g., elevated conductivity) was clear based on our review of available survey data.

(5) *Comment:* One peer reviewer commented that the Service should recognize water clarity (turbidity) as a factor under PCE (primary constituent element) 4 because the Kentucky arrow darter is a visual feeder.

Our Response: We concur with the peer reviewer that the Kentucky arrow darter is a visual feeder, and water clarity (or turbidity) may influence its feeding behavior; however, we currently have no specific data demonstrating how water clarity influences the species' feeding behavior. Increased stream turbidity is a common occurrence across the species' range, especially during and immediately after high stream flow events. Even streams supporting the most robust populations of Kentucky arrow darters are subjected to periods of high turbidity and poor water clarity, yet these populations have been able to persist. Poor water clarity may be important, but we have not quantified the level at which turbidity can be detrimental to the species' feeding behavior. The Service must rely on the best and most current scientific data available when identifying the specific elements (PCEs) of the physical or biological features that provide for a species' life-history processes and are essential to the conservation of the species. Without specific data or more detailed information on how water clarity influences the species, we cannot include it as an important factor under PCE 4.

(6) *Comment:* One peer reviewer commented on the importance of riparian buffers and stated the designation of critical habitat for the Kentucky arrow darter should be expanded to include areas outside of the stream channel.

Our Response: We concur with the peer reviewer that lands outside of designated critical habitat play an important role in the conservation of the species. Intact riparian buffers help support the PCEs and biological features by protecting against soil erosion

and instream sedimentation and providing shade that lowers stream temperatures. We limited our designation of critical habitat to the stream channel (areas within the ordinary high-water mark) because this is where the species occurs and these areas contain one or more of the physical or biological features essential to the species' conservation.

(7) Comment: One peer reviewer recommended that critical habitat unit 6 be expanded by moving the downstream terminus to the confluence of Middle Fork Quicksand Creek and Quicksand Creek. The peer reviewer provided new occurrence information that included observations of the Kentucky arrow darter approximately 100 m (328 ft) upstream of the mouth of Middle Fork Quicksand Creek.

Our Response: We concur with the peer reviewer that Unit 6 should be modified, and we appreciate receipt of new collection data documenting the species' occurrence in downstream reaches of Middle Fork Quicksand Creek. Based on collection data provided by the peer reviewer, we have expanded Unit 6 by moving the downstream terminus 2.7 skm (1.7 smi) to the mouth of Middle Fork Quicksand Creek. The species' total number of designated stream kilometers (miles) has been adjusted accordingly.

Public Comments

(8) Comment: One commenter questioned our assertion that activities within Robinson Forest may require special management considerations or protections to address minor siltation associated with management activities, road use, and limited off-road vehicle use. The commenter stated that off-road vehicle use is not a potential threat in Robinson Forest as no off-road vehicle paths or trails are present. The commenter also explained that 40 years of forest management and research activities in Robinson Forest are consistent with the maintenance of Kentucky arrow darter populations in both the

Clemons Fork and Coles Fork watersheds. The commenter suggested that if major increases in activities occur in or around the riparian corridors, special management considerations may be required to address minor siltation associated with these activities.

Our Response: We concur with the commenter that off-road vehicle use is not a threat in Robinson Forest, and we have modified this final rule accordingly. We also agree with the commenter that management activities and general use of the Forest over the last 40 years have been consistent with the maintenance of Kentucky arrow darter populations in the Clemons Fork and Coles Fork watersheds. The robust populations of Kentucky arrow darters in both watersheds indicate that these management activities are working to protect the species and its habitats. Therefore, it is clear that these special management considerations are required to maintain the features essential to the species' conservation.

(9) *Comment:* One commenter stated that the economic analysis did not consider or discuss the possible economic effects on the local economy, and in particular, the coal production industry.

Our Response: In the economic screening analysis, we evaluated the “without critical habitat” baseline versus the “with critical habitat” scenario, to identify those effects expected to occur solely due to the designation of critical habitat and not from the protections that are in place due to the species being listed under the Act. This method, known as the “incremental effects” approach, focuses on the incremental economic impact of the regulatory change being considered. All of the proposed critical habitat units for the Kentucky arrow darter are considered to be within the geographical area occupied by the species at the time of listing. As described in our Incremental Effects

Memo, we do not anticipate differences in the outcome of section 7 consultations in occupied habitat because actions that adversely affect occupied habitat would typically also jeopardize the existence of the species. Therefore, in the economic screening analysis, the Service concluded that the only incremental costs anticipated are the administrative costs due to the additional consideration of the adverse modification of critical habitat during section 7 consultations.

The Service took steps in its economic screening analysis to determine what, if any, industries would be affected by the designation of critical habitat. Any project with a Federal nexus (e.g., receiving Federal funding or requiring a Federal permit) that may affect the listed species or its designated habitat requires Federal agencies to consult with the Service and could thus be potentially impacted by the regulation. The Service gathered information on the estimated number of section 7 consultations addressing the Kentucky arrow darter and its critical habitat from various Federal agencies that distribute permits or fund projects within the proposed critical habitat units. These results are present in Exhibit 3 (Summary of Estimated Number of Section 7 Consultations Addressing the Kentucky Arrow Darter and its Critical Habitat) of the Screening Memo.

One of the agencies that the Service contacted was the U.S. Army Corps of Engineers (USACE), which is responsible for distributing permits for a variety of land activities including coal mining. Any coal mining projects that may be affected by the critical habitat designation would be affected only through incremental administrative costs associated with a section 7 consultation. USACE noted that adding critical habitat to a consultation already considering the jeopardy standard does not substantially increase administrative costs (reported in Exhibit 4 of the Screening Memo: Summary of

Estimated Incremental Administrative Costs of Section 7 Consultations). Therefore, any activities that require a USACE permit and consultation with the Service, such as coal mining, should experience minimal incremental economic impacts from critical habitat designation for the Kentucky arrow darter.

(10) Comment: One commenter stated that the Service did not discuss how it would regulate the protection of streams on private lands or specify whose responsibility it was to inform the public of new regulations.

Our Response: 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 Act does not authorize the Service to regulate private actions (i.e., actions without a Federal nexus) on private lands or confiscate private property as a result of critical habitat designation.

The designation of critical habitat does not prevent access to any land, whether private, tribal, State, or Federal. 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 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.

The Service believes that restrictions alone are neither an effective nor a desirable means for achieving the conservation of listed species. We prefer to work collaboratively with private landowners, and strongly encourage individuals with listed species or designated critical habitat on their property to work with us to develop incentive-based measures such as Safe Harbor Agreements or Habitat Conservation Plans (HCPs), which have the potential to provide conservation measures that effect positive results for the species and its habitat while providing regulatory relief for landowners. The conservation and recovery of endangered and threatened species, and the ecosystems upon which they depend, is the ultimate objective of the Act, and the Service recognizes the vital importance of voluntary, nonregulatory conservation measures that provide incentives for landowners in achieving that objective.

(11) Comment: One commenter stated that the proposed critical habitat rule did not sufficiently discuss the threat posed by mountaintop coal mining or acknowledge the presence of hydraulic fracturing (fracking) within some critical habitat units.

Our Response: The Service did not specifically discuss mountaintop coal mining or hydraulic fracking in the proposed critical habitat rule; however, we did identify these activities indirectly in the *Special Management Considerations or Protection* section of the proposed rule. In that section and in several unit descriptions, we identified resource extraction (e.g., surface coal mining, logging, natural gas and oil exploration) as a threat that may affect one or more of the physical or biological features essential to the Kentucky arrow darter and may require special management considerations or protection. Potential threats associated with surface coal mining and natural gas and oil exploration

were discussed thoroughly in the species' proposed listing rule (80 FR 60962, October 8, 2015).

Summary of Changes from Proposed Rule

We have considered all comments and information received during the open comment period for the proposed designation of critical habitat for the Kentucky arrow darter. In the **Critical Habitat** section of this document, we provide new or revised information and references on feeding behavior, the species' water quality requirements (e.g., elevated conductivity, temperature), spawning behavior, development and viability of eggs, and special management considerations or protection for Units 3 and 4. Under the **Final Critical Habitat Designation** section, we expanded Unit 6 (Middle Fork Quicksand Creek) by extending its downstream terminus 2.7 skm (1.7 smi) to the mouth of Middle Fork Quicksand Creek. The total number of designated stream kilometers (miles) were adjusted accordingly.

Based on further review and an effort to clarify our descriptions of the Primary Constituent Elements (PCEs), we modified PCEs 1 and 4 by adding additional descriptive information.

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 and 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 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 listed 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 ensure 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. If we list the Kentucky arrow darter, these protections and conservation tools would 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, HCPs, or other species conservation planning efforts if new information available at the time of these planning efforts calls for a different outcome.

On February 11, 2016, we published a final rule in the **Federal Register** (81 FR 7413) to amend our regulations concerning the procedures and criteria we use to designate and revise critical habitat. That rule became effective on March 14, 2016, but, as stated in that rule, the amendments it sets forth apply to "rules for which a proposed rule was published after March 14, 2016." We published our proposed critical habitat designation for the Kentucky arrow darter on October 8, 2015 (80 FR 61030); therefore,

the amendments set forth in the February 11, 2016, final rule at 81 FR 7413 do not apply to this final designation of critical habitat for the Kentucky arrow darter.

Physical or Biological Features

In accordance with section 3(5)(A)(i) of the Act and regulations in title 50 of the Code of Federal Regulations at 50 CFR 424.12(b), 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 that are 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 historic, geographical, and ecological distributions of a species.

We derive the specific physical or biological features essential for the Kentucky arrow darter from studies of its habitat, ecology, and life history as described below. Additional information can be found in the final listing rule published elsewhere in this **Federal Register**. To identify the physical or biological features essential to the conservation of the species, we have relied on current conditions at locations where the species survives, the limited information available on the species and its closest relatives,

and factors associated with the decline of other fishes that occupy similar habitats in the Southeast. We have determined that the following physical or biological features are essential to the Kentucky arrow darter.

Space for Individual and Population Growth and for Normal Behavior

Little is known about the specific space requirements of the Kentucky arrow darter; however, the species is typically observed in moderate- to high-gradient, first- to third-order geomorphically stable streams (Lotrich 1973, p. 382; Thomas 2008, p. 6). Geomorphically stable streams transport sediment while maintaining their horizontal and vertical dimensions (width to depth ratio and cross-sectional area), pattern (sinuosity), and longitudinal profile (riffles, runs, and pools), thereby conserving the physical characteristics of the stream, including bottom features such as riffles, runs, and pools and the transition zones between these features (Rosgen 1996, pp. 1–3). The protection and maintenance of these habitat features accommodate spawning, rearing, growth, migration, and other normal behaviors of the species.

During most of the year (late spring through winter), Kentucky arrow darters occupy shallow pools between 10–45 centimeters (cm) (4–18 inches (in)) or transitional areas between riffles and pools (runs and glides) with cobble and boulder substrates that are interspersed with clean (relatively silt free) sand and gravel (Lotrich 1973, p. 382; Thomas 2008, p. 6). Most individuals are encountered near some type of instream cover: large cobble, boulders, bedrock ledges, or woody debris piles (Thomas 2008, p. 6). During the spawning period (April through June), Kentucky arrow darters utilize riffle habitats with relatively silt free, gravel, cobble, and sand substrates (Kuehne and Barbour

1983, p. 71). Streams inhabited by Kentucky arrow darters tend to be clear and cool (generally less than or equal to 24 degrees Celsius (°C) (75 degrees Fahrenheit (°F))), with shaded corridors and naturally vegetated, intact riparian zones (Lotrich 1973, p. 378; Thomas 2008, pp. 7, 23).

Limited information exists about upstream or downstream movements of Kentucky arrow darters; however, there is evidence that the species can utilize relatively long stream reaches. Observations by Lowe (1979, pp. 26–27) of potential dispersal behavior for a related species (the Cumberland arrow darter (*Etheostoma sagitta*)) in Tennessee, preliminary findings from a movement study at Eastern Kentucky University (EKU), and recent survey results by Kentucky Department of Fish and Wildlife Resources (KDFWR) suggest that Kentucky arrow darters can utilize stream reaches of over 4 skm (2.5 smi) and disperse to other tributaries (Baxter 2015,entire; Thomas 2015, pers. comm.) (see “Habitat and Life History” section of our final listing rule published elsewhere in this **Federal Register**).

The current range of the Kentucky arrow darter has been reduced from 74 historically occupied streams to 47 currently occupied streams due to destruction, modification, and fragmentation of habitat. Fragmentation of the species’ habitat has subjected these small populations to genetic isolation, reduced space for rearing and reproduction, reduced adaptive capabilities, and an increased likelihood of local extinctions (Burkhead *et al.* 1997, pp. 397–399; Hallerman 2003, pp. 363–364). Genetic variation and diversity within a species are essential to recovery, adaptation to environmental change, and long-term viability (capability to live, reproduce, and develop) (Noss and Cooperrider 1994, pp. 282–297; Harris 1984, pp. 93–107; Fluker *et*

al. 2007, p. 2). The long-term viability of a species is founded on the conservation of numerous local populations throughout its geographic range (Harris 1984, pp. 93–104). Connectivity of these habitats is essential in preventing further fragmentation and isolation of Kentucky arrow darter populations and promoting species movement and genetic flow between populations.

Therefore, based on the information above, we identify connected riffle-pool complexes (with alternating runs and glides) of geomorphically stable, first- to third-order streams to be physical or biological features essential to the conservation of the Kentucky arrow darter. The maintenance of these habitats is essential in accommodating feeding, breeding, growth, and other normal behaviors of the Kentucky arrow darter and in promoting gene flow within the species.

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

Feeding habits of the Kentucky arrow darter were documented by Lotrich (1973, pp. 380–382) in the Clemons Fork system, Breathitt County, Kentucky. The primary prey item was mayflies (Order Ephemeroptera), which comprised 77 percent of identifiable food items (420 of 542 items) in 57 Kentucky arrow darter stomachs (Lotrich 1973, p. 381). Large Kentucky arrow darters (greater than 70 millimeters (mm) (2.8 in total length (TL)) utilized small crayfishes, as 7 of 8 stomachs examined by Lotrich (1973, p. 381) contained crayfishes ranging in size from 11 to 24 mm (0.4 to 0.9 in). Lotrich (1973, p. 381) considered this to be noteworthy because stomachs of small Kentucky arrow darters (less than 70 mm (2.8 in) TL) and stomachs of other darter species did not contain crayfishes. Other food items reported by Lotrich (1973, p. 381)

and Etnier and Starnes (1993, p. 523) included larval blackflies (family Simuliidae) and midges (Chironomidae), with lesser amounts of caddisfly larvae, stonefly nymphs, and beetle larvae. Etnier and Starnes (1993, p. 523) reported that juvenile arrow darters feed on microcrustaceans and dipteran larvae.

Observations by Lowe (1979, pp. 32–34) for the closely related Cumberland arrow darter indicated that feeding strategies typically consisted of continuous prey searches, with little dependence on drift items. The general pattern observed by Lowe (1979, p. 34) was movement by adults to mid-stream, followed by active searches that included probing underneath and around rocks and chasing of prey. When spotted, prey items were picked off rocks, and pelvic and pectoral fins were often used to aid in climbing over rocks.

Like most other darters, the Kentucky arrow darter depends on perennial stream flows that create suitable habitat conditions needed for successful completion of its life cycle. An ample supply of flowing water provides a means of transporting nutrients and food items, moderating water temperatures and dissolved oxygen levels, removing fine sediments that could damage spawning or foraging habitats, and diluting nonpoint-source pollutants. Water withdrawals do not represent a significant threat to the species, but the species is faced with occasional low-flow conditions that occur during periods of drought.

Water quality is also important to the persistence of the Kentucky arrow darter. The species requires relatively clean (unpolluted), cool, flowing water to successfully complete its life cycle (Thomas 2008, entire; Service 2014, entire). Specific water quality requirements, such as temperature, dissolved oxygen, pH (a measure of the

acidity or alkalinity of water), and conductivity (a measure of electrical conductance in the water column that increases as the concentration of dissolved solids increases), that define suitable habitat conditions for the Kentucky arrow darter have not been determined; however, the species is sensitive to elevated conductivity and is generally absent when levels exceed 350 microsiemens (μS)/cm (Service 2012, pp. 1–4; Hitt 2014, pp. 5–7, 11–13; Hitt et al. 2016, pp. 46–52). Kentucky arrow darters are sometimes observed in streams with conductivity values greater than 350 $\mu\text{S}/\text{cm}$; however, we consider all of these individuals to be transients that have simply migrated from a nearby source stream (or refugium) where conductivity levels are lower. This is not common and likely occurs as dispersing individuals move through an area in search of better habitat conditions. The best and most current scientific data available to the Service indicate the species' abundance decreases sharply as conductivities exceed 261 $\mu\text{S}/\text{cm}$ (Hitt et al. 2016, pp. 46–52).

In general, optimal water quality conditions for fishes and other aquatic organisms are characterized by (1) moderate stream temperatures (generally less than or equal to 24 °C (75 °F) for the Kentucky arrow darter) (Thomas 2008, entire); (2) high dissolved-oxygen concentrations (generally greater than 6.0 mg/L); (3) moderate pH (generally 6.0–8.5), and (4) low levels of pollutants, such as inorganic contaminants (e.g., sulfate, iron, manganese, selenium, and cadmium); organic contaminants such as human and animal waste products; pesticides and herbicides; nitrogen, potassium, and phosphorus fertilizers; and petroleum distillates.

Therefore, based on the information above, we identify aquatic macroinvertebrate prey items, which are typically dominated by larval mayflies but also include larval black

flies, midges, caddisflies, stoneflies, beetles, and small crayfishes; permanent surface flows, as measured during average rainfall years; and adequate water quality to be physical or biological features essential to the conservation of the Kentucky arrow darter.

Cover or Shelter

Kentucky arrow darters depend on specific habitats and bottom substrates for normal life processes such as spawning, rearing, resting, and foraging. As described above, the species typically inhabits shallow pools, riffles, runs, and glides dominated by cobble and boulder substrates and interspersed with clean sand and gravel and low levels of siltation (Thomas 2008, p. 6; Service unpublished data). Kentucky arrow darters are typically observed near some type of cover (boulders, rock ledges, large cobble, or woody debris piles) and at depths ranging from 10 to 91 cm (4 to 36 in) (Thomas 2008, p. 6; Service unpublished data). Sedimentation (siltation) has been listed repeatedly as a threat to the Kentucky arrow darter (Kuehne and Barbour 1983, p. 71; Etnier and Starnes 1993, p. 523; Thomas 2008, pp. 3–7), and the species has suffered population declines and extirpations where sedimentation has been severe (Etnier and Starnes 1993, p. 524; Thomas 2008, p. 7; Service 2012, p. 1). Substrates with low levels of siltation are essential in accommodating the species' feeding, breeding, growth, and other normal behaviors. The term "low levels of siltation" is defined for the purpose of this rule as silt or fine sand within interstitial spaces of substrates in amounts low enough to have minimal impact (i.e., that would have no appreciable reduction in spawning, breeding, growth, and feeding) to the species. Increased levels of siltation (interstitial spaces of substrates filled with large amounts of fine sediment) would reduce the species' ability to

feed (e.g., reduced abundance of prey items) and reproduce (e.g., lack of appropriate spawning sites, smothering of eggs).

Therefore, based on the information above, we identify stable, shallow pools, runs, and glides with boulder and cobble substrates, relatively low levels of siltation, and ample cover (e.g., slab rocks, bedrock ledges, woody debris piles) to be physical or biological features essential to the conservation of the Kentucky arrow darter.

Sites for Breeding, Reproduction, or Rearing (or Development) of Offspring

Little information is available on the reproductive biology and early life history of the Kentucky arrow darter; however, general details were provided by Kuehne and Barbour (1983, p. 71), and more specific information can be elucidated from research conducted by Bailey (1948, pp. 82–84) and Lowe (1979, pp. 44–50), both of whom studied the closely related Cumberland arrow darter. Prior to spawning, male Kentucky arrow darters establish territories over riffles from March to May, when they are quite conspicuous in water 5 to 15 cm (2 to 6 in) deep. Males fan out a depression in the substrate (typically a mixture of cobble, gravel, and sand) and defend these sites vigorously.

The spawning period extends from April to June, but peak activity occurs when water temperatures reach 13 °C (55 °F), typically in mid-April. As mentioned above, substrates with low levels of siltation are essential in accommodating the species' normal behaviors, including breeding, reproduction, and rearing. The species has suffered population declines and extirpations where sedimentation has been severe (Etnier and Starnes 1993, p. 524; Thomas 2008, p. 7; Service 2012, p. 1).

Juvenile arrow darters can be found throughout the channel but are often observed in shallow water along stream margins near root mats, rock ledges, or some other cover. As stream flow lessens and riffles begin to shrink, most arrow darters move into pools and tend to remain there even when summer and autumn rains restore stream flow (Kuehne and Barbour 1983, p. 71).

Therefore, based on the information above, we identify first- to third-order streams containing moderately flowing riffle, pool, run, and glide habitats with gravel and cobble substrates, root mats along the bank, undercut banks, and low levels of siltation to be physical or biological features essential to the conservation of the Kentucky arrow darter.

Habitats Protected from Disturbance or Representative of the Historic, Geographical, and Ecological Distributions of the Species

As described above, stable substrates with low levels of siltation, adequate water quality, and healthy aquatic insect populations are habitat features essential to the Kentucky arrow darter. Historically, first- to third-order streams across the species' range would have contained these habitat features.

All current and historical capture locations of the Kentucky arrow darter are from first- to third-order order, warmwater streams within the upper Kentucky River drainage (Gilbert 1887, pp. 53–54; Woolman 1892, pp. 275–281; Kuehne and Bailey 1961, pp. 3–4; Kuehne 1962, pp. 608–609; Thomas 2008, entire; Service 2012, entire). The species was historically distributed in at least six sub-basins of the Kentucky River, but it is now extirpated from at least 36 historical streams within those sub-basins. Most remaining

populations are highly fragmented and restricted to short stream reaches. Given the species' reduced range and fragmented distribution, it is vulnerable to extirpation from intentional or accidental toxic chemical spills, habitat modification, progressive degradation from runoff (nonpoint-source pollutants), natural catastrophic changes to their habitat (e.g., flood scour, drought), and other stochastic disturbances, such as loss of genetic variation and inbreeding (Soulé 1980, pp. 157–158; Hunter 2002, pp. 97–101; Allendorf and Luikart 2007, pp. 117–146). In addition, the level of isolation seen in this species makes natural repopulation following localized extirpations virtually impossible without human intervention. Greater connectivity within extant populations is needed to provide some protection against these threats and would be more representative of the historic, geographical distribution of the species.

Based on the biological information and needs discussed above, we identify stable, undisturbed stream beds and banks, and ability for populations to be distributed in multiple first- to third-order streams throughout the upper Kentucky River drainage that are protected from disturbance or are representative of the historic, geographical, and ecological distributions of the species to be physical or biological features essential to the conservation of the Kentucky arrow darter.

Primary Constituent Elements for the Kentucky Arrow Darter

According to 50 CFR 424.12(b), we are required to identify the physical or biological features essential to the conservation of the Kentucky arrow darter in areas occupied at the time of listing, focusing on the features' primary constituent elements. We consider primary constituent elements to be 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 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 Kentucky arrow darter are:

(1) Primary Constituent Element 1—Riffle-pool complexes and transitional areas (glides and runs) of geomorphically stable, first- to third-order streams of the upper Kentucky River drainage with connectivity between spawning, foraging, and resting sites to promote gene flow throughout the species' range.

(2) Primary Constituent Element 2—Stable bottom substrates composed of gravel, cobble, boulders, bedrock ledges, and woody debris piles with low levels of siltation.

(3) Primary Constituent Element 3—An instream flow regime (magnitude, frequency, duration, and seasonality of discharge over time) sufficient to provide permanent surface flows, as measured during years with average rainfall, and to maintain benthic habitats utilized by the species.

(4) Primary Constituent Element 4—Adequate water quality characterized by seasonally moderate stream temperatures (generally $\leq 24^{\circ}\text{C}$ or 75°F), high dissolved oxygen concentrations (generally ≥ 6.0 mg/L), moderate pH (generally 6.0 to 8.5), low stream conductivity (species' abundance decreases sharply as conductivities exceed $261\text{ }\mu\text{S/cm}$ and species is typically absent above $350\text{ }\mu\text{S/cm}$) (Service 2012, pp. 1–4; Hitt et al. 2016, pp. 46–52)), and low levels of pollutants. Adequate water quality is defined for the purpose of this rule as the quality necessary for normal behavior, growth, and

viability of all life stages of the Kentucky arrow darter.

(5) Primary Constituent Element 5—A prey base of aquatic macroinvertebrates, including mayfly nymphs, midge larvae, blackfly larvae, caddisfly larvae, stonefly nymphs, and small crayfishes.

Special Management Considerations or Protection

When designating critical habitat, we assess whether the specific areas within the geographical area occupied by the species at the time of listing, and which contain features which are essential to the conservation of the species, may require special management considerations or protection. The 38 units we are designating as critical habitat for the Kentucky arrow darter will require some level of management to address the current and future threats to the physical or biological features of the species. Due to their location on the Daniel Boone National Forest (DBNF), at least a portion of 20 critical habitat units (Units 15–16, 18–32, and 36–38) are being managed and protected under DBNF’s land and resource management plan (LRMP) (United States Forest Service (USFS) 2004, pp. 1–14), and additional conservation measures will be provided upon completion of a candidate conservation agreement (CCA) between DBNF and the Service (see **Available Conservation Measures** section of the final listing rule published elsewhere in this **Federal Register**).

Two of the 38 critical habitat units (Units 3 and 4) are located wholly (Unit 3) or partially (Unit 4) on State property, specifically Robinson Forest, a 4,047-hectare (10,000-acre) research, education, and extension forest in Breathitt and Knott Counties owned by the University of Kentucky (UK) and managed by the Department of Forestry

in the College of Agriculture, Food, and Environment. Management guidelines approved by UK's Board of Trustees in 2004 provide general land use allocations, sustainable allowances for active research and demonstration projects involving overstory manipulation, allocations of net revenues from research and demonstration activities, and management and oversight responsibilities (Stringer 2015, pers. comm.). Based on our knowledge of Kentucky arrow darter populations in Clemons Fork and Coles Fork, there is adequate evidence indicating that forestry and hydrology research and management activities, including road use, over the last 40 years at Robinson Forest are consistent with the maintenance of these populations in both watersheds. The robust populations in both watersheds indicate that these management activities are working to protect the species and its habitats. Therefore, it is clear that these special management considerations are required to maintain the features essential to the species' conservation.

At least portions of 32 critical habitat units are located on private property (16 are located entirely on private property) and are not presently under the protection provided by DBNF's LRMP or the CCA developed by the DBNF and the Service. Activities in or adjacent to these areas of critical habitat may affect one or more of the physical or biological features essential to the Kentucky arrow darter. For example, features in these critical habitat units may require special management due to threats associated with resource extraction (coal surface mining, logging, natural gas and oil exploration), agricultural runoff (livestock, row crops), lack of adequate riparian buffers, construction and maintenance of State and county roads, land development, off-road vehicle use, and other nonpoint-source pollution. These threats are in addition to adverse effects of drought, floods, or other natural phenomena. Other activities that may affect physical

and biological features in the critical habitat units include those listed in the **Effects of Critical Habitat Designation** section, below.

Management activities that could ameliorate these threats include, but are not limited to, the use of best management practices (BMPs) designed to reduce sedimentation, erosion, and stream bank destruction; development of alternatives that avoid and minimize stream bed disturbances; an increase of stormwater management and reduction of stormwater flows into stream systems; preservation of headwater springs and streams; regulation of off-road vehicle use; and reduction of other watershed and floodplain disturbances that release sediments, pollutants, or nutrients into the water.

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. The following discussion describes how we identified and delineated those occupied areas.

We began our analysis by considering the historical and current ranges of the Kentucky arrow darter. We used various sources including published literature, museum collection databases, surveys, reports, and collection records obtained from the KDFWR, Kentucky State Nature Preserves Commission, Kentucky Division of Water, and our own files (see “Historical Range and Distribution” and “Current Range and Distribution” sections of our final listing rule published elsewhere in this **Federal Register**). Within

these ranges, we then identified the specific areas that are occupied by the species and that contain one or more of the physical or biological features essential to the species' conservation. We defined occupied habitat as those stream reaches known to be currently occupied by the species.

To identify these currently occupied stream reaches, we used post-2006 survey data that provided information on distribution and habitat condition (Thomas 2008, entire; Service 2012, entire; Service unpublished data). Generally, if the species was collected or observed in a particular stream during our recent rangewide surveys (2007–2014), the stream reach was considered to be occupied. A few transient individuals were observed in streams with unsuitable habitat conditions (e.g., elevated conductivity), but these streams were not considered to be occupied due to the poor habitat conditions and the high likelihood that these individuals had simply migrated from a nearby source stream. To identify the unoccupied stream reaches, we evaluated historical data (late 1880s–2006) and the results of our recent surveys (2007–2014) (Thomas 2008, entire; Service 2012, entire; Service unpublished data). If the species was known to occur in a stream prior to 2007, but was not observed during our recent rangewide survey, the stream reach was considered to be unoccupied.

Based on our review, we made a determination not to designate any unoccupied stream reaches as critical habitat. We concluded that the designated units occupied by the species at the time of listing are representative of the species' historical range and include both the core population areas of Kentucky arrow darters, as well as remaining peripheral population areas. We further determined that there was sufficient area for the

conservation of the species within the occupied areas. Therefore, we are not designating any areas outside the geographic area occupied by the species.

Following the identification of occupied stream reaches, the next step was to delineate the probable upstream and downstream extent of the species' distribution within those reaches. We used U.S. Geological Survey (USGS) 1:100,000 digital stream maps to delineate these boundaries of the critical habitat units according to the criteria explained below. We set the upstream and downstream limits of each critical habitat unit by identifying landmarks (bridges, confluences, and road crossings), and in some instances latitude and longitude coordinates and section lines, above and below the upper and lowermost reported locations of the Kentucky arrow darter in each stream reach to ensure incorporation of all potential sites of occurrence.

We considered stream order and watershed size to select the upstream terminus. The species can occur in small, first-order reaches (Thomas 2008, entire; Service 2012, entire), but recent surveys have also demonstrated that the species is typically absent in these reaches once the watershed size (the upstream basin or catchment) falls below 1.3 square kilometers (km^2) (0.5 square miles (mi^2)). Consequently, we searched for this point within the watershed and selected the nearest tributary confluence as the upstream terminus. When a tributary was not available, a road-crossing (bridge or ford) or dam was used to mark the boundary.

For the downstream boundary of a unit, we typically selected a stream confluence of a named tributary below the downstream-most occurrence record and within a third-order or smaller stream reach. In the unit descriptions, distances between landmarks used to identify the upstream or downstream extent of a stream segment are given in stream

kilometers and equivalent miles, as measured tracing the course of the stream, not straight-line distance. The critical habitat areas were then mapped using ArcGIS software to produce the critical habitat unit maps.

Because fishes are naturally restricted by certain physical conditions within a stream reach (i.e., flow, substrate, cover), they may be unevenly distributed within these habitat units. Uncertainty on some downstream distributional limits for some populations (e.g., Frozen Creek) may have resulted in small areas of occupied habitat not being included in, or areas of unoccupied habitat included in, the designation. We recognize that both historical and recent collection records upon which we relied are incomplete, and that there may be stream segments or small tributaries not included in this designation that harbor small, limited populations of the species considered in this designation, or that others may become suitable in the future. The omission of such areas does not diminish their potential individual or cumulative importance to the conservation of the Kentucky arrow darter. The habitat areas contained within the designated units described below constitute our best evaluation of areas needed for the conservation of this species at this time.

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 **Regulation Promulgation** section. We include more detailed information on the boundaries of the critical habitat designation in the individual unit descriptions below. 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-2015-0133, on our Internet site

at <http://www.fws.gov/frankfort/>, and at the field office responsible for the designation (see **FOR FURTHER INFORMATION CONTACT**, above).

The areas designated as critical habitat include only stream channels within the ordinary high-water mark and do not contain any developed areas or structures. 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. For each stream reach within a critical habitat unit, the upstream and downstream boundaries are described generally below.

When determining critical habitat boundaries, we made every effort to avoid including developed areas such as lands covered by buildings, pavement, and other structures because such areas usually lack physical and biological features essential to the conservation of the species. The scale of the maps we prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of such developed areas. Any such areas inadvertently left inside critical habitat boundaries shown on the maps of this final rule have been excluded by text 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. Further, the designation of critical habitat does not imply that lands outside of critical habitat do not play an important role in the conservation of

the species.

Final Critical Habitat Designation

We are designating approximately 398 skm (248 smi) in 38 units in Kentucky as critical habitat in Kentucky for the Kentucky arrow darter. These stream reaches comprise the entire currently known range of the species (and all extant populations). All units are considered to be occupied at the time of listing and contain the physical or biological features in the appropriate quantity and spatial arrangement essential to the conservation of this species and support multiple life-history processes for the Kentucky arrow darter. The 38 areas we designate as critical habitat are listed in table 1 below.

Critical habitat units are either in private, Federal (DBNF), or State (UK) ownership. In Kentucky, adjacent landowners also own the land under streams (e.g., the stream channel or bottom), but the water is under State jurisdiction. Portions of the public-to-private boundary for Units 16, 18, 19, 21, 22, 24, 32, and 36 were located along the mid-line of the stream channel; lengths for these segments were divided equally between public and private ownership. Ownership and lengths of Kentucky arrow darter critical habitat units are provided in table 1.

TABLE 1. Location, Ownership, and Lengths for Kentucky Arrow Darter Critical Habitat Units (in stream kilometers (skm) and stream miles (smi))

			Ownership—skm (smi)			
Unit	Stream	County	Private	Federal	State	Total Length skm (smi)
1	Buckhorn Creek and Prince Fork	Knott	1.1 (0.7)	0	0	1.1 (0.7)
2	Eli Fork	Knott	1.0 (0.6)	0	0	1.0 (0.6)
3	Coles Fork and Snag Ridge Fork	Breathitt, Knott	0	0	11.0 (6.8)	11.0 (6.8)
4	Clemons Fork	Breathitt	0.1 (0.1)	0	6.9 (4.3)	7.0 (4.4)
5	Laurel Fork Quicksand Creek and Tributaries	Knott	19.8 (12.4)	0	0	19.8 (12.4)
6	Middle Fork Quicksand Creek and Tributaries	Knott	25.2 (15.6)	0	0	25.2 (15.6)
7	Spring Fork Quicksand Creek	Breathitt	2.2 (1.4)	0	0	2.2 (1.4)
8	Hunting Creek and Tributaries	Breathitt	15.6 (9.7)	0	0	15.6 (9.7)
9	Frozen Creek and Tributaries	Breathitt	26.4 (16.4)	0	0	26.4 (16.4)
10	Holly Creek and Tributaries	Wolfe	18.3 (11.5)	0	0	18.3 (11.5)
11	Little Fork	Lee, Wolfe	3.8 (2.3)	0	0	3.8 (2.3)
12	Walker Creek and Tributaries	Lee, Wolfe	25.0 (15.5)	0	0	25.0 (15.5)
13	Hell Creek and Tributaries	Lee	12.0 (7.4)	0	0	12.0 (7.4)
14	Big Laurel Creek	Harlan	9.1 (5.7)	0	0	9.1 (5.7)
15	Laurel Creek	Leslie	0.7 (0.5)	3.4 (2.1)	0	4.1 (2.6)
16	Hell For Certain Creek and Tributaries	Leslie	11.4 (7.0)	4.4 (2.8)	0	15.8 (9.8)
17	Squabble Creek	Perry	12.0 (7.5)	0	0	12.0 (7.5)
18	Blue Hole Creek and Left Fork Blue Hole Creek	Clay	0	5.7 (3.5)	0	5.7 (3.5)
19	Upper Bear Creek and Tributaries	Clay	0.2 (0.1)	6.6 (4.2)	0	6.8 (4.3)
20	Katies Creek	Clay	1.7 (1.0)	4.0 (2.5)	0	5.7 (3.5)
21	Spring Creek and Little Spring Creek	Clay	3.6 (2.2)	5.6 (3.5)	0	9.2 (5.7)
22	Bowen Creek and Tributaries	Leslie	2.0 (1.2)	11.6 (7.3)	0	13.6 (8.5)
23	Elisha Creek and Tributaries	Leslie	3.0 (1.9)	6.6 (4.0)	0	9.6 (5.9)
24	Gilberts Big Creek	Clay, Leslie	2.0 (1.2)	5.2 (3.3)	0	7.2 (4.5)
25	Sugar Creek	Clay, Leslie	1.1 (0.7)	6.1 (3.8)	0	7.2 (4.5)
26	Big Double Creek and Tributaries	Clay	0	10.3 (6.4)	0	10.3 (6.4)
27	Little Double Creek	Clay	0	3.4 (2.1)	0	3.4 (2.1)
28	Jacks Creek	Clay	5.4 (3.4)	0.5 (0.3)	0	5.9 (3.7)
29	Long Fork	Clay	0	2.2 (1.4)	0	2.2 (1.4)

30	Horse Creek	Clay	3.0 (1.9)	2.0 (1.2)	0	5.0 (3.1)
31	Bullskin Creek	Clay, Leslie	21.3 (13.3)	0.4 (0.2)	0	21.7 (13.5)
32	Buffalo Creek and Tributaries	Owsley	23.2 (14.5)	14.9 (9.3)	0	38.1 (23.8)
33	Lower Buffalo Creek	Lee, Owsley	7.3 (4.6)	0	0	7.3 (4.6)
34	Silver Creek	Lee	6.2 (3.9)	0	0	6.2 (3.9)
35	Travis Creek	Jackson	4.1 (2.5)	0	0	4.1 (2.5)
36	Wild Dog Creek	Jackson, Owsley	4.3 (2.7)	3.8 (2.4)	0	8.1 (5.1)
37	Granny Dismal Creek	Lee, Owsley	4.4 (2.7)	2.5 (1.6)	0	6.9 (4.3)
38	Rockbridge Fork	Wolfe	0	4.5 (2.8)	0	4.5 (2.8)
Total			276.5 (172.0)	103.7 (64.7)	17.9 (11.1)	398.1 (247.8)

We present brief descriptions of all units below. Each unit contains all the physical or biological features and PCEs identified above that are essential to the conservation of the species. In general, stream channels within these units are stable, with ample pool, glide, riffle, and run habitats (PCE 1) that maintain surface flows year round (PCE 3) and contain gravel, cobble, and boulder substrates with low levels of siltation (PCE 2). Such characteristics are necessary for reproductive, foraging, and sheltering requirements of Kentucky arrow darters. We consider water quality in each of these units to be characterized by moderate temperatures, relatively high dissolved oxygen concentrations, moderate pH, and low levels of pollutants (PCE 4). These conditions support abundant populations of aquatic macroinvertebrates that serve as prey items for Kentucky arrow darters (PCE 5).

More precise definitions are provided in the **Regulation Promulgation** section at the end of this final rule.

Unit 1: Buckhorn Creek and Prince Fork, Knott County, Kentucky

Unit 1 is located off Buckhorn Road in the headwaters of the Buckhorn Creek drainage and between Kentucky Highway 1098 (KY 1098) and KY 1087. It includes 0.7 skm (0.4 smi) of Prince Fork from its confluence with Mart Branch downstream to its confluence with Buckhorn Creek and 0.4 skm (0.3 smi) of Buckhorn Creek from its confluence with Prince Fork downstream to its confluence with Emory Branch. Live Kentucky arrow darters have been collected from Unit 1 in Prince Fork and just upstream of the confluence of Buckhorn Creek and Emory Branch (ATS 2011, p. 6; Service 2012, pp. 1–4). This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements. The watershed surrounding Unit 1 is dominated by forest and remains relatively undisturbed; however, downstream reaches of Buckhorn Creek have been degraded by siltation and nonpoint-source pollutants associated with surface coal mining, oil and gas exploration, logging, and runoff from unpaved roads (Service 2012, pp. 1–4).

Within Unit 1, the physical and biological features may require special management considerations or protection to address potential adverse effects (e.g., water pollution, siltation) associated with surface coal mining, logging (timber harvests on private land), natural gas and oil exploration, construction and maintenance of county roads (Buckhorn Road), the lack of adequate riparian buffers (near the confluence with Emory Branch), and off-road vehicle use. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species (adds population redundancy), and provides opportunity for population growth.

Unit 2: Eli Fork, Knott County, Kentucky

This unit is located in the headwaters of the Buckhorn Creek drainage between KY 1098 and KY 1087. It includes 1.0 skm (0.6 smi) of Eli Fork from its confluence with Stonecoal Branch downstream to its confluence with Boughcamp Branch (of Buckhorn Creek). Live Kentucky arrow darters have been collected from Unit 2 near the confluence of Eli Fork and Boughcamp Branch (ATS 2011, p. 6). This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements. The watershed surrounding Unit 2 is dominated by forest and remains relatively undisturbed; however, its receiving stream, Boughcamp Branch, and adjacent watersheds have been degraded by siltation and nonpoint-source pollutants associated with surface coal mining and logging (Service 2012, pp. 1–4).

Within Unit 2, the physical and biological features may require special management considerations or protection to address potential adverse effects (e.g., water pollution, siltation) associated with surface coal mining, logging, natural gas and oil exploration, off-road vehicle use, and construction and maintenance of county roads. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species (adds population redundancy), and provides opportunity for population growth.

Unit 3: Coles Fork and Snag Ridge Fork, Breathitt and Knott Counties, Kentucky

This unit is located entirely within Robinson Forest, a 4,047-hectare (10,000-acre)

research, education, and extension forest in Breathitt and Knott Counties owned by UK and managed by the Department of Forestry in the College of Agriculture, Food, and Environment. Unit 3 includes 2.1 skm (1.3 smi) of Snag Ridge Fork from its headwaters downstream to its confluence with Coles Fork and 8.9 skm (5.5 smi) of Coles Fork from its confluence with Saddle Branch downstream to its confluence with Buckhorn Creek. Live Kentucky arrow darters have been observed throughout Unit 3 (Thomas 2008, p. 5; Service 2012, pp. 1–4), and Coles Fork continues to be one of the species' best remaining habitats. This unit is located entirely on lands owned by UK. The watershed surrounding Unit 3 is intact and densely forested, water quality conditions are excellent (very close to baseline levels), and instream habitats are ideal for the species.

Within Unit 3, the physical and biological features may require special management considerations or protection to address siltation associated with timber management (on Robinson Forest) and stormwater runoff from unpaved roads; however, we consider these threats to be minor as management activities and general use of Robinson Forest over the last 40 years have been consistent with the maintenance of Kentucky arrow darter populations in the Clemons Fork watershed. These minor threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, represents a stronghold for the species (core population), and likely contributes to range expansion (source population).

Unit 4: Clemons Fork, Breathitt County, Kentucky

Unit 4 is located along Clemons Fork Road in southeastern Breathitt County. This unit includes 7.0 skm (4.4 smi) of Clemons Fork from its confluence with Maple

Hollow downstream to its confluence with Buckhorn Creek. Live Kentucky arrow darters have been observed throughout Unit 4 (Lotrich 1973, p. 380; Thomas 2008, p. 5; Service 2012, pp. 1–4). A portion of this unit near the mouth of Clemons Fork is privately owned (0.1 skm (0.1 smi)), but the majority is located on lands owned by UK (see description for Unit 3). The watershed surrounding Unit 4 is intact and densely forested, water quality conditions are excellent (very close to baseline levels), and instream habitats are ideal for the species. Clemons Fork continues to be one of the species' best remaining habitats.

Within Unit 4, the physical and biological features may require special management considerations or protection to address siltation associated with timber management (on Robinson Forest) and stormwater runoff from unpaved roads; however, we consider these threats to be minor as management activities and general use of Robinson Forest over the last 40 years have been consistent with the maintenance of Kentucky arrow darter populations in the Clemons Fork watershed. These minor threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, represents a stronghold for the species (core population), and likely contributes to range expansion (source population).

Unit 5: Laurel Fork Quicksand Creek and Tributaries, Knott County, Kentucky

Unit 5 generally runs parallel to KY 1098 and Laurel Fork Road in northern Knott County. This unit includes 1.2 skm (0.8 smi) of Fitch Branch from its headwaters downstream to its confluence with Laurel Fork Quicksand Creek, 2.7 skm (1.7 smi) of Newman Branch from its headwaters downstream to its confluence with Laurel Fork

Quicksand Creek, 2.1 skm (1.3 smi) of Combs Branch from its headwaters downstream to its confluence with Laurel Fork Quicksand Creek, and 13.8 skm (8.6 smi) of Laurel Fork Quicksand Creek from KY 80 downstream to its confluence with Patten Fork. Live Kentucky arrow darters have been captured within Unit 5 just upstream of the Laurel Fork and Patten Fork confluence and farther upstream at the first Laurel Fork Road crossing (Thomas 2008, p. 5; Service 2012, pp. 1–4). This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements. Hillsides and ridgetops above Unit 5 are forested, but the valley is more developed with scattered residences along Laurel Fork Road.

Within Unit 5, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with logging, inadequate sewage treatment, surface coal mining, natural gas and oil exploration activities, inadequate riparian buffers, construction and maintenance of county roads, and off-road vehicle use. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species (adds population redundancy), and likely serves as a source population within the Quicksand Creek watershed.

Unit 6: Middle Fork Quicksand Creek and Tributaries, Knott County, Kentucky

Unit 6 is located along Middle Fork of Quicksand Creek Road in northeastern Knott County. This unit includes 0.8 skm (0.5 smi) of Big Firecoal Branch from its headwaters downstream to its confluence with Middle Fork Quicksand Creek, 2.1 skm

(1.3 smi) of Bradley Branch from its headwaters downstream to its confluence with Middle Fork Quicksand Creek, 2.0 skm (1.2 smi) of Lynn Log Branch from its headwaters downstream to its confluence with Middle Fork Quicksand Creek, and 20.3 skm (12.6 smi) of Middle Fork Quicksand Creek from its headwaters downstream to its confluence with Quicksand Creek. Live Kentucky arrow darters have been captured within Unit 6 near the confluence of Middle Fork and Jack Branch, the confluence of Middle Fork and Upper Bear Pen Branch, and near the confluence of Middle Fork and Quicksand Creek (Thomas 2008, p. 5; Service 2012, pp. 1–4; Eisenhour pers. comm. 2015). This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements. The watershed surrounding Unit 6 is dominated by forest and continues to be relatively undisturbed. An unpaved road traverses the length of the unit, but the rough condition of the road limits its use to off-road vehicles.

Within Unit 6, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with natural gas and oil exploration activities, logging, surface coal mining, inadequate riparian buffers, construction and maintenance of county roads, and off-road vehicle use. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species (adds population redundancy), and likely serves as a source population within the Quicksand Creek watershed.

Unit 7: Spring Fork Quicksand Creek, Breathitt County, Kentucky

Unit 7 is located off KY 2465 in southeastern Breathitt County and includes 2.2 skm (1.4 smi) of Spring Fork Quicksand Creek from its headwaters downstream to its confluence with an unnamed tributary. Live Kentucky arrow darters have been captured within Unit 7 (Service unpublished data). This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements. Most of the watershed surrounding Unit 7 is forested, but mine reclamation activities have created open, pasture-like habitats along ridgetops and slopes to the north.

Within Unit 7, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with surface coal mining, natural gas and oil exploration activities, logging, and off-road vehicle use. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species within the Quicksand Creek watershed (adds population redundancy), and provides opportunity for population growth.

Unit 8: Hunting Creek and Tributaries, Breathitt County, Kentucky

Unit 8 is located along KY 1094 in eastern Breathitt County and includes 0.9 skm (0.5 smi) of Wolf Pen Branch from its headwaters downstream to its confluence with Hunting Creek, 2.3 skm (1.4 smi) of Fletcher Fork from its headwaters downstream to its confluence with Hunting Creek, 1.6 skm (1.0 smi) of Negro Fork from its headwaters downstream to its confluence with Hunting Creek, 3.1 skm (1.9 smi) of Licking Fork

from its headwaters downstream to its confluence with Hunting Creek, and 7.7 skm (4.8 smi) of Hunting Creek from its confluence with Wells Fork downstream to its confluence with Quicksand Creek. Live Kentucky arrow darters have been captured within Unit 8 near the confluence with Winnie Branch (Service unpublished data). This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements. The narrow valley surrounding Unit 8 contains a few scattered residences and fields along Hunting Creek Road, but the majority of the watershed is relatively intact and dominated by forest.

Within Unit 8, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with natural gas and oil exploration activities, logging, surface coal mining, inadequate sewage treatment, inadequate riparian buffers, construction and maintenance of county roads, and off-road vehicle use. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species within the Quicksand Creek watershed (adds population redundancy), and provides opportunity for population growth.

Unit 9: Frozen Creek and Tributaries, Breathitt County, Kentucky

Unit 9 is located along KY 378 in northern Breathitt County. This unit includes 4.7 skm (2.9 smi) of Clear Fork from its headwaters downstream to its confluence with Frozen Creek, 3.6 skm (2.3 smi) of Negro Branch from its headwaters downstream to its confluence with Frozen Creek, 4.2 skm (2.6 smi) of Davis Creek from its headwaters

downstream to its confluence with Frozen Creek, and 13.9 skm (8.6 smi) of Frozen Creek from its headwaters downstream to its confluence with Morgue Fork. Live Kentucky arrow darters have been captured within Unit 9 upstream of Rock Lick in the headwaters of Frozen Creek (Thomas 2008, p. 5; Service unpublished data). This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements. The individual valleys surrounding Unit 9 are relatively narrow (approximately 100–160 meters (m) (328–525 feet (ft)) at their widest) and composed of small farms and scattered residences. The ridgetops and hillsides are relatively undisturbed and dominated by forest.

Within Unit 9, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with inadequate sewage treatment, canopy loss, agricultural runoff, inadequate riparian buffers, construction and maintenance of county roads, logging, natural gas and oil exploration activities, surface coal mining (legacy effects), and off-road vehicle use. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species (adds population redundancy), contributes to genetic exchange between several streams in the Frozen Creek watershed, and likely serves as an important source population in the northern limits of the species' range.

Unit 10: Holly Creek and Tributaries, Wolfe County, Kentucky

Unit 10 is located along KY 1261 in southern Wolfe County and includes 2.8 skm

(1.8 smi) of Spring Branch from its headwaters downstream to its confluence with Holly Creek, 2.0 skm (1.3 smi) of Pence Branch from its headwaters downstream to its confluence with Holly Creek, 4.0 skm (2.5 smi) of Cave Branch from its headwaters downstream to its confluence with Holly Creek, and 9.5 skm (5.9 smi) of Holly Creek from KY 1261 (first bridge crossing north of KY 15) downstream to its confluence with the North Fork Kentucky River. Live Kentucky arrow darters have been captured within Unit 10 near the confluence of Holly Creek and Spring Branch (Thomas 2008, p. 5). This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements.

The valley bottom surrounding Unit 10 is consistently wider (approximately 320 m (1,050 ft) at its widest) than other occupied stream valleys (e.g., Frozen Creek), and agricultural land use is more extensive. Multiple small farms (e.g., pasture, row crops, hayfields) and residences are scattered along KY 1261, while the ridgetops and hillsides are dominated by forest. We are not designating critical habitat in upstream reaches of the drainage (e.g., Kelse Holland Fork, Mandy Holland Fork, Terrell Fork) because these streams do not contain the PCEs essential to the species' conservation. Habitat conditions in these upstream reaches are poor, as characterized by straightened, incised channels; a lack of canopy cover; and unstable substrates.

Within Unit 10, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with agricultural runoff, canopy loss, inadequate riparian buffers, construction and maintenance of county roads, inadequate sewage treatment, logging, surface coal mining (legacy effects), and off-road vehicle use. These threats are in

addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species, and provides opportunity for population growth.

Unit 11: Little Fork, Lee and Wolfe Counties, Kentucky

This unit is located between KY 2016 and Booth Ridge Road in southern Wolfe County and includes 3.8 skm (2.3 smi) of Little Fork from its headwaters downstream to its confluence with Lower Devil Creek. Live Kentucky arrow darters have been captured within Unit 11 just upstream of the confluence of Little Fork and Lower Devil Creek (Thomas 2008, p. 5; Service 2012, pp. 1–4). This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements. The valley bottom surrounding this unit is densely forested, but a network of unpaved roads and oil and gas well sites are located along the ridgetops to the east and west of the stream.

Within Unit 11, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with oil and gas exploration activities, off-road vehicle use, road runoff, canopy loss, logging, and surface coal mining (legacy effects). These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species (population redundancy), and provides opportunity for population growth.

Unit 12: Walker Creek and Tributaries, Lee and Wolfe Counties, Kentucky

Unit 12 is located between KY 11 and Shumaker Road to the west and KY 2016 to the east in northern Lee County and southwestern Wolfe County. This unit includes 3.9 skm (2.4 smi) of an unnamed tributary of Walker Creek from its headwaters downstream to its confluence with Walker Creek, 2.4 skm (1.5 smi) of Cowan Fork from its headwaters downstream to its confluence with Hell for Certain Creek, 2.0 skm (1.2 smi) of Hell for Certain Creek from the outflow of an unnamed reservoir downstream to its confluence with Walker Creek, 0.8 skm (0.5 smi) of Boonesboro Fork from its headwaters downstream to its confluence with Walker Creek, 2.2 skm (1.4 smi) of Peddler Creek from its headwaters downstream to its confluence with Walker Creek, 1.1 skm (0.7 smi) of Huff Cave Branch from its headwaters downstream to its confluence with Walker Creek, and 12.6 skm (7.8 smi) of Walker Creek from its headwaters (reservoir) downstream to its confluence with North Fork Kentucky River. Live Kentucky arrow darters have been captured at several locations within Unit 12 (Thomas 2008, p. 5; Service 2012, pp. 1–4), including the Old Fincastle Road low-water crossing, a site upstream near the confluence with Boonesboro Fork, and in the headwaters just upstream of the confluence of Walker Creek with Hell For Certain Creek. This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements.

Land use surrounding this unit is similar to that of Little Fork (Unit 11) and Hell Creek (Unit 13). The valley bottom is densely forested, but numerous unpaved roads, oil and gas well sites, and scattered residences occur along the ridgetops to the east and west of the stream. A narrow, unmaintained dirt road (Walker Creek Road) runs parallel to and east of this unit for its entire length; off-road vehicle use is common.

Within Unit 12, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with oil and gas exploration activities, off-road vehicle use, road runoff, canopy loss, and legacy effects of previous oil and gas well development. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species (adds population redundancy), contributes to genetic exchange between several streams in the Walker Creek watershed, and likely serves as an important source population in the northern limits of the species' range.

Unit 13: Hell Creek and Tributaries, Lee County, Kentucky

Unit 13 is located between KY 11 and Shumaker Road in northern Lee County. This unit includes 2.3 skm (1.4 smi) of Miller Fork from its headwaters downstream to its confluence with Hell Creek, 0.7 skm (0.4 smi) of Bowman Fork from its headwaters downstream to its confluence with Hell Creek, 1.9 skm (1.2 smi) of an unnamed tributary of Hell Creek from its headwaters downstream to its confluence with Hell Creek, and 7.1 skm (4.4 smi) of Hell Creek from the outflow of an unnamed reservoir downstream to its confluence with North Fork Kentucky River. Live Kentucky arrow darters have been captured within Unit 13 from the Hell Creek mainstem near the Hell Creek Road low-water crossing and from an unnamed tributary of Hell Creek near the Hell Creek Road low-water crossing (Thomas 2008, p. 5; Service 2012, pp. 1–4). This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements.

Land use surrounding this unit is similar to that of Little Fork (Unit 11) and Walker Creek (Unit 12). The valley bottom surrounding this unit is forested, but numerous unpaved roads, oil and gas well sites, and scattered residences occur along the ridgetops to the east and west of the stream. A narrow, unmaintained dirt road runs parallel to and east of Unit 13 upstream of the Hell Creek Road crossing; off-road vehicle use is common.

Within Unit 13, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with oil and gas exploration activities, off-road vehicle use, road runoff, canopy loss, and legacy effects of previous oil and gas well development. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species (population redundancy), and provides opportunity for population growth.

Unit 14: Big Laurel Creek, Harlan County, Kentucky

Unit 14 is located off KY 221 and Big Laurel Creek Road in northern Harlan County and includes 9.1 skm (5.7 smi) of Big Laurel Creek from its confluence with Combs Fork downstream to its confluence with Greasy Creek. Live Kentucky arrow darters have been captured from this unit near its confluence with White Oak Branch (Thomas 2008, p. 5; Service 2012, pp. 1–4). This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements. The valley bottom and hillsides surrounding Unit 14 are

densely forested, but extensive surface coal mining within the watershed has created clearings along the ridgetops and has resulted in five valley (hollow) fills that are located within tributaries of Big Laurel Creek.

Within Unit 14, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with historical surface coal mining, off-road vehicle use, road runoff, logging, and canopy loss. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding and adds population redundancy at the southeastern edge of the species' range.

Unit 15: Laurel Creek, Leslie County, Kentucky

Unit 15 is located south of US 421/KY 80 in western Leslie County and includes 4.1 skm (2.6 smi) of Laurel Creek from its confluence with Sandlick Branch downstream to its confluence with Left Fork Rockhouse Creek. A single live Kentucky arrow darter has been captured from this unit, approximately 0.48 skm (0.3 smi) from the confluence with Left Fork Rockhouse Creek (Thomas 2013, pers. comm.). A small portion of this unit is privately owned (0.7 skm (0.5 smi)), but the remainder of the unit is in Federal ownership (administered by DBNF). Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14). The watershed surrounding Unit 15 is entirely forested, with no private residences or other structures.

Within Unit 15, the physical and biological features may require special

management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with illegal off-road vehicle use, road runoff, and timber management. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, adds population redundancy, and provides opportunity for population growth.

Unit 16: Hell For Certain Creek and Tributaries, Leslie County, Kentucky

Unit 16 is located off Hell For Certain Road between KY 1482 and KY 257 in northern Leslie County. This unit includes 1.3 skm (0.8 smi) of Cucumber Branch from its headwaters downstream to its confluence with Hell For Certain Creek, 3.1 skm (1.9 smi) of Big Fork from its headwaters downstream to its confluence with Hell For Certain Creek, and 11.4 skm (7.1 smi) of Hell For Certain Creek from its headwaters downstream to its confluence with Middle Fork Kentucky River. Live Kentucky arrow darters have been captured from Unit 16 at multiple locations upstream of its confluence with Big Fork (Thomas 2008, p. 4; Service unpublished data). A portion of this unit is in Federal ownership (administered by DBNF) (4.4 skm (2.8 smi)), but the majority of the unit is in private ownership. For the portion of the unit in Federal ownership, land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14). The valley bottom surrounding Unit 16 is narrow (approximately 100 m (328 ft) at its widest) and composed of a mixture of small farms (e.g., pasture, hayfields) and scattered residences along Hell For Certain Road. The ridgetops and hillsides are relatively undisturbed and dominated by forest.

Within Unit 16, the physical and biological features may require special

management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, inadequate sewage treatment, inadequate riparian buffers, construction and maintenance of county roads, agricultural runoff, illegal off-road vehicle use, logging, and timber management (on DBNF). These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, represents a stronghold for the species within the Middle Fork Kentucky River sub-basin, and likely acts as a source population. This unit is also important for maintaining the distribution and genetic diversity of the species within the Middle Fork sub-basin.

Unit 17: Squabble Creek, Perry County, Kentucky

This unit is located south of KY 28, just downstream of Buckhorn Lake Dam and near the community of Buckhorn in northwestern Perry County. Unit 17 includes 12.0 skm (7.5 smi) of Squabble Creek from its confluence with Long Fork downstream to its confluence with Middle Fork Kentucky River. Live Kentucky arrow darters have been captured from this unit near its confluence with Big Branch (Service unpublished data). This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements.

The valley surrounding Unit 17 is narrow (approximately 113 m (370 ft) at its widest) and composed of a mixture of residences (many in clusters) and small farms (e.g., pasture, hayfields) scattered along KY 2022, which parallels Squabble Creek for much of its length. Ridgetops and hillsides in most of the Squabble Creek valley are relatively undisturbed and dominated by forest; however, surface coal mining has occurred along

ridgetops (to the north and south of Squabble Creek) in the downstream half of the drainage.

Within Unit 17, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, inadequate sewage treatment, agricultural runoff, inadequate riparian buffers, construction and maintenance of county roads, illegal off-road vehicle use, logging, and historical surface coal mining. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species, and provides opportunity for population growth.

Unit 18: Blue Hole Creek and Left Fork Blue Hole Creek, Clay County, Kentucky

Unit 18 is located along KY 1524 in southeastern Clay County. This unit includes 1.8 skm (1.1 smi) of Left Fork from its headwaters downstream to its confluence with Blue Hole Creek and 3.9 skm (2.4 smi) of Blue Hole Creek from its confluence with Dry Branch downstream to its confluence with the Red Bird River. Live Kentucky arrow darters have been captured from Unit 18 near the mouth of Cow Hollow (Thomas 2008, p. 4). This unit is entirely in Federal ownership (administered by DBNF). Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The watershed surrounding Unit 18 is entirely forested, with no private residences or other structures. The only interruption in the canopy is the KY 1525 corridor, which traverses most of the valley. One additional road, Blue Hole School Road, is located at

the headwaters of Blue Hole Creek, leading to a small cemetery site. Blue Hole Creek is 1 of 11 Red Bird River tributaries (Units 18–28) that support Kentucky arrow populations (Thomas 2008, entire; Service 2012, entire). Collectively, these streams represent the largest, most significant cluster of occupied streams and are characterized by intact riparian zones with negligible residential development, high gradients with abundant riffles, cool temperatures, low conductivities (less than 100 $\mu\text{S}/\text{cm}$), and stable channels with clean cobble and boulder substrates (Thomas 2008, p. 4; Service 2014, p. 6).

Within Unit 18, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, illegal off-road vehicle use, and timber management (on DBNF). These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, comprises a portion of the species' core population within the Red Bird River watershed, and contributes to connectivity of streams within the watershed.

Unit 19: Upper Bear Creek and Tributaries, Clay County, Kentucky

Unit 19 is located along KY 1524 and Upper Bear Creek Road in southeastern Clay County. This unit includes 1.5 skm (1.0 smi) of Left Fork Upper Bear Creek from its headwaters downstream to its confluence with Upper Bear Creek, 0.8 skm (0.5 smi) of Right Fork Upper Bear Creek from its headwaters downstream to its confluence with Upper Bear Creek, and 4.5 skm (2.8 smi) of Upper Bear Creek from its confluence with Left Fork and Right Fork Upper Bear Creek downstream to its confluence with the Red Bird River. Live Kentucky arrow darters have been captured from Unit 19 in two

locations downstream of the Left and Right Forks (Thomas 2008, p. 4). A small portion of this unit is privately owned (0.2 skm (0.1 smi)), but the majority of the unit is in Federal ownership (administered by DBNF). Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The watershed surrounding Unit 19 is primarily forested, but a few scattered residences and small farms are located along KY 1524 in the upstream (western) half of the watershed. Upper Bear Creek is 1 of 11 Red Bird River tributaries (Units 18–28) that support Kentucky arrow populations (Thomas 2008, entire; Service 2012, entire). See the description of Unit 18 for more information regarding the characterization of the streams within this drainage.

Within Unit 19, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, illegal off-road vehicle use, agricultural runoff, and timber management (on DBNF). These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, comprises a portion of the species' core population within the Red Bird River watershed, and contributes to connectivity of streams within the watershed.

Unit 20: Katies Creek, Clay County, Kentucky

Unit 20 is located along Katies Creek Road in southeastern Clay County and includes 5.7 skm (3.5 smi) of Katies Creek from its confluence with Cave Branch downstream to its confluence with the Red Bird River. Live Kentucky arrow darters have been captured from this unit approximately 0.2 skm (0.12 smi) upstream of the

mouth of Katies Creek (Thomas 2008, p. 4). A small portion of this unit is privately owned (1.7 skm (1 smi)), but the majority of the unit is in Federal ownership (administered by DBNF). Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The watershed surrounding Unit 20 is entirely forested, with no private residences or other structures. The only interruption in the canopy is the Katies Creek Road corridor, which traverses the valley. Katies Creek is 1 of 11 Red Bird River tributaries (Units 18–28) that support Kentucky arrow populations (Thomas 2008, entire; Service 2012, entire). See the description of Unit 18 for more information regarding the characterization of the streams within this drainage.

Within Unit 20, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, illegal off-road vehicle use, logging (on private land), and timber management (on DBNF). These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, comprises a portion of the species' core population within the Red Bird River watershed, and contributes to connectivity of streams within the watershed.

Unit 21: Spring Creek and Little Spring Creek, Clay County, Kentucky

Unit 21 is located west of KY 66 in southeastern Clay County. This unit includes 1.0 skm (0.6 smi) of Little Spring Creek from its headwaters downstream to its confluence with Spring Creek and 8.2 skm (5.1 smi) of Spring Creek from its headwaters

downstream to its confluence with the Red Bird River. Live Kentucky arrow darters have been captured within Unit 21 approximately 0.2 skm (0.1 smi) upstream of the mouth of Spring Creek (Thomas 2008, p. 4). A portion of this unit is privately owned (3.6 skm (2.2 smi)), but the majority of the unit is in Federal ownership (administered by DBNF). Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The watershed surrounding Unit 21 is relatively undisturbed and dominated by forest; however, a few scattered residences are located along a short segment (approximately 0.8 skm (0.5 smi)) of Lower Spring Creek Road near its junction with KY 66 and along Sand Hill Road and Spring Creek Road at the western (upstream) end of the drainage. The stream corridor between these two areas, an approximate 6.4-skm (4-smi) segment, is inaccessible except by off-road vehicle. About 10 oil wells are located along ridgetops and hillsides near the mouth of Spring Creek, and these sites are connected by a network of unpaved roads. Spring Creek is 1 of 11 Red Bird River tributaries (Units 18–28) that support Kentucky arrow populations (Thomas 2008, entire; Service 2012, entire). See the description of Unit 18 for more information regarding the characterization of the streams within this drainage.

Within Unit 21, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, off-road vehicle use, inadequate sewage treatment, logging (on private land), timber management (on DBNF), and oil and gas exploration activities. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, comprises a

portion of the species' core population within the Red Bird River watershed, and contributes to connectivity of streams within the watershed.

Unit 22: Bowen Creek and Tributaries, Leslie County, Kentucky

Unit 22 is located east of KY 66 and adjacent to Bowen Creek Road in western Leslie County. This unit includes 2.2 skm (1.4 smi) of Laurel Fork from its headwaters downstream to its confluence with Bowen Creek, 1.8 skm (1.1 smi) of Amy Branch from its headwaters downstream to its confluence with Bowen Creek, and 9.6 skm (6.0 smi) of Bowen Creek from its headwaters downstream to the Red Bird River. Live Kentucky arrow darters have been captured from Unit 22 near its confluence with Blevins Branch and Hurricane Branch (Service unpublished data). A portion of this unit is privately owned (2.0 skm (1.2 smi)), but the majority of the unit is in Federal ownership (administered by DBNF). Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The watershed surrounding this unit is relatively undisturbed and dominated by forest. A few scattered residences are located along Bowen Creek Road near the midpoint of the valley, and others are located further upstream along KY 406. Bowen Creek is 1 of 11 Red Bird River tributaries (Units 18–28) that support Kentucky arrow darter populations (Thomas 2008, entire; Service 2012, entire). See the description of Unit 18 for more information regarding the characterization of the streams within this drainage.

Within Unit 22, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, illegal off-road vehicle use, inadequate sewage

treatment, logging (on private land), and timber management (on DBNF). These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, comprises a portion of the species' core population within the Red Bird River watershed, and contributes to connectivity of streams within the watershed.

Unit 23: Elisha Creek and Tributaries, Leslie County, Kentucky

Unit 23 is located east of KY 66 and adjacent to Elisha Creek Road in western Leslie County. This unit includes 4.4 skm (2.7 smi) of Right Fork Elisha Creek from its headwaters downstream to its confluence with Elisha Creek, 2.3 skm (1.4 smi) of Left Fork Elisha Creek from its headwaters downstream to its confluence with Elisha Creek, and 2.9 skm (1.8 smi) of Elisha Creek from its confluence with Right Fork Elisha Creek downstream to its confluence with the Red Bird River. Live Kentucky arrow darters have been captured throughout Unit 23 (Service unpublished data). A portion of this unit is privately owned (3.0 skm (1.9 smi)), but the majority of the unit is in Federal ownership (administered by DBNF). Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The watershed surrounding Unit 23 is relatively undisturbed and dominated by forest. A few scattered residences are located along Elisha Creek Road at the downstream end of the Elisha Creek valley (near the mouth of Elisha Creek). A few oil and gas wells are scattered throughout the drainage. Elisha Creek is 1 of 11 Red Bird River tributaries (Units 18–28) that support Kentucky arrow populations (Thomas 2008, entire; Service 2012, entire). See the description of Unit 18 for more information

regarding the characterization of the streams within this drainage.

Within Unit 23, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, illegal off-road vehicle use, logging (on private land), timber management (on DBNF), inadequate sewage treatment, and natural gas and oil exploration activities. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, comprises a portion of the species' core population within the Red Bird River watershed, and contributes to connectivity of streams within the watershed.

Unit 24: Gilberts Big Creek, Clay and Leslie Counties, Kentucky

Unit 24 is located east of KY 66 and generally parallel to Gilberts Creek Road in southeastern Clay County and western Leslie County. This unit includes 7.2 skm (4.5 smi) of Gilberts Big Creek from its headwaters downstream to its confluence with the Red Bird River. Live Kentucky arrow darters have been captured throughout this unit. A portion of this unit is privately owned (2.0 skm (1.2 smi)), but the majority of the unit is in Federal ownership (administered by DBNF). Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The watershed surrounding Unit 24 is relatively undisturbed and dominated by forest. A few scattered residences and small farms are located along Gilberts Creek Road at the downstream end of the valley near the mouth of Gilberts Big Creek. Several gas and oil wells are also scattered throughout the valley. Gilberts Big Creek is 1 of 11 Red

Bird River tributaries (Units 18–28) that support Kentucky arrow darter populations (Thomas 2008, entire; Service 2012, entire). See the description of Unit 18 for more information regarding the characterization of the streams within this drainage.

Within Unit 24, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, off-road vehicle use, logging (on private land), timber management (on DBNF), inadequate sewage treatment, agricultural runoff, and natural gas and oil exploration activities. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, comprises a portion of the species' core population within the Red Bird River watershed, and contributes to connectivity of streams within the watershed.

Unit 25: Sugar Creek, Clay and Leslie Counties, Kentucky

Unit 25 is located off Sugar Creek Road in southeastern Clay County and western Leslie County and includes 7.2 skm (4.5 smi) of Sugar Creek from its headwaters downstream to its confluence with the Red Bird River. Live Kentucky arrow darters have been captured throughout this unit (Thomas 2008, p. 4; Thomas *et al.* 2014, p. 23). A portion of this unit is privately owned (1.1 skm (0.7 smi)), but the majority of the unit is in Federal ownership (administered by DBNF). Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The watershed surrounding Unit 25 is relatively undisturbed and dominated by

forest. A few scattered residences and small farms are located along Sugar Creek Road at the downstream end of the valley near the mouth of Sugar Creek. Several gas and oil wells are also scattered throughout the valley. Sugar Creek is 1 of 11 Red Bird River tributaries (Units 18–28) that support Kentucky arrow darter populations (Thomas 2008, entire; Service 2012, entire). See the description of Unit 18 for more information regarding the characterization of the streams within this drainage.

Within Unit 25, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, off-road vehicle use, logging (on private land), timber management (on DBNF), inadequate sewage treatment, agricultural runoff, and natural gas and oil exploration activities. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, comprises a portion of the species' core population within the Red Bird River watershed, and contributes to connectivity of streams within the watershed.

Unit 26: Big Double Creek and Tributaries, Clay County, Kentucky

Unit 26 is located adjacent to Big Double Creek Road in southeastern Clay County. This unit includes 1.4 skm (0.9 smi) of Left Fork Big Double Creek from its headwaters downstream to its confluence with Big Double Creek, 1.8 skm (1.1 smi) of Right Fork Big Double Creek from its headwaters downstream to its confluence with Big Double Creek, and 7.1 skm (4.4 smi) of Big Double Creek from its headwaters downstream to its confluence with the Red Bird River. Live Kentucky arrow darters

have been captured from numerous localities in Unit 26, which has been surveyed regularly by KDFWR and Service personnel (Thomas 2008, p. 4; Thomas *et al.* 2014, p. 23; Service unpublished data). This unit is entirely in Federal ownership (administered by DBNF). Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The watershed surrounding Unit 26 is relatively undisturbed and dominated by forest, with about 90 percent in Federal ownership (administered by DBNF). The only residential development is concentrated along Arnett Fork Road, which parallels Arnett Fork, a first order tributary of Big Double Creek. A USFS public use area (Big Double Creek Recreational Area) is located adjacent to Unit 26, approximately 1.6 skm (1.0 smi) upstream of Arnett Fork. This area consists of a gravel road and parking lot, a bathroom facility, several picnic tables, and two maintained fields connected by a pedestrian bridge over Big Double Creek. Upstream of the public use area, Big Double Creek can be accessed via USFS Road 1501, which extends upstream to the confluence of the Left and Right Forks. Big Double Creek is 1 of 11 Red Bird River tributaries (Units 18–28) that support Kentucky arrow darter populations (Thomas 2008, entire; Service 2012, entire). See the description of Unit 18 for more information regarding the characterization of the streams within this drainage.

Within Unit 26, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation) associated with road runoff, off-road vehicle use, and timber management (on DBNF). These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, comprises a portion

of the species' core population within the Red Bird River watershed, and contributes to connectivity of streams within the watershed.

Unit 27: Little Double Creek, Clay County, Kentucky

Unit 27 is located adjacent to Little Double Creek Road in southeastern Clay County. This unit includes 3.4 skm (2.1 smi) of Little Double Creek from its headwaters downstream to its confluence with the Red Bird River. Live Kentucky arrow darters have been captured from two localities in Unit 27 (Thomas 2008, p. 4; Service unpublished data). One hundred percent of this unit is in Federal ownership (administered by DBNF), and the DBNF's Redbird Ranger District headquarters is located off KY 66 at the mouth of Little Double Creek. Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The watershed surrounding Unit 27 is entirely forested, with no private residences or other structures. The only interruption in the canopy of the watershed is the Little Double Creek Road corridor, which traverses the length of the valley. Little Double Creek is 1 of 11 Red Bird River tributaries (Units 18–28) that support Kentucky arrow darter populations (Thomas 2008, entire; Service 2012, entire). See the description of Unit 18 for more information regarding the characterization of the streams within this drainage.

Within Unit 27, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation) associated with road runoff, illegal off-road vehicle use, and timber management (on

DBNF). These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, comprises a portion of the species' core population within the Red Bird River watershed, and contributes to connectivity of streams within the watershed.

Unit 28: Jacks Creek, Clay County, Kentucky

This unit is located along Jacks Creek Road, north of Hal Rogers Parkway and east of KY 66 in eastern Clay County. Unit 28 includes 5.9 skm (3.7 smi) of Jacks Creek from its headwaters downstream to its confluence with the Red Bird River. Live Kentucky arrow darters have been captured from Unit 28 just downstream of the Crib Branch confluence (Service 2012, entire). A small portion of this unit is in Federal ownership (0.5 skm (0.3 smi)), but the majority of the unit is privately owned. For the portion of the unit in Federal ownership (administered by DBNF), land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The valley bottom surrounding Unit 28 is composed of a mixture of residences (many in clusters) and small farms (e.g., pasture, hayfields) scattered along Jacks Creek Road, which parallels Jacks Creek for most of its length. Ridgetops and hillsides in most of the valley are relatively undisturbed and dominated by forest. Jacks Creek is 1 of 11 Red Bird River tributaries (Units 18–28) that support Kentucky arrow darter populations (Thomas 2008, entire; Service 2012, entire). See the description of Unit 18 for more information regarding the characterization of the streams within this drainage.

Within Unit 28, the physical and biological features may require special

management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, inadequate sewage treatment, agricultural runoff, inadequate riparian buffers, construction and maintenance of county roads, illegal off-road vehicle use, logging (on private land), and timber management (on DBNF). These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, comprises a portion of the species' core population within the Red Bird River watershed, and contributes to connectivity of streams within the watershed.

Unit 29: Long Fork, Clay County, Kentucky

Unit 29 is located along USFS Road 1633, which is west of KY 149 and the Hal Rogers Parkway in eastern Clay County. Unit 29 includes 2.2 skm (1.4 smi) of Long Fork from its headwaters downstream to its confluence with Hector Branch. Live Kentucky arrow darters have been captured throughout Unit 29 as a result of a reintroduction effort by KDFWR and Conservation Fisheries, Inc. (CFI) of Knoxville, Tennessee (Thomas et al. 2014, p. 23) (see **Available Conservation Measures** section of our final listing rule published elsewhere in this **Federal Register**). One hundred percent of this unit is in Federal ownership (administered by DBNF). Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The watershed surrounding Unit 29 is entirely forested, with no private residences or other structures. The only minor interruption in the canopy of the watershed is the USFS Road 1633 corridor, which parallels Long Fork for part of its length. Habitats in

Long Fork are similar to other occupied streams (Units 18–28) in the Red Bird River drainage. See the description of Unit 18 for more information regarding the characterization of the streams within the Red Bird drainage.

Within Unit 29, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation) associated with road runoff, illegal off-road vehicle use, and timber management (on DBNF). These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, comprises a portion of the species' core population within the Red Bird River watershed, and contributes to connectivity of streams within the watershed.

Unit 30: Horse Creek, Clay County, Kentucky

Unit 30 is located adjacent to Reynolds Road and Elijah Feltner Road in southwestern Clay County. It includes 5.0 skm (3.1 smi) of Horse Creek from its headwaters downstream to its confluence with Pigeon Roost Branch. Live Kentucky arrow darters have been captured within this unit approximately 1.9 skm (1.2 smi) downstream of the confluence of Horse Creek and Tuttle Branch (Service unpublished data). A portion of Unit 30 is in Federal ownership (2.0 skm (1.2 smi)), but the majority of the unit is privately owned. For the portion of the basin in Federal ownership (administered by DBNF), land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14). The valley bottom surrounding Unit 30 is composed of a mixture of forest, small farms, and residences. Ridgetops and hillsides in most of the valley are relatively undisturbed and dominated by

forest.

Within Unit 30, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, agricultural runoff, inadequate sewage treatment, lack of riparian buffers, construction and maintenance of county roads, illegal off-road vehicle use, and logging on private land and timber management on DBNF. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species, and represents the only occupied habitat within the Goose Creek watershed.

Unit 31: Bullskin Creek, Clay and Leslie Counties, Kentucky

Unit 31 is located along KY 1482, east of the town of Oneida, Kentucky, in eastern Clay County and northwestern Leslie County. It includes 21.7 skm (13.5 smi) of Bullskin Creek from its confluence with Old House Branch downstream to its confluence with the South Fork Kentucky River. Live Kentucky arrow darters have been captured from Unit 31 at the confluence of Long Branch and just upstream of the confluence of Barger Branch (Thomas 2008, p. 4; Service 2012, entire). A small portion of this unit is in Federal ownership (0.4 skm (0.2 smi)), but the majority of the unit is privately owned. For the portion of the basin in Federal ownership (administered by DBNF), land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The valley bottom surrounding Unit 31 is composed of a mixture of residences

(many in clusters) and small farms (e.g., pasture, hayfields) scattered along KY 1482, which parallels Bullskin Creek for its entire length. Ridgetops and hillsides in most of the valley are relatively undisturbed and dominated by forest, but a few watersheds show signs of active or recent disturbance. Surface coal mining is currently ongoing in the watersheds of Wiles Branch (Permit #826–0649), Barger Branch (Permit #826–0664), and a few unnamed tributaries of Bullskin Creek (Permit #826–0664). Recent logging activities have occurred in the watershed of Panco Branch.

Within Unit 31, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, surface coal mining, inadequate sewage treatment, agricultural runoff, lack of riparian buffers, construction and maintenance of county roads, illegal off-road vehicle use, and logging. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species, and provides opportunity for population growth.

Unit 32: Buffalo Creek and Tributaries, Owsley County, Kentucky

Unit 32 is located north of Oneida, Kentucky, and east of KY 11 in southeastern Owsley County. This unit includes 2.0 skm (1.2 smi) of Cortland Fork from its headwaters downstream to its confluence with Laurel Fork, 6.4 skm (4.0 smi) of Laurel Fork from its headwaters downstream to its confluence with Left Fork Buffalo Creek, 4.6 skm (2.9 smi) of Lucky Fork from its headwaters downstream to its confluence with Left Fork Buffalo Creek, 5.1 skm (3.2 smi) of Left Fork Buffalo Creek from its headwaters

downstream to its confluence with Buffalo Creek, 17.3 skm (10.8 smi) of Right Fork Buffalo Creek from its headwaters downstream to its confluence with Buffalo Creek, and 2.7 skm (1.7 smi) of Buffalo Creek from its confluence with Left Fork Buffalo Creek, and Right Fork Buffalo Creek downstream to its confluence with the South Fork Kentucky River. Live Kentucky arrow darters have been captured from multiple locations throughout Unit 32 (Thomas 2008, p. 4; Service 2012, entire). A portion of this unit is in Federal ownership (administered by DBNF) (14.9 skm (9.3 smi)), but the majority of the unit is in private ownership. For the portion in Federal ownership, land and resource management decisions and activities are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

Ridgetops and hillsides in most of the valley surrounding Unit 32 are relatively undisturbed and dominated by forest, but portions of the valley bottom surrounding Unit 32 have been cleared and consist of a mixture of residences (many in clusters) and small farms (e.g., pasture, hayfields, row crops) scattered along roadways. Surface coal mining has been conducted recently or is currently ongoing in the headwaters of Left Fork Buffalo Creek, specifically Stamper Branch of Lucky Fork (Permit #895–0175), Cortland Fork of Laurel Fork (Permit #813–0271), and Joyce Fork of Laurel Fork (Permit #895–0175).

Within Unit 32, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, surface coal mining, inadequate sewage treatment, inadequate riparian buffers, agricultural runoff, construction and maintenance of roads, illegal off-road vehicle use, logging (on private land), and timber management (on

DBNF). These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, represents a stronghold for the species within the lower half of the South Fork Kentucky River sub-basin, and likely acts as a source population.

Unit 33: Lower Buffalo Creek, Lee and Owsley Counties, Kentucky

Unit 33 is located along KY 1411 and Straight Fork-Zeke Branch Road in southern Lee and northern Owsley Counties. This unit includes 2.2 skm (1.4 smi) of Straight Fork from its headwaters downstream to its confluence with Lower Buffalo Creek and 5.1 skm (3.2 smi) of Lower Buffalo Creek from its confluence with Straight Fork downstream to its confluence with the South Fork Kentucky River. Live Kentucky arrow darters have been captured within Unit 33 at the confluence of Lower Buffalo Creek and Straight Fork (Thomas 2008, p. 4). This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements.

Ridgetops and hillsides in most of the valley surrounding Unit 33 are relatively undisturbed and dominated by forest, but large portions of the valley bottom surrounding Unit 33 have been cleared and consist of a mixture of residences (many in clusters) and small farms (e.g., pasture, hayfields, row crops). Extensive logging has occurred recently (within the last 7 years) within Jerushia Branch, a first-order tributary of Lower Buffalo Creek.

Within this unit, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water

pollution) associated with road runoff, construction and maintenance of roads, inadequate sewage treatment, inadequate riparian buffers, agricultural runoff, illegal off-road vehicle use, and logging. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species, and provides opportunity for population growth.

Unit 34: Silver Creek, Lee County, Kentucky

Unit 34 is located along Silver Creek Road, partially within the city limits of Beattyville in central Lee County. This unit includes 6.2 skm (3.9 smi) of Silver Creek from its headwaters downstream to its confluence with the Kentucky River. Live Kentucky arrow darters have been captured within Unit 34 approximately 1.4 skm (0.9 smi) upstream of the mouth of Silver Creek (Thomas 2008, p. 5). This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements.

The valley surrounding Unit 34 is unusual among occupied watersheds because it is not located in a rural area. The mouth of Silver Creek (downstream terminus of Unit 34) is located within the city limits of Beattyville, and the downstream half of the watershed is moderately developed, with numerous residences along Silver Creek Road. The upstream half of the watershed is less developed and dominated by forest.

Within this unit, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, construction and maintenance of roads, inadequate

sewage treatment, inadequate riparian buffers, and illegal off-road vehicle use. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, helps to maintain the geographical range of the species, and provides opportunity for population growth.

Unit 35: Travis Creek, Jackson County, Kentucky

Unit 35 is located along Travis Creek Road in eastern Jackson County. This unit includes 4.1 skm (2.5 smi) of Travis Creek from its headwaters downstream to its confluence with Hector Branch. Live Kentucky arrow darters have been captured within Unit 35 approximately 1.8 skm (1.1 smi) upstream of the mouth of Travis Creek. This unit is located almost entirely on private land, except for any small amount that is publicly owned in the form of bridge crossings and road easements. A few agricultural fields are located near the mouth of Travis Creek, but most of the watershed surrounding Unit 35 is forested, with no private residences or other structures. Some of the forest is early successional due to recent logging in the watershed.

Within Unit 35, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, off-road vehicle use, inadequate riparian buffers, construction and maintenance of county roads, agricultural runoff, and logging. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, increases population redundancy within the species' range, and provides the opportunity for population growth at the western extent of the species' range.

Unit 36: Wild Dog Creek, Jackson and Owsley Counties, Kentucky

Unit 36 is located west of Sturgeon Creek in eastern Jackson and northwestern Owsley Counties. This unit includes 8.1 skm (5.1 smi) of Wild Dog Creek from its headwaters downstream to its confluence with Sturgeon Creek. Live Kentucky arrow darters have been captured within Unit 36 just upstream of the mouth of Wild Dog Creek. A portion of this unit is in Federal ownership (3.8 skm (2.4 smi)), but the majority of the unit is in private ownership. For the portion of the unit in Federal ownership (administered by DBNF), land and resource management decisions and activities are guided by DBNF's LRMP (USFS 2004, pp. 1–14). The watershed surrounding Unit 36 is relatively undisturbed and dominated by forest, but a few scattered residences and small farms occur in the headwaters just east of KY 587.

Within Unit 36, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, construction and maintenance of roads, illegal off-road vehicle use, inadequate riparian buffers, agricultural runoff, logging (on private land), timber management (on DBNF), and inadequate sewage treatment. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, increases population redundancy within the species' range, and provides the opportunity for population growth at the western extent of the species' range.

Unit 37: Granny Dismal Creek, Lee and Owsley Counties, Kentucky

Unit 37 is located west of Sturgeon Creek in western Lee and eastern Owsley Counties. This unit includes 6.9 skm (4.3 smi) of Granny Dismal Creek from its confluence with Harris Branch downstream to its confluence with Sturgeon Creek. Live Kentucky arrow darters have been captured within Unit 37 approximately 1.1 skm (0.7 smi) upstream of the mouth of Granny Dismal Creek. A portion (2.5 skm (1.6 smi)) of this unit is in Federal ownership (administered by DBNF), but the majority of the unit is privately owned. Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14). The watershed surrounding Unit 37 is relatively undisturbed and dominated by forest, but a few scattered residences and small farms occur in the headwaters just east of KY 587.

Within Unit 37, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, construction and maintenance of roads, illegal off-road vehicle use, inadequate riparian buffers, agricultural runoff, logging (on private land), timber management (on DBNF), and inadequate sewage treatment. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, increases population redundancy within the species' range, and provides the opportunity for population growth at the western extent of the species' range.

Unit 38: Rockbridge Fork, Wolfe County, Kentucky

Unit 38 is located within the Red River Gorge region in northwestern Wolfe County and represents the only occupied habitat within the Red River drainage. This unit

includes 4.5 skm (2.8 smi) of Rockbridge Fork from its confluence with Harris Branch downstream to its confluence with Sturgeon Creek. Live Kentucky arrow darters have been captured within Unit 38 approximately 0.2 skm (0.1 smi) upstream of the mouth of Rockbridge Fork. This unit is entirely in Federal ownership (administered by DBNF). Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14). The watershed surrounding Unit 38 is relatively undisturbed and dominated by forest, but a few scattered residences and small farms occur in the headwaters of Rockbridge Fork near the Mountain Parkway (KY 402).

Within Unit 38, the physical and biological features may require special management considerations or protection to address adverse effects (e.g., siltation, water pollution) associated with road runoff, illegal off-road vehicle use, agricultural runoff, timber management (on DBNF), and inadequate sewage treatment. These threats are in addition to random effects of drought, floods, or other natural phenomena. This unit provides habitat for reproduction and feeding, increases population redundancy within the species' range, and provides the opportunity for population growth at the western extent of the species' range.

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 that 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.

We published a final rule that sets forth a new definition of “destruction or adverse modification” on February 11, 2016 (81 FR 7214); that final rule became effective on March 14, 2016. “Destruction or adverse modification” means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features.

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 U.S. Army Corps of Engineers 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 the Kentucky arrow darter. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of this subspecies or that preclude or significantly delay development of such features. 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 Kentucky arrow darter. These activities include, but are not limited to:

(1) Actions that would alter the geomorphology of stream habitats. Such activities could include, but are not limited to, instream excavation or dredging, impoundment, channelization, road and bridge construction, surface coal mining, and discharge of fill materials. These activities could cause aggradation or degradation of the channel bed elevation or significant bank erosion that would degrade or eliminate habitats necessary for growth and reproduction of the Kentucky arrow darter.

(2) Actions that would significantly alter the existing flow regime or water quantity. Such activities could include, but are not limited to, impoundment, water diversion, water withdrawal, and hydropower generation. These activities could eliminate or reduce the habitat necessary for growth and reproduction of this species.

(3) Actions that would significantly alter water quality (for example, temperature, pH, contaminants, and excess nutrients). Such activities could include, but are not limited to, the release of chemicals, biological pollutants, or heated effluents into surface water or connected groundwater at a point source or by dispersed release (non-point source). These activities could alter water conditions to levels that are beyond the tolerances of the Kentucky arrow darter (e.g., elevated conductivity) and result in direct or cumulative adverse effects to the species and its life cycle.

(4) Actions that would significantly alter stream bed material composition and quality by increasing sediment deposition or filamentous algal growth. Such activities could include, but are not limited to, construction projects, channel alteration, livestock

grazing, timber harvests, off-road vehicle use, and other watershed and floodplain disturbances that release sediments or nutrients into the water. These activities could eliminate or degrade habitats necessary for the growth and reproduction of the Kentucky arrow darter by increasing the sediment deposition to levels that would adversely affect its ability to complete its life cycle.

Exemptions

Application of Section 4(a)(3) of the Act

Section 4(a)(3)(B)(i) of the Act 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 shall 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, we prepared an incremental effects memorandum (IEM) and screening analysis which, together with our narrative and interpretation of effects, constitutes our draft economic analysis (DEA) of the proposed critical habitat designation and related factors (Abt Associates 2015). The analysis, dated September 11, 2015, was made available for public review from October 8, 2015, through December 7, 2015 (80 FR 61030, October 8, 2015). Following the close of the comment period, 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. Additional information relevant to the probable incremental economic impacts of critical habitat designation for the Kentucky arrow darter was summarized in the proposed critical habitat designation (80 FR 61030, October 8, 2015) and is also available in the screening analysis for the Kentucky arrow darter (Abt Associates 2015, entire), available at <http://www.regulations.gov> in Docket No. FWS-R4-ES-2015-0133.

The 2.7-km (1.7-mi) extension of Unit 6 was not evaluated in our original

screening analysis (Abt Associates 2015, entire), so we completed a review of the probable economic impacts associated with this area. Land use within this reach is similar to the rest of Unit 6 that was evaluated in our screening analysis (Abt Associates 2015, entire). Land ownership is almost entirely private, except for a small amount that is publicly owned in the form of bridge crossings and road easements. The watershed surrounding this area is dominated by forest, with a few scattered residences, hayfields, and gas wells. Based on our analysis, significant economic impacts are not expected in this portion of Unit 6. Any section 7-related incremental impacts of the designation will be limited to administrative costs only. With respect to indirect impacts, this critical habitat designation is unlikely to trigger other regulatory requirements or economic impacts outside of the ESA. That is, the rule is not expected to result in additional or different State or local regulations or permitting and land use management practices.

Because all of the units proposed as critical habitat for the Kentucky arrow darter are currently occupied by the species, any actions that may affect the species or its habitat would also affect critical habitat and it is unlikely that any additional conservation efforts would be recommended to address the adverse modification standard over and above those recommended as necessary to avoid jeopardizing the continued existence of the Kentucky arrow darter. Any anticipated incremental costs of the critical habitat designation will predominantly be administrative in nature and would not be significant. Critical habitat may impact property values indirectly if developers assume the designation will limit the potential use of that land. However, the designation of critical habitat is not likely to result in an increase of consultations, but rather only the additional administrative effort within each consultation to address the effects of each proposed

agency action on critical habitat.

A copy of the IEM and screening analysis with supporting documents may be obtained by contacting the Kentucky Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**) or by downloading from the Internet at <http://www.regulations.gov> in Docket No. FWS–R4–ES–2015–0133.

Exclusion Based on Economic Impacts

Based on the Service’s consideration of the economic impacts of the critical habitat designation above, the Secretary is not exercising her discretion to exclude any areas from this designation of critical habitat for the Kentucky arrow darter based on economic impacts.

Exclusions Based on National Security Impacts

Under section 4(b)(2) of the Act, we consider whether there are areas where designation of critical habitat might have an impact on national security. In preparing this final rule, we have determined that no lands within the designation of critical habitat for the Kentucky arrow darter are owned or managed by the Department of Defense or Department of Homeland Security, and, therefore, we anticipate no impact on national security. Consequently, the Secretary is not exercising her discretion to exclude any areas from the final designation based on impacts on national security.

Exclusions Based on Other Relevant Impacts

Under section 4(b)(2) of the Act, we also 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 HCPs or other management plans for the Kentucky arrow darter, and the final designation does not include any tribal lands or trust resources. We anticipate no impact on partnerships 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 (E.O.) 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.

E.O. 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 of 1996 (SBREFA; 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 (i.e., small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of the 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; and small businesses (13 CFR 121.201). 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 to these small entities are significant, we considered the types of activities that might trigger regulatory impacts under this designation as well as 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 out 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 a 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 the 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 the 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

E.O. 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use) requires agencies to prepare Statements of Energy Effects when undertaking certain actions. In our economic analysis, we found that the designation of critical habitat for the Kentucky arrow darter will not significantly affect energy supplies, distribution, or use. Natural gas and oil exploration and development activities occur or could potentially occur in all of the critical habitat units for the Kentucky arrow darter; however, compliance with State regulatory requirements or voluntary BMPs would be expected to minimize impacts of natural gas and oil exploration and development in the areas of critical habitat for the species. The measures for natural gas and oil exploration and development are generally not considered a substantial cost compared with overall project costs and are already being implemented by oil and gas companies.

Surface coal mining occurs or could potentially occur in all critical habitat units for the Kentucky arrow darter. Incidental take for listed species associated with surface coal mining activities is currently covered under a programmatic, non-jeopardy biological opinion between the Office of Surface Mining Reclamation and Enforcement and the Service completed in 1996 (Service 1996, entire). The biological opinion covers

existing, proposed, and future endangered and threatened species that may be affected by the implementation and administration of surface coal mining programs under the Surface Mining Control and Reclamation Act (30 U.S.C. 1201 *et seq.*). Through its analysis, the Service concluded that the proposed action (surface coal mining and reclamation activities) was not likely to jeopardize the continued existence of any endangered or threatened species, or any species proposed for listing as an endangered or threatened species, or result in adverse modification of designated or proposed critical habitat. 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 would significantly or uniquely affect small governments because this species occurs primarily in Federally owned river channels or in remote privately owned stream channels. Also, this rule 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. The designation of critical habitat imposes no obligations on State or local governments and, as such, a Small Government Agency Plan is not required.

Takings—Executive Order 12630

In accordance with E.O. 12630 (Government Actions and Interference with Constitutionally Protected Private Property Rights), we have analyzed the potential takings implications of designating critical habitat for Kentucky arrow darter in a takings implications assessment. The Act does not authorize the Service to regulate private actions on private lands or confiscate private property as a result of critical habitat designation. Designation of critical habitat does not affect land ownership, or establish any closures, or restrictions on use of or access to the designated areas. Furthermore, the designation of critical habitat does not affect landowner actions that do not require Federal funding or permits, nor does it preclude development of habitat conservation programs or issuance of incidental take permits to permit actions that do require Federal funding or permits to go forward. However, Federal agencies are prohibited from carrying out, funding, or authorizing actions that would destroy or adversely modify critical habitat. A takings implications assessment has been completed and concludes that this designation of critical habitat for Kentucky arrow darter does not pose significant takings implications for lands within or affected by the designation.

Federalism—Executive Order 13132

In accordance with E.O. 13132 (Federalism), this final 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 the proposed critical habitat designation with, appropriate State resource agencies in Kentucky. We received comments from one State agency, the Kentucky State Nature Preserves Commission, and have addressed them in the **Summary of Comments and Recommendations** section of this document.

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, the rule does not have substantial direct effects either on the States, or on the relationship between the Federal 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 these 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 E.O. 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 requirements of 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 species. 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 the Office of Management and Budget (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 (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 the National Environmental Policy Act 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)).

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), E.O. 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 Kentucky arrow darter 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 Kentucky arrow darter

that are essential for the conservation of the species. Therefore, we are not designating critical habitat for the Kentucky arrow darter on tribal lands.

References Cited

A complete list of references cited in this rulemaking is available on the Internet at <http://www.regulations.gov> in Docket No. FWS–R4–ES–2015–0133 and upon request from the Kentucky Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this final rulemaking are the staff members of the Kentucky 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—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245, unless otherwise

noted.

2. In § 17.95, amend paragraph (e) by adding the entry “Kentucky Arrow Darter (*Etheostoma spilotum*)” after the entry for “Fountain Darter (*Etheostoma fonticola*)” to read as follows:

§ 17.95 Critical habitat—fish and wildlife.

* * * * *

(e) *Fishes.*

* * * * *

Kentucky Arrow Darter (*Etheostoma spilotum*)

(1) Critical habitat units are depicted on the maps below for Breathitt, Clay, Harlan, Jackson, Knott, Lee, Leslie, Owsley, Perry, and Wolfe Counties, Kentucky.

(2) Within these areas, the primary constituent elements of the physical or biological features essential to the conservation of the Kentucky arrow darter consist of five components:

(i) Primary Constituent Element 1—Riffle-pool complexes and transitional areas (glides and runs) of geomorphically stable, first- to third-order streams of the upper Kentucky River drainage with connectivity between spawning, foraging, and resting sites to promote gene flow throughout the species’ range.

(ii) Primary Constituent Element 2—Stable bottom substrates composed of gravel, cobble, boulders, bedrock ledges, and woody debris piles with low levels of siltation.

(iii) Primary Constituent Element 3—An instream flow regime (magnitude, frequency, duration, and seasonality of discharge over time) sufficient to provide

permanent surface flows, as measured during years with average rainfall, and to maintain benthic habitats utilized by the species.

(iv) Primary Constituent Element 4—Adequate water quality characterized by seasonally moderate stream temperatures (generally $\leq 24^{\circ}\text{C}$ or 75°F), high dissolved oxygen concentrations (generally $\geq 6.0\text{ mg/L}$), moderate pH (generally 6.0 to 8.5), low stream conductivity (species' abundance decreases sharply as conductivities exceed $261\text{ }\mu\text{S/cm}$ and species is typically absent above $350\text{ }\mu\text{S/cm}$), and low levels of pollutants. Adequate water quality is the quality necessary for normal behavior, growth, and viability of all life stages of the Kentucky arrow darter.

(v) Primary Constituent Element 5—A prey base of aquatic macroinvertebrates, including mayfly nymphs, midge larvae, blackfly larvae, caddisfly larvae, stonefly nymphs, and small crayfishes.

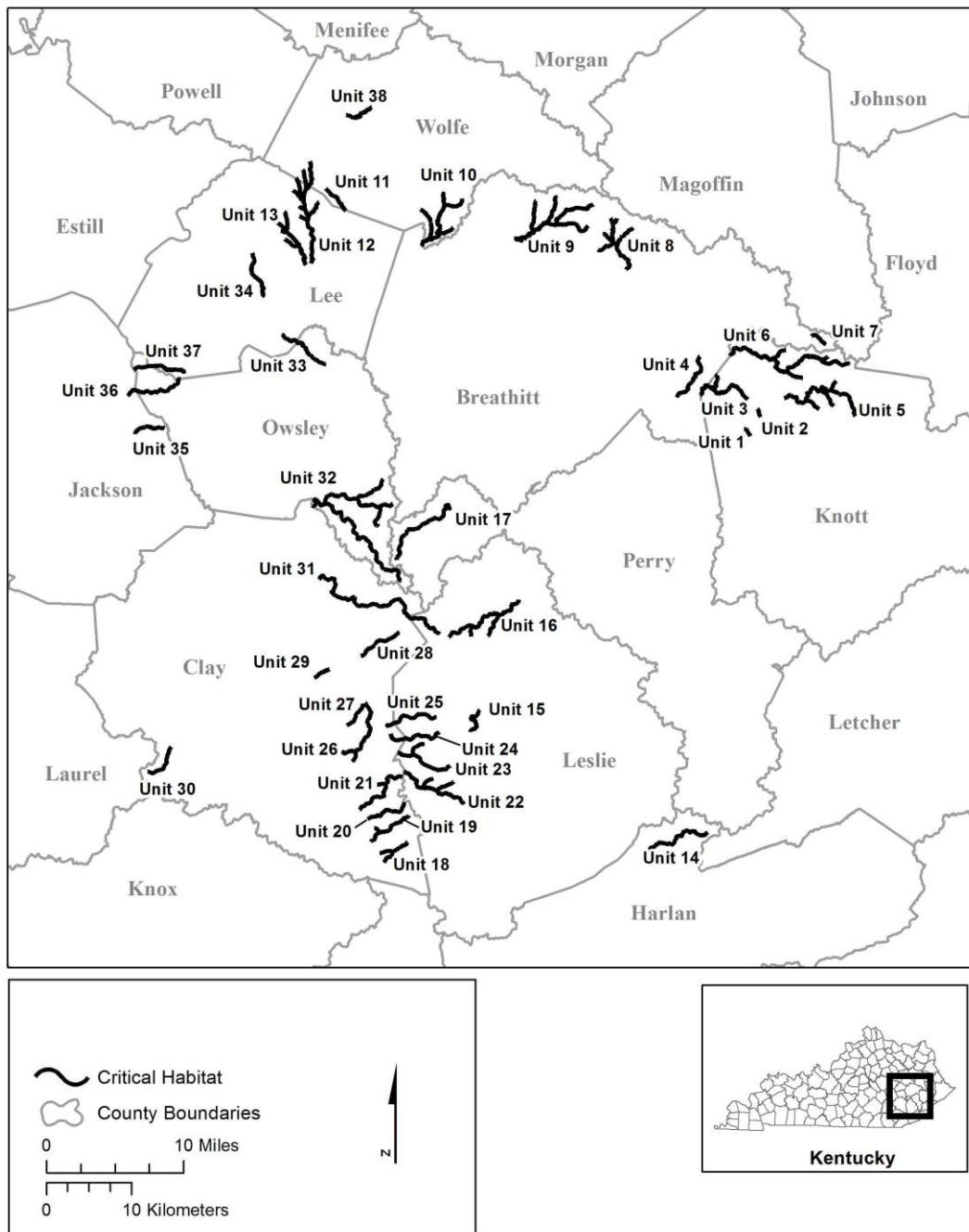
(3) Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on [**INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER**].

(4) *Critical habitat map units.* Data layers defining map units were created on a base of U.S. Geological Survey (USGS) National Hydrography Dataset (NHD+) GIS data. The 1:100,000 river reach (route) files were used to calculate river kilometers and miles. ESRI's ArcGIS 10.0 software was used to determine longitude and latitude coordinates using decimal degrees. The projection used in mapping all units was USA Contiguous Albers Equal Area Conic USGS version, NAD 83, meters. The following data sources were referenced to identify features (like roads and streams) used to

delineate the upstream and downstream extents of critical habitat units: NHD+ flowline and waterbody data, 2011 Navteq roads data, USA Topo ESRI online basemap service, DeLorme Atlas and Gazetteers, and USGS 7.5 minute topographic maps. 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://fws.gov/frankfort/>), at <http://www.regulations.gov> at Docket No. FWS-R4-ES-2015-0133, 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 follows:

Index Map: Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)



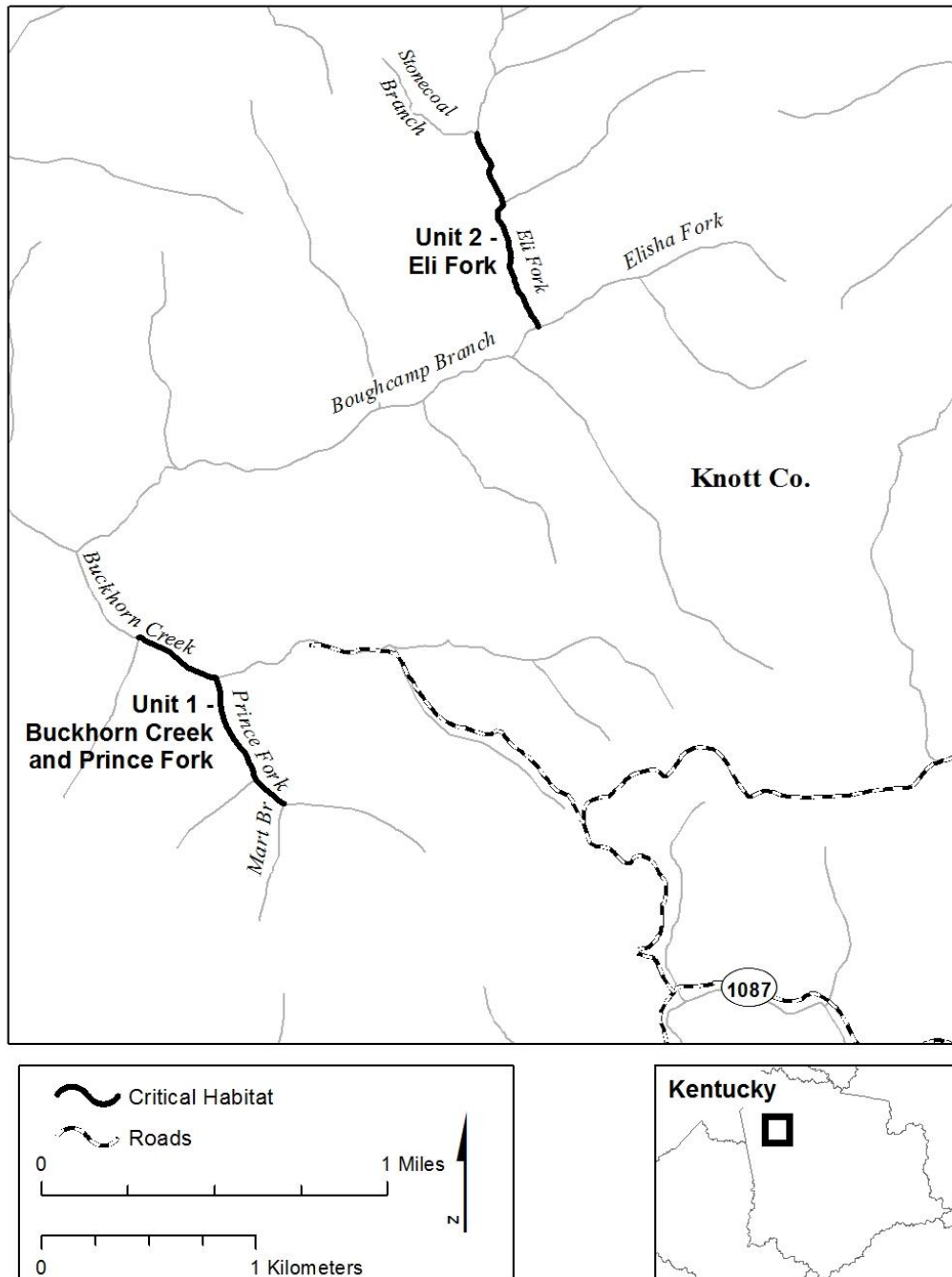
(6) Unit 1: Buckhorn Creek and Prince Fork, and Unit 2: Eli Fork, Knott County, Kentucky.

(i) Unit 1 includes 0.7 skm (0.4 smi) of Prince Fork from Mart Branch (37.41291, -83.07000) downstream to its confluence with Buckhorn Creek (37.41825, -83.07341), and 0.4 skm (0.3 smi) of Buckhorn Creek from its headwaters at (37.41825, -83.07341) downstream to its confluence with Emory Branch (37.42006, -83.07738) in Knott County, Kentucky.

(ii) Unit 2 includes 1.0 skm (0.6 smi) of Eli Fork from its headwaters at (37.44078, -83.05884), downstream to its confluence with Boughcamp Branch (37.43259, -83.05591) in Knott County, Kentucky.

(iii) Map of Units 1 and 2 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 1 - Buckhorn Creek and Prince Fork: Knott County, Kentucky
Unit 2 - Eli Fork: Knott County, Kentucky

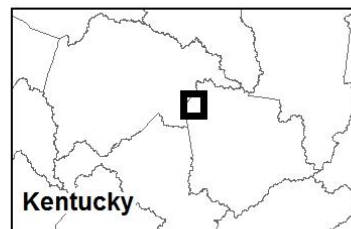
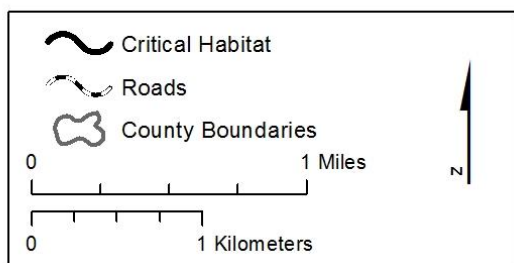
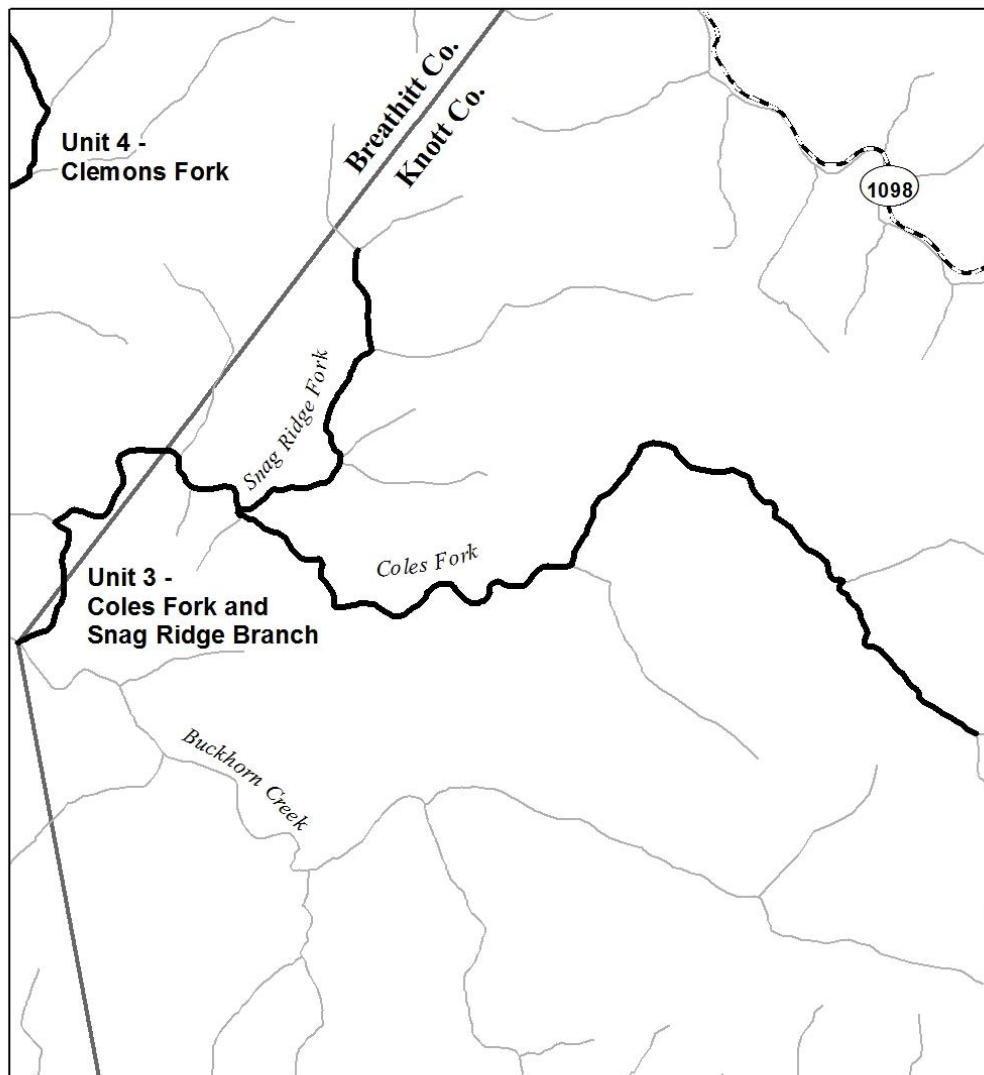


(7) Unit 3: Coles Fork and Snag Ridge Fork, Breathitt and Knott Counties, Kentucky.

(i) Unit 3 includes 2.1 skm (1.3 smi) of Snag Ridge Fork from its headwaters at (37.47746, -83.11139), downstream to its confluence with Coles Fork (37.46391, -83.13468) in Knott County; and 8.9 skm (5.5 smi) of Coles Fork from its headwaters at (37.45096, -83.07124), downstream to its confluence with Buckhorn Creek (37.45720, -83.13468) in Knott County, Kentucky.

(ii) Map of Unit 3 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 3 - Coles Fork and Snag Ridge Branch: Knott and Breathitt Counties,
Kentucky

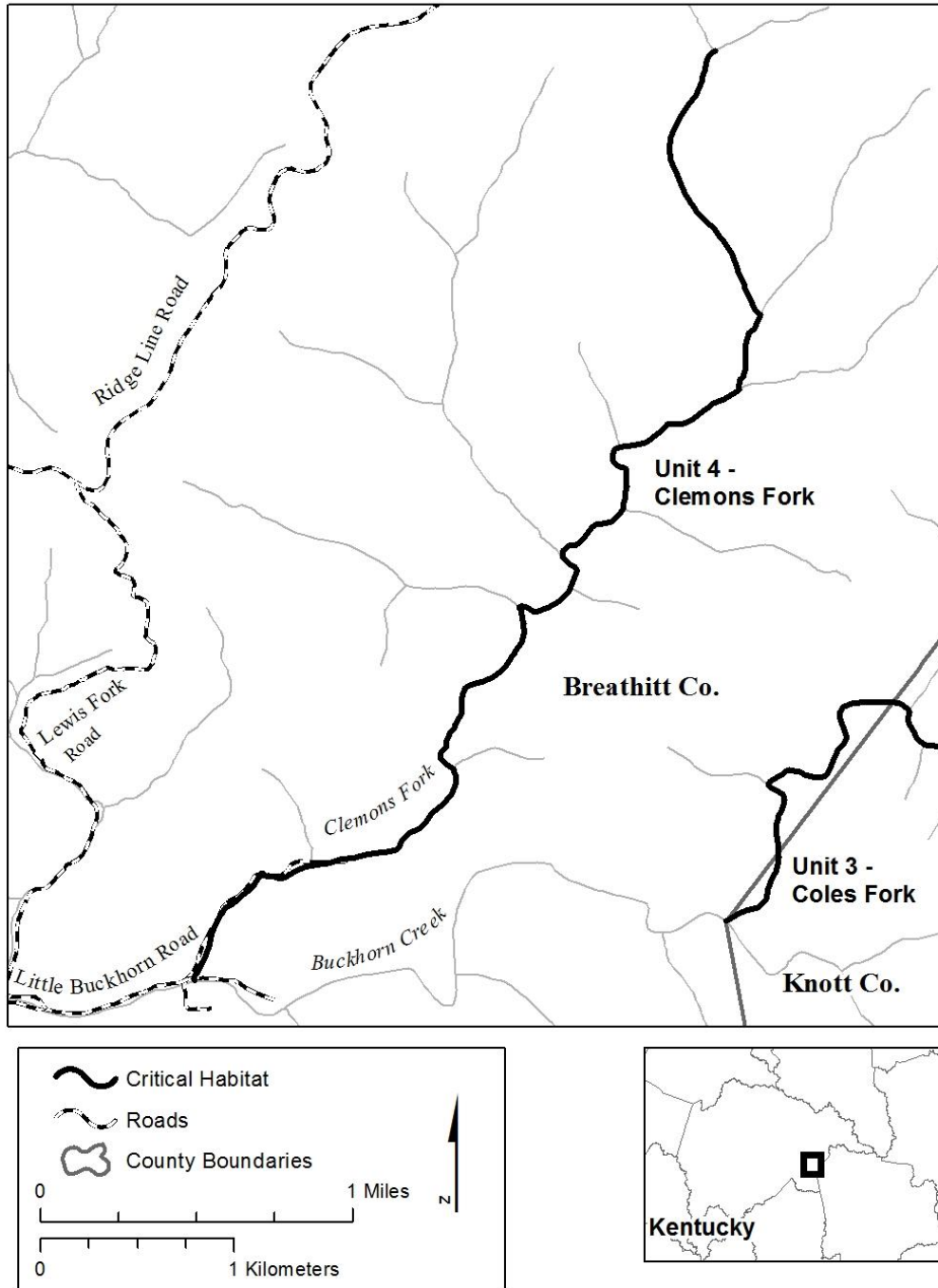


(8) Unit 4: Clemons Fork, Breathitt County, Kentucky.

(i) Unit 4 includes 7.0 skm (4.4 smi) of Clemons Fork from its headwaters at (37.49772, -83.13390), downstream to its confluence with Buckhorn Creek (37.45511, -83.16582) in Breathitt County, Kentucky.

(ii) Map of Unit 4 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 4 - Clemons Fork: Breathitt County, Kentucky

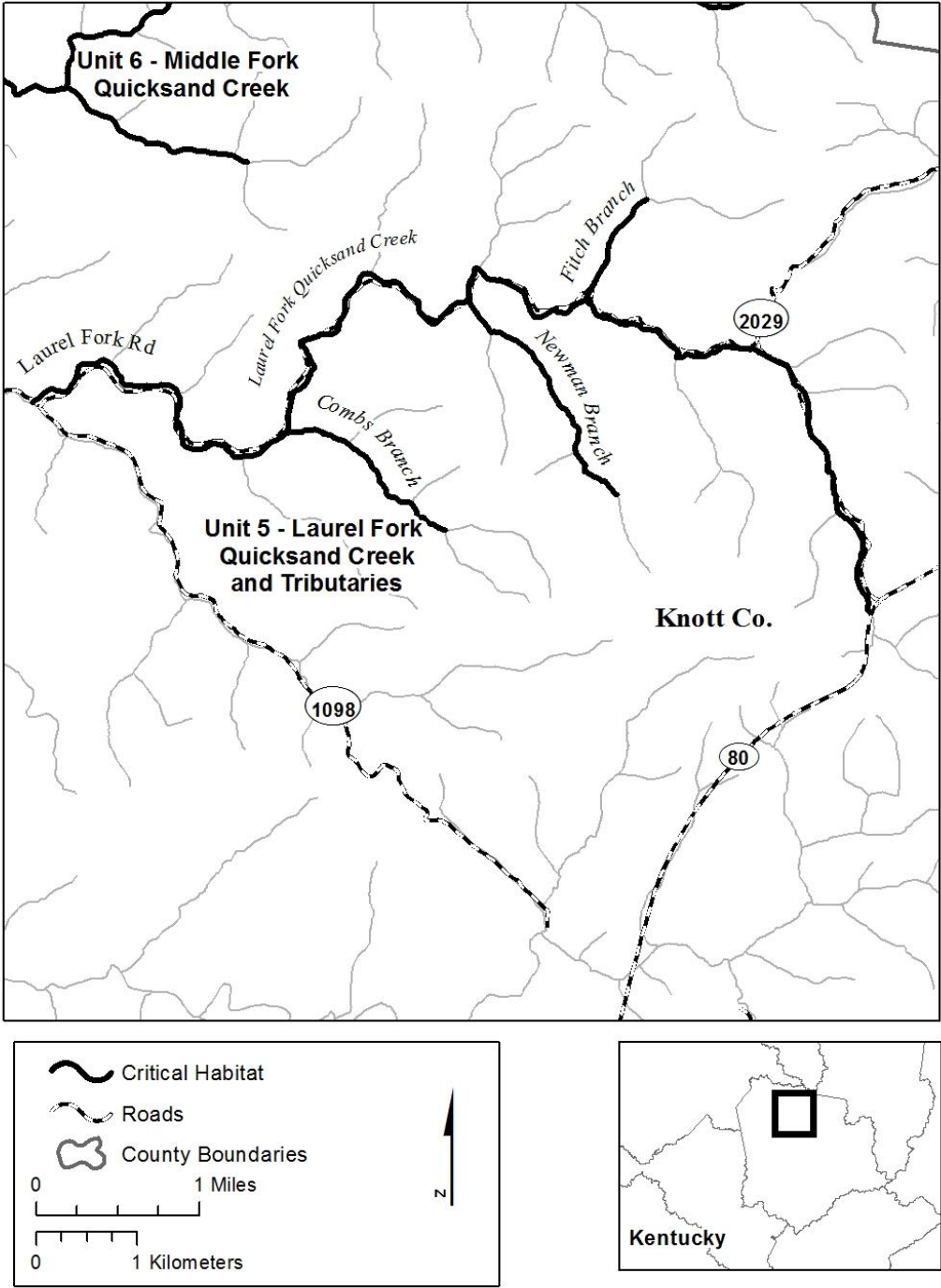


(9) Unit 5: Laurel Fork Quicksand Creek and Tributaries, Knott County, Kentucky.

(i) Unit 5 includes 1.2 skm (0.8 smi) of Fitch Branch from its headwaters at (37.46745, -82.95373), downstream to its confluence with Laurel Fork Quicksand Creek (37.45855, -82.96089); 2.7 skm (1.7 smi) of Newman Branch from its headwaters at (37.44120, -82.95810), downstream to its confluence with Laurel Fork Quicksand Creek (37.45893, -82.97417); 2.1 skm (1.3 smi) of Combs Branch from its headwaters at (37.43848, -82.97731), downstream to its confluence with Laurel Fork Quicksand Creek (37.44758, -82.99476); and 13.8 skm (8.6 smi) of Laurel Fork Quicksand Creek from its headwaters at (37.43001, -82.93016), downstream to its confluence with Quicksand Creek (37.45100, -83.02303) in Knott County, Kentucky.

(ii) Map of Unit 5 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 5 - Laurel Fork Quicksand Creek and Tributaries: Knott County,
Kentucky



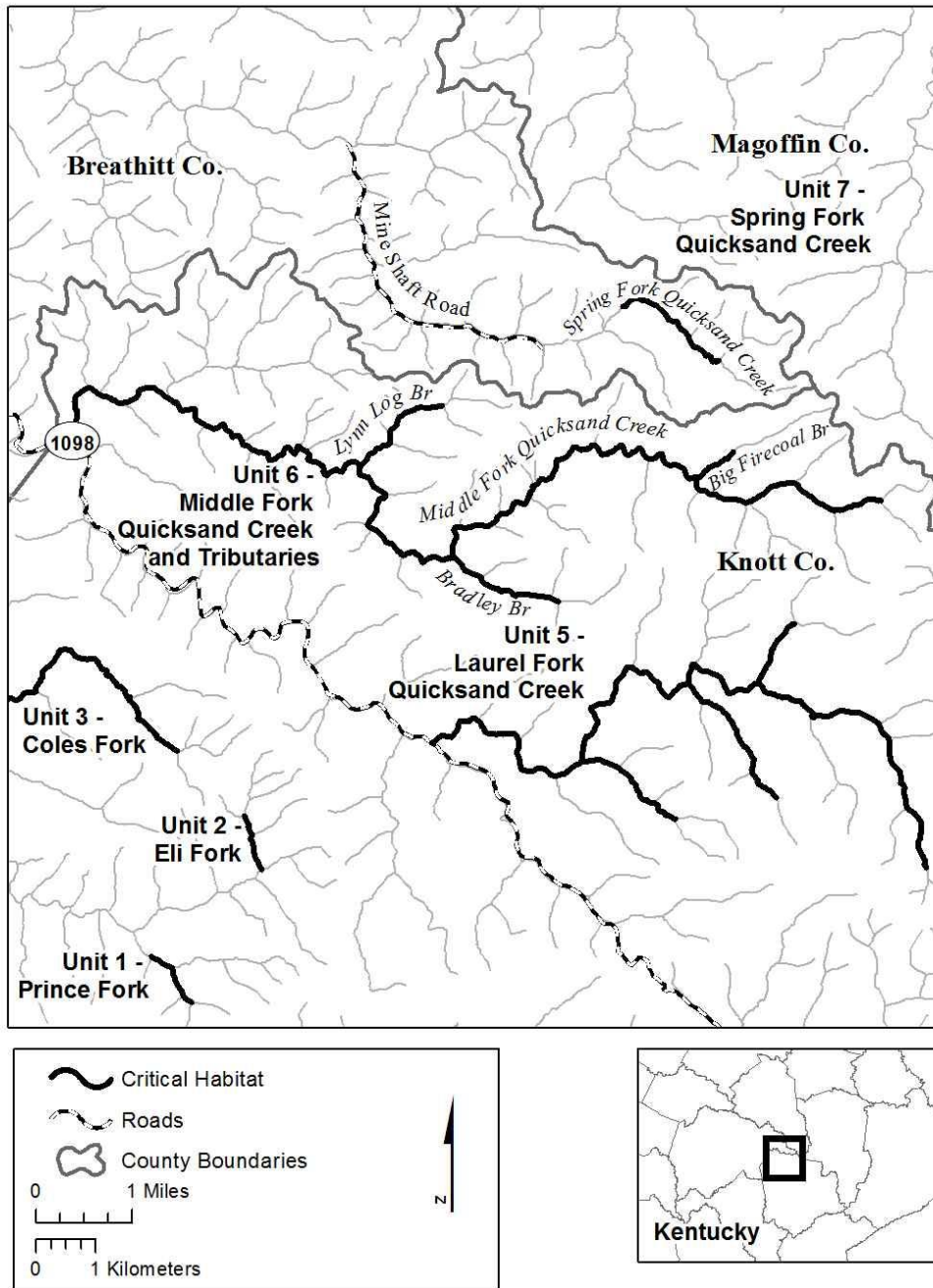
(10) Unit 6: Middle Fork Quicksand Creek and Tributaries, Knott County, and Unit 7: Spring Fork Quicksand Creek, Breathitt County, Kentucky.

(i) Unit 6 includes 0.8 skm (0.5 smi) of Big Firecoal Branch from its headwaters at (37.49363, -82.96426), downstream to its confluence with Middle Fork Quicksand Creek (37.48990, -82.97148); 2.1 skm (1.3 smi) of Bradley Branch from its headwaters at (37.47180, -82.99819), downstream to its confluence with Middle Fork Quicksand Creek (37.47899, -83.01823); 2.0 skm (1.2 smi) of Lynn Log Branch from its headwaters at (37.50190, -83.01921), downstream to its confluence with Middle Fork Quicksand Creek (37.49286, -83.03524); and 20.3 skm (12.6 smi) of Middle Fork Quicksand Creek from its headwaters at (37.48562, -82.93667), downstream to its confluence with Quicksand Creek (37.498281, -83.092946) in Knott County, Kentucky.

(ii) Unit 7 includes 2.2 skm (1.4 smi) of Spring Fork Quicksand Creek from its headwaters at (37.50746, -82.96647), downstream to its confluence with Laurel Fork (37.51597, -82.98436) in Breathitt County, Kentucky.

(iii) Map of Units 6 and 7 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 6 - Middle Fork Quicksand Creek and Tributaries: Knott County, Kentucky
Unit 7 - Spring Fork Quicksand Creek: Breathitt County, Kentucky

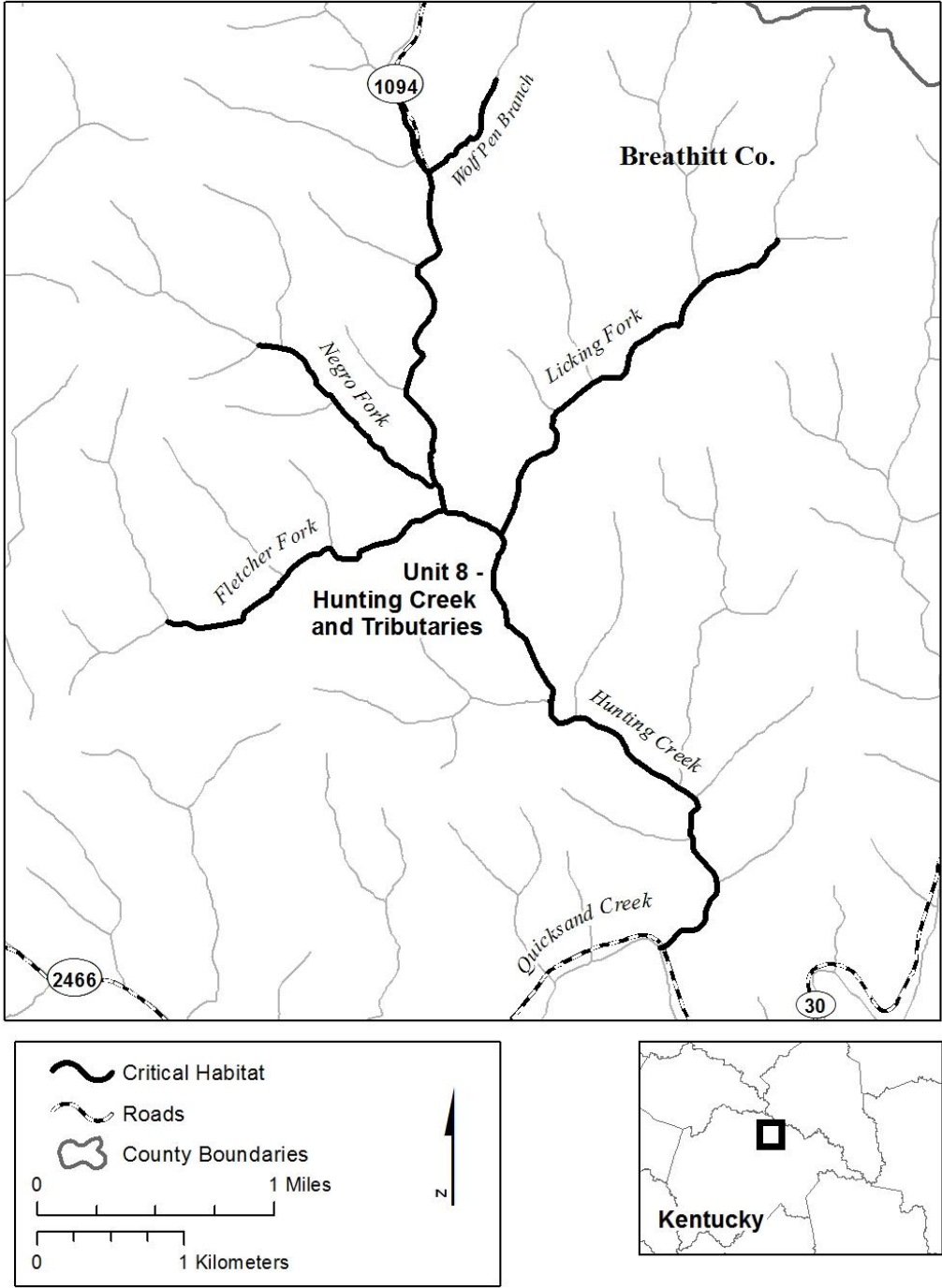


(11) Unit 8: Hunting Creek and Tributaries, Breathitt County, Kentucky.

(i) Unit 8 includes 0.9 skm (0.5 smi) of Wolf Pen Branch from its headwaters at (37.64580, -83.23885), downstream to its confluence with Hunting Creek (37.64023, -83.24424); 1.6 skm (1.0 smi) of Negro Fork from its headwaters at (37.62992, -83.25760), downstream to its confluence with Hunting Creek (37.62121, -83.24433); 2.3 skm (1.4 smi) of Fletcher Fork from its headwaters at (37.61315, -83.26521), downstream to its confluence with Hunting Creek (37.61956, -83.24370); 3.1 skm (1.9 smi) of Licking Fork from its headwaters at (37.63553, -83.21754, -83.21754), downstream to its confluence with Hunting Creek (37.61794, -83.23938); and 7.7 skm (4.8 smi) of Hunting Creek from its confluence with Wells Fork (37.64629, -83.24708), downstream to its confluence with Quicksand Creek (37.59235, -83.22803) in Breathitt County, Kentucky.

(ii) Map of Unit 8 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 8 - Hunting Creek and Tributaries: Breathitt County, Kentucky

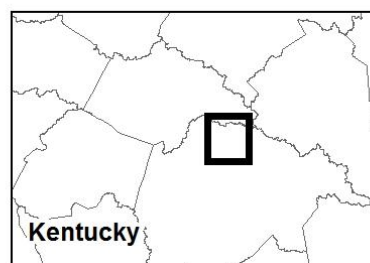
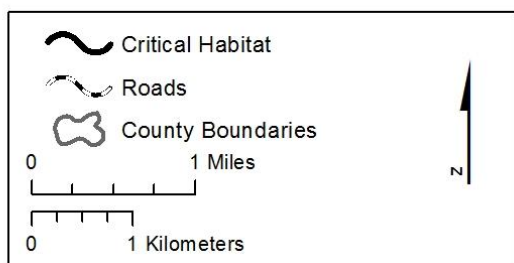
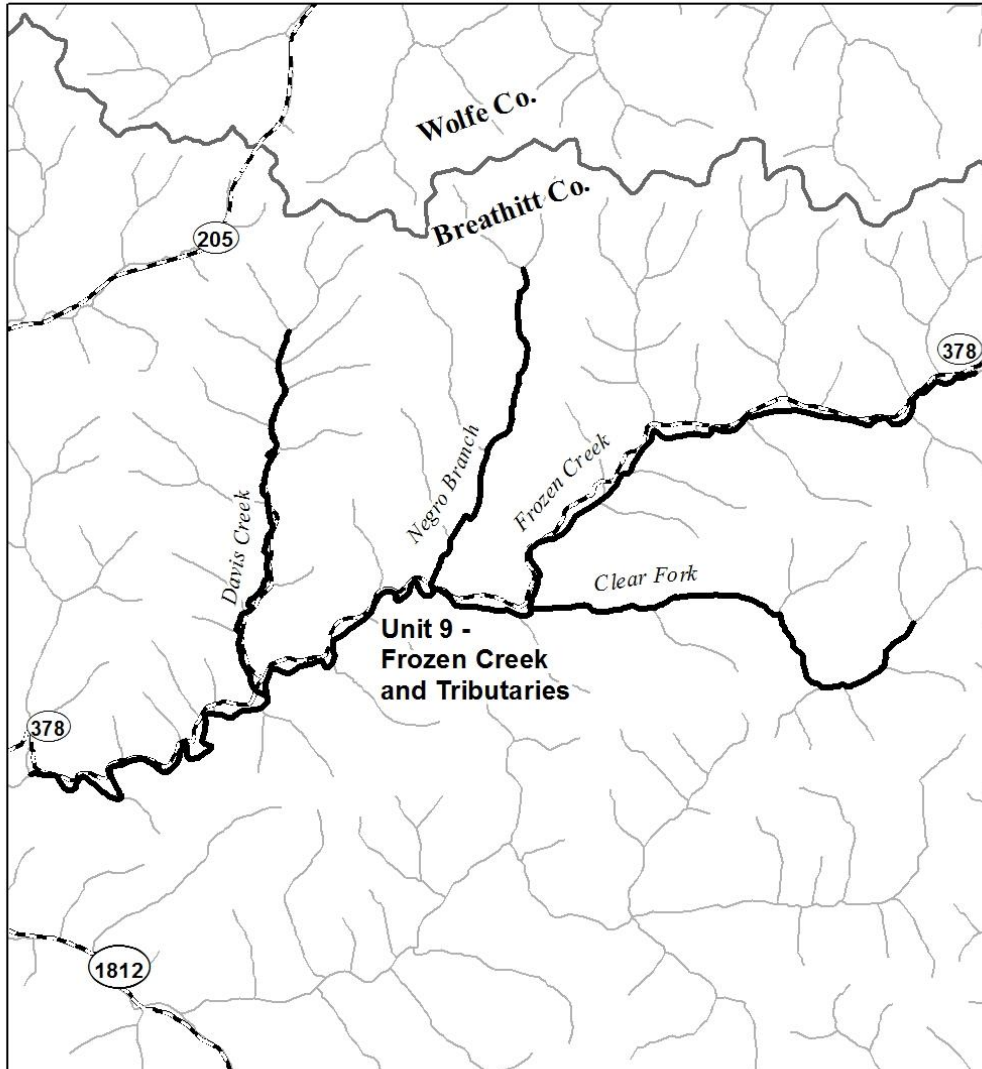


(12) Unit 9: Frozen Creek and Tributaries, Breathitt County, Kentucky.

(i) Unit 9 includes 4.7 skm (2.9 smi) of Clear Fork from its headwaters at (37.63899, -83.27706), downstream to its confluence with Frozen Creek (37.64109, -83.31969); 3.6 skm (2.3 smi) of Negro Branch from its headwaters at (37.67146, -83.31971), downstream to its confluence with Frozen Creek (37.64319, -83.33068); 4.2 skm (2.6 smi) of Davis Creek from its headwaters at (37.66644, -83.34599), downstream to its confluence with Frozen Creek (37.63402, -83.34953); and 13.9 skm (8.6 smi) of Frozen Creek from its headwaters at (37.66115, -83.26945), downstream to its confluence with Morgue Fork (37.62761, -83.37622) in Breathitt County, Kentucky.

(ii) Map of Unit 9 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 9 - Frozen Creek and Tributaries: Breathitt County, Kentucky

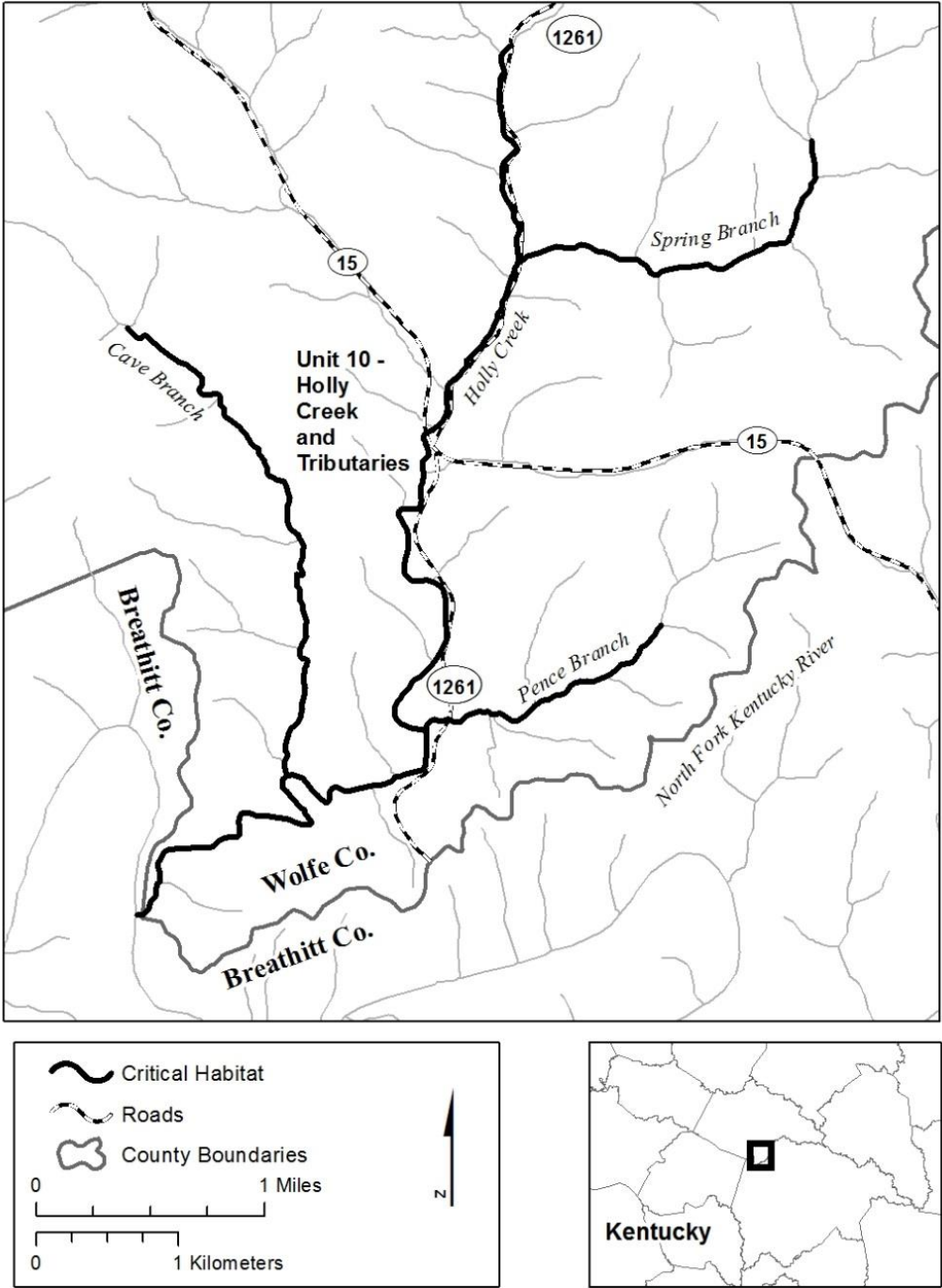


(13) Unit 10: Holly Creek and Tributaries, Wolfe County, Kentucky.

(i) Unit 10 includes 2.8 skm (1.8 smi) of Spring Branch from its headwaters at (37.67110, -83.44406), downstream to its confluence with Holly Creek (37.66384, -83.46780) in Wolfe County; 2.0 skm (1.3 smi) of Pence Branch from its headwaters at (37.64048, -83.45703), downstream to its confluence with Holly Creek (37.63413, -83.47608) in Wolfe County; 4.0 skm (2.5 mi) of Cave Branch from its headwaters at (37.66023, -83.49916), downstream to its confluence with Holly Creek (37.63149, -83.48725) in Wolfe County; 9.5 skm (5.9 smi) of Holly Creek from KY 1261 (37.67758, -83.46792) in Wolfe County, downstream to its confluence with the North Fork Kentucky River (37.62289, -83.49948) in Wolfe County, Kentucky.

(ii) Map of Unit 10 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 10 - Holly Creek and Tributaries: Wolfe County, Kentucky



(14) Unit 11: Little Fork, Lee and Wolfe Counties; Unit 12: Walker Creek and Tributaries, Lee and Wolfe Counties; and Unit 13: Hell Creek and Tributaries, Lee County, Kentucky.

(i) Unit 11 includes 3.8 skm (2.3 smi) of Little Fork from its headwaters at (37.68456, -83.62465) in Wolfe County, downstream to its confluence with Lower Devil Creek (37.66148, -83.59961) in Lee County, Kentucky.

(ii) Unit 12 includes 3.9 skm (2.4 smi) of an unnamed tributary of Walker Creek from its headwaters at (37.71373, -83.64553) in Wolfe County, downstream to its confluence with Walker Creek (37.68567, -83.65045) in Lee County; 2.4 skm (1.5 smi) of Cowan Fork from its headwaters at (37.69624, -83.66366) in Wolfe County, downstream to its confluence with Hell for Certain Creek (37.67718, -83.65931) in Lee County; 2.0 skm (1.2 smi) of Hell for Certain Creek from an unnamed reservoir at (37.68377, -83.66804), downstream to its confluence with Walker Creek (37.67340, -83.65449) in Lee County; 0.8 skm (0.5 smi) of Boonesboro Fork from its headwaters at (37.66706, -83.66053), downstream to its confluence with Walker Creek (37.66377, -83.65408) in Lee County; 2.2 skm (1.4 smi) of Peddler Creek from its headwaters at (37.67054, -83.63456), downstream to its confluence with Walker Creek (37.65696, -83.64879) in Lee County; 1.1 skm (0.7 smi) of Huff Cave Branch from its headwaters at (37.65664, -83.66033), downstream to its confluence with Walker Creek (37.65138, -83.65034) in Lee County; and 12.6 skm (7.8 smi) of Walker Creek from an unnamed reservoir (37.70502, -83.65490) in Wolfe County, downstream to its confluence with North Fork Kentucky River (37.60678, -83.64652) in Lee County, Kentucky.

(iii) Unit 13 includes 2.3 skm (1.4 smi) of Miller Fork from its headwaters at

(37.66074, -83.68005), downstream to its confluence with Hell Creek (37.64261, -83.67912); 0.7 skm (0.4 smi) of Bowman Fork from its headwaters at (37.64142, -83.68594), downstream to its confluence with Hell Creek (37.64070, -83.67848); 1.9 skm (1.2 smi) of an unnamed tributary of Hell Creek from its headwaters at (37.63199, -83.83.68064), downstream to its confluence with Hell Creek (37.62516, -83.66246); and 7.1 skm (4.4 smi) of Hell Creek from an unnamed reservoir (37.64941, -83.68907), downstream to its confluence with North Fork Kentucky River (37.60480, -83.65440) in Lee County, Kentucky.

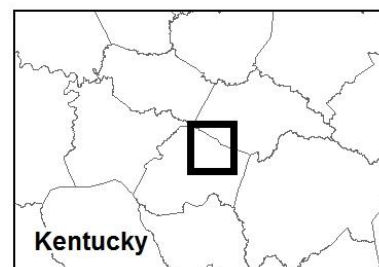
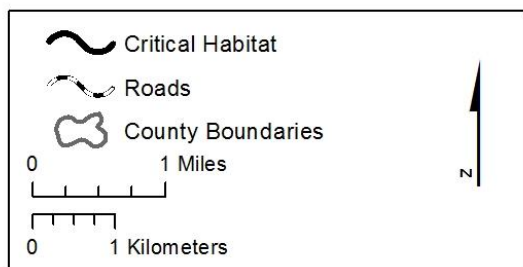
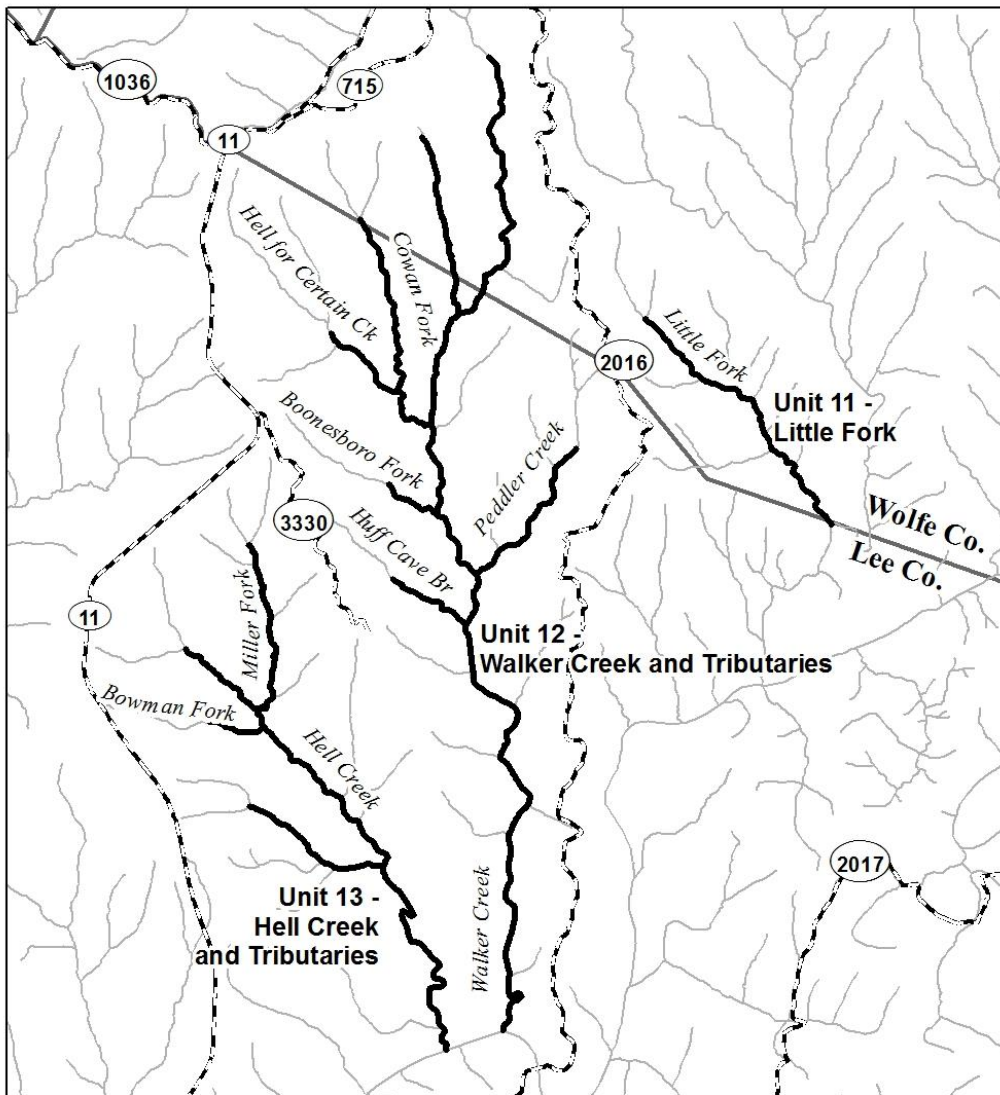
(iv) Map of Units 11, 12, and 13 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)

Unit 11 - Little Fork: Lee and Wolfe Counties, Kentucky

Unit 12 - Walker Creek and Tributaries: Wolfe and Lee Counties, Kentucky

Unit 13 - Hell Creek and Tributaries: Lee County, Kentucky

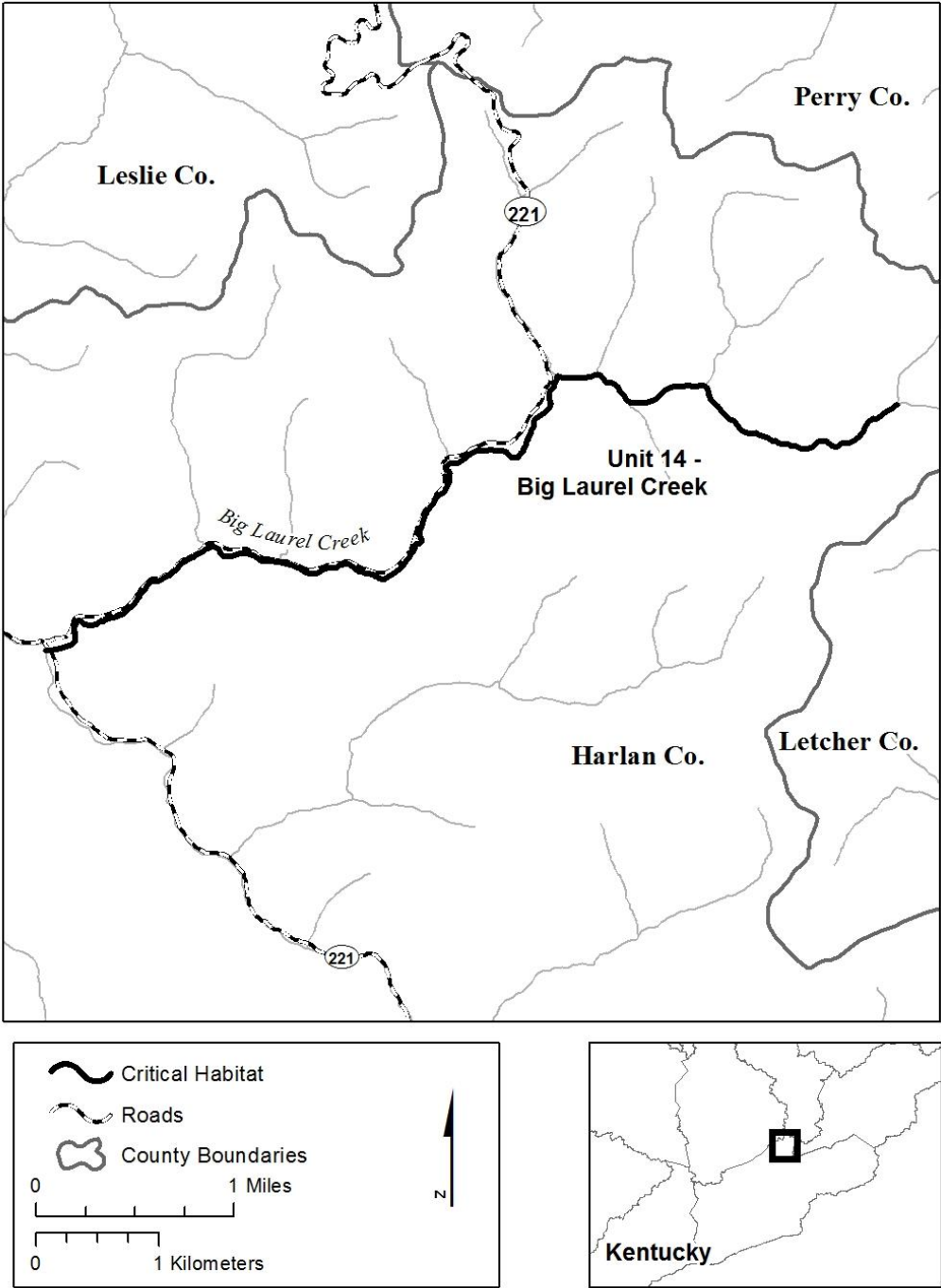


(15) Unit 14: Big Laurel Creek, Harlan County, Kentucky.

(i) Unit 14 includes 9.1 skm (5.7 smi) of Big Laurel Creek from its confluence with Combs Fork (36.99520, -83.14086), downstream to its confluence with Greasy Creek (36.97893, -83.21907) in Harlan County, Kentucky.

(ii) Map of Unit 14 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 14 - Big Laurel Creek: Harlan County, Kentucky

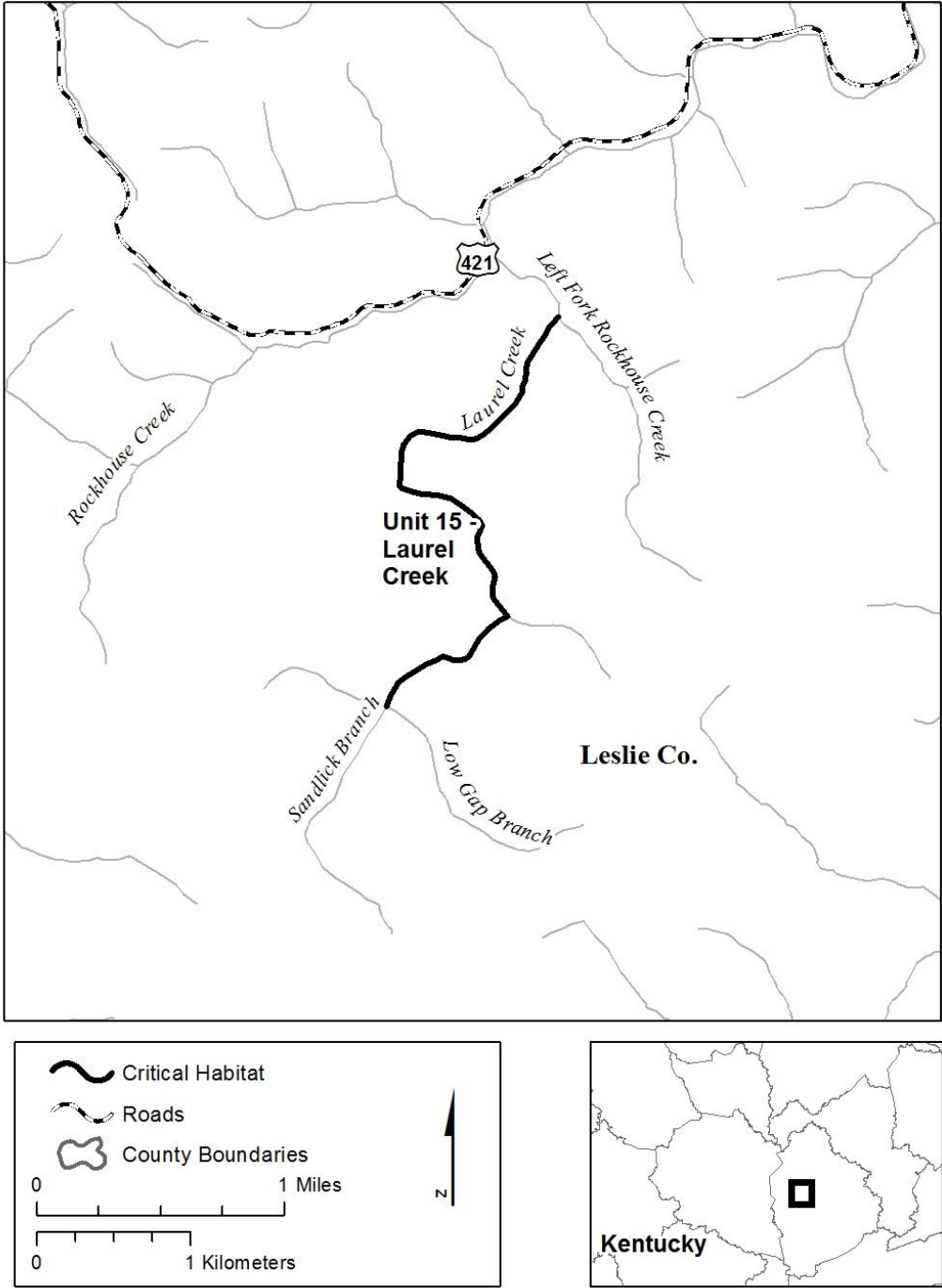


(16) Unit 15: Laurel Creek, Leslie County, Kentucky.

(i) Unit 15 includes 4.1 skm (2.6 smi) of Laurel Creek from its confluence with Sandlick Branch (37.10825, -83.45036), downstream to its confluence with Left Fork Rockhouse Creek (37.13085, -83.43699) in Leslie County, Kentucky.

(ii) Map of Unit 15 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 15 - Laurel Creek: Leslie County, Kentucky

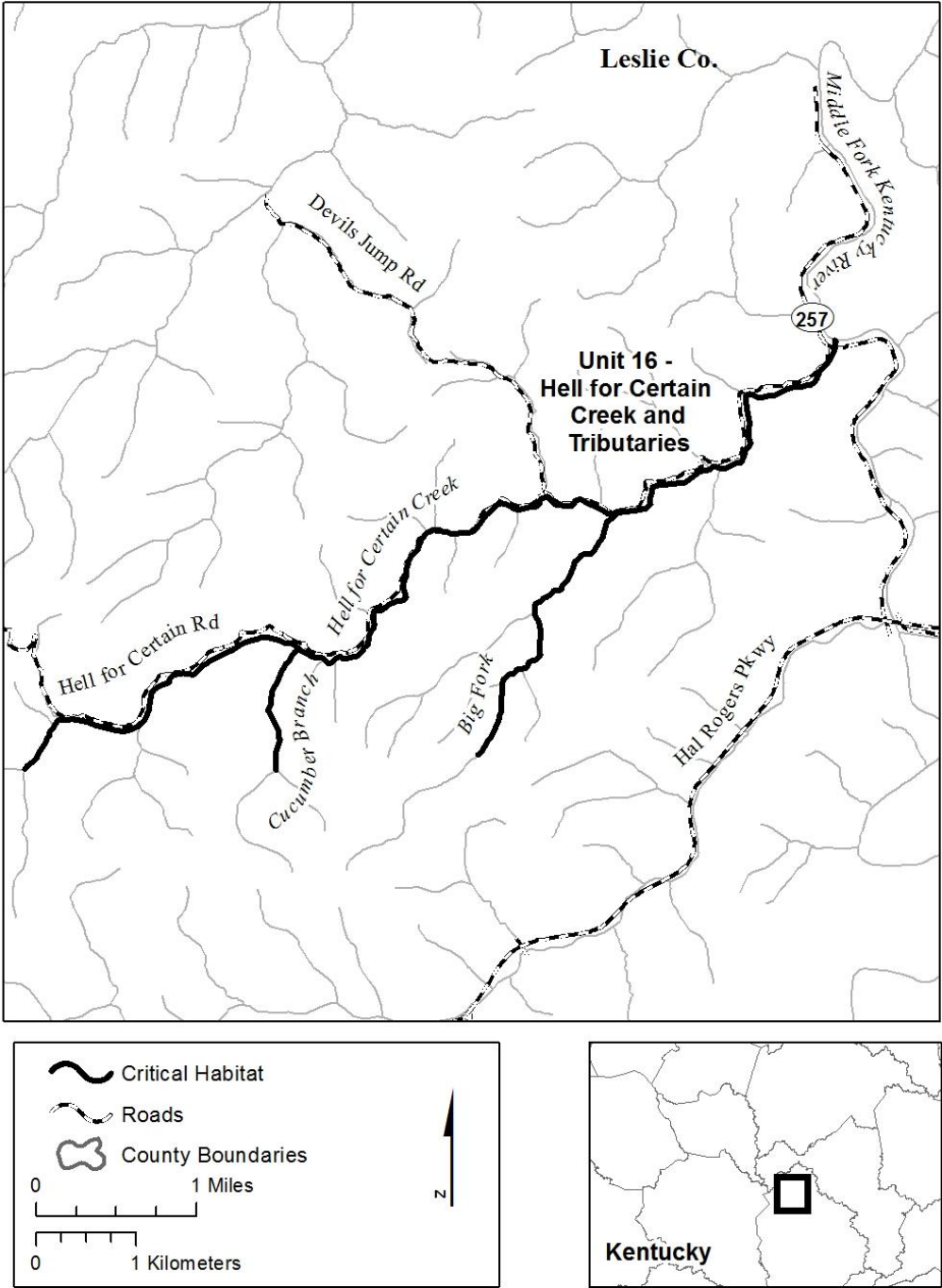


(17) Unit 16: Hell For Certain Creek and Tributaries, Leslie County, Kentucky.

(i) Unit 16 includes 1.3 skm (0.8 smi) of Cucumber Branch from its headwaters at (37.20839, -83.44644), downstream to its confluence with Hell For Certain Creek (37.21929, -83.44355); 3.1 skm (1.9 smi) of Big Fork from its headwaters at (37.20930, -83.42356), downstream to its confluence with Hell For Certain Creek (37.23082, -83.40720); and 11.4 skm (7.1 smi) of Hell For Certain Creek from its headwaters at (37.20904, -83.47489), downstream to its confluence with the Middle Fork Kentucky River (37.24611, -83.38192) in Leslie County, Kentucky.

(ii) Map of Unit 16 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 16 - Hell for Certain Creek and Tributaries: Leslie County, Kentucky

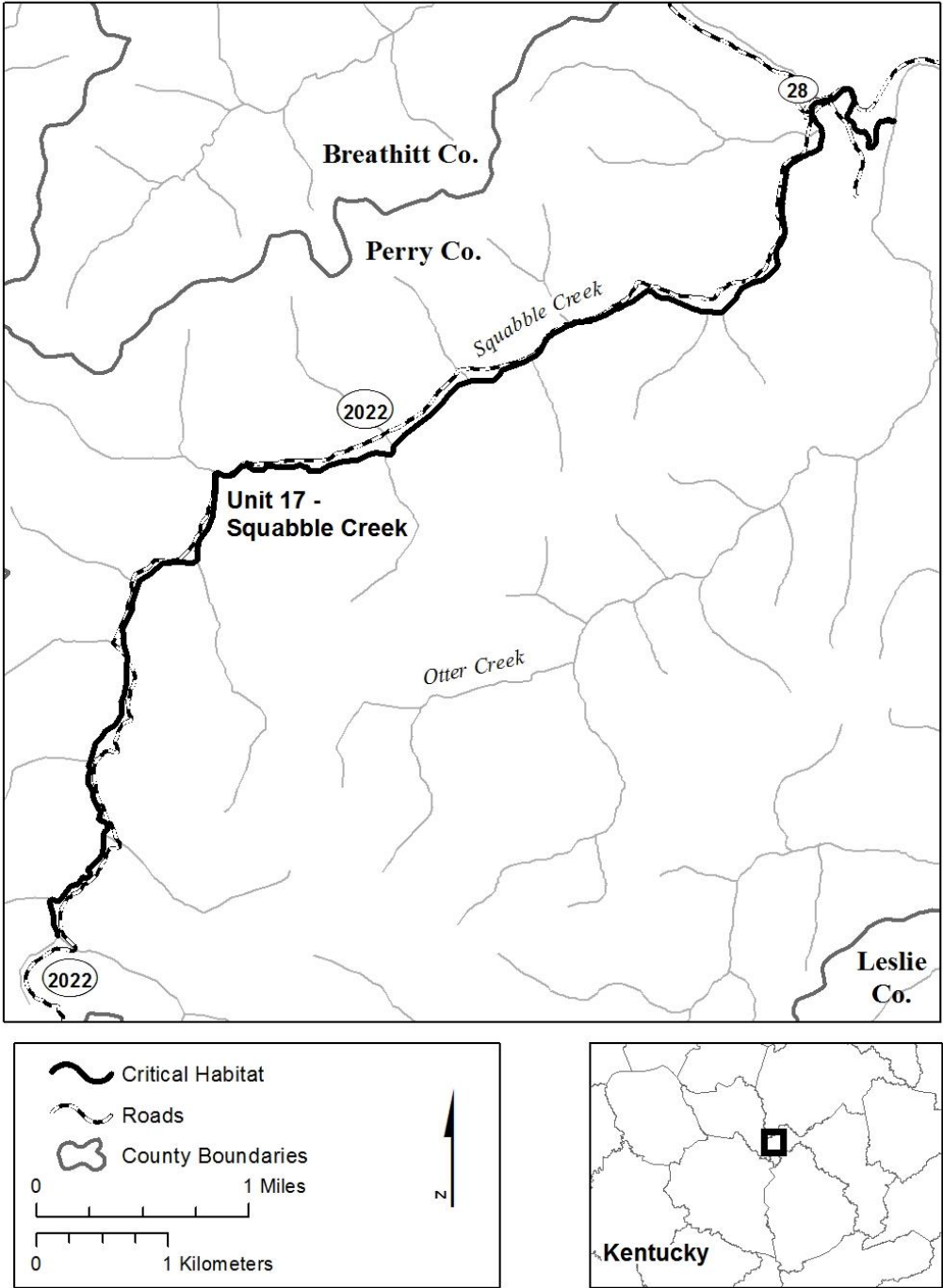


(18) Unit 17: Squabble Creek, Perry County, Kentucky.

(i) Unit 17 includes 12.0 skm (7.5 smi) of Squabble Creek from its confluence with Long Fork (37.29162, -83.54202), downstream to its confluence with the Middle Fork Kentucky River (37.34597, -83.46883) in Perry County, Kentucky.

(ii) Map of Unit 17 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 17 - Squabble Creek: Perry County, Kentucky



(19) Unit 18: Blue Hole Creek and Left Fork Blue Hole Creek, Unit 19: Upper Bear Creek and Tributaries, Unit 20: Katies Creek, and Unit 21: Spring Creek and Little Spring Creek, Clay County; and Unit 22: Bowen Creek and Tributaries, Leslie County, Kentucky.

(i) Unit 18 includes 1.8 skm (1.1 smi) of Left Fork from its headwaters at (36.97278, -83.56898), downstream to its confluence with Blue Hole Creek (36.98297, -83.55687); and 3.9 skm (2.4 smi) of Blue Hole Creek from its headwaters at (36.98254, -83.57376), downstream to its confluence with the Red Bird River (36.99288, -83.53672) in Clay County, Kentucky.

(ii) Unit 19 includes 1.5 skm (1.0 smi) of Left Fork Upper Bear Creek from its headwaters at (36.99519, -83.58446), downstream to its confluence with Upper Bear Creek (37.00448, -83.57354); 0.8 skm (0.5 smi) of Right Fork Upper Bear Creek from its headwaters at (37.00858, -83.58013), downstream to its confluence with Upper Bear Creek (37.00448, -83.57354); and 4.5 skm (2.8 smi) of Upper Bear Creek from its confluence with Left Fork and Right Fork Upper Bear Creek (37.02109, -83.53423), downstream to its confluence with the Red Bird River (37.00448, -83.57354) in Clay County, Kentucky.

(iii) Unit 20 includes 5.7 skm (3.5 smi) of Katies Creek from its confluence with Cave Branch (37.01837, -83.58848), downstream to its confluence with the Red Bird River (37.03527, -83.53999) in Clay County, Kentucky.

(iv) Unit 21 includes 1.0 skm (0.6 smi) of Little Spring Creek from its headwaters at (37.05452, -83.57483), downstream to its confluence with Spring Creek (37.05555, -83.56339); and 8.2 skm (5.1 smi) of Spring Creek from its headwaters at

(37.02874, -83.59815), downstream to its confluence with the Red Bird River (37.06189, -83.54134) in Clay County, Kentucky.

(v) Unit 22 includes 2.2 skm (1.4 smi) of Laurel Fork from its headwaters at (37.05536, -83.47452), downstream to its confluence with Bowen Creek (37.04702, -83.49641); 1.8 skm (1.1 smi) of Amy Branch from its headwaters at (37.05979, -83.50083), downstream to its confluence with Bowen Creek (37.05031, -83.51498); and 9.6 skm (6.0 smi) of Bowen Creek from its headwaters at (37.03183, -83.46124), downstream to its confluence with the Red Bird River (37.06777, -83.53840) in Leslie County, Kentucky.

(vi) Map of Units 18, 19, 20, 21, and 22 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)

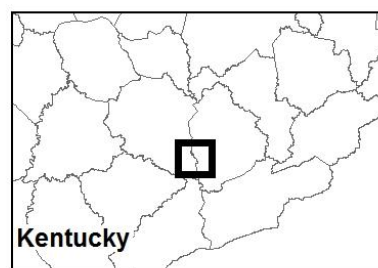
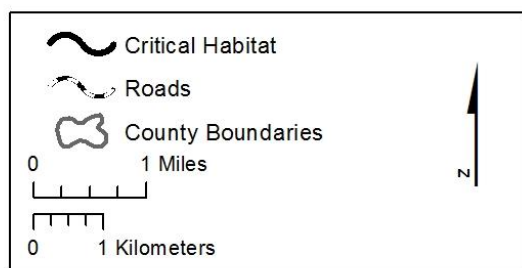
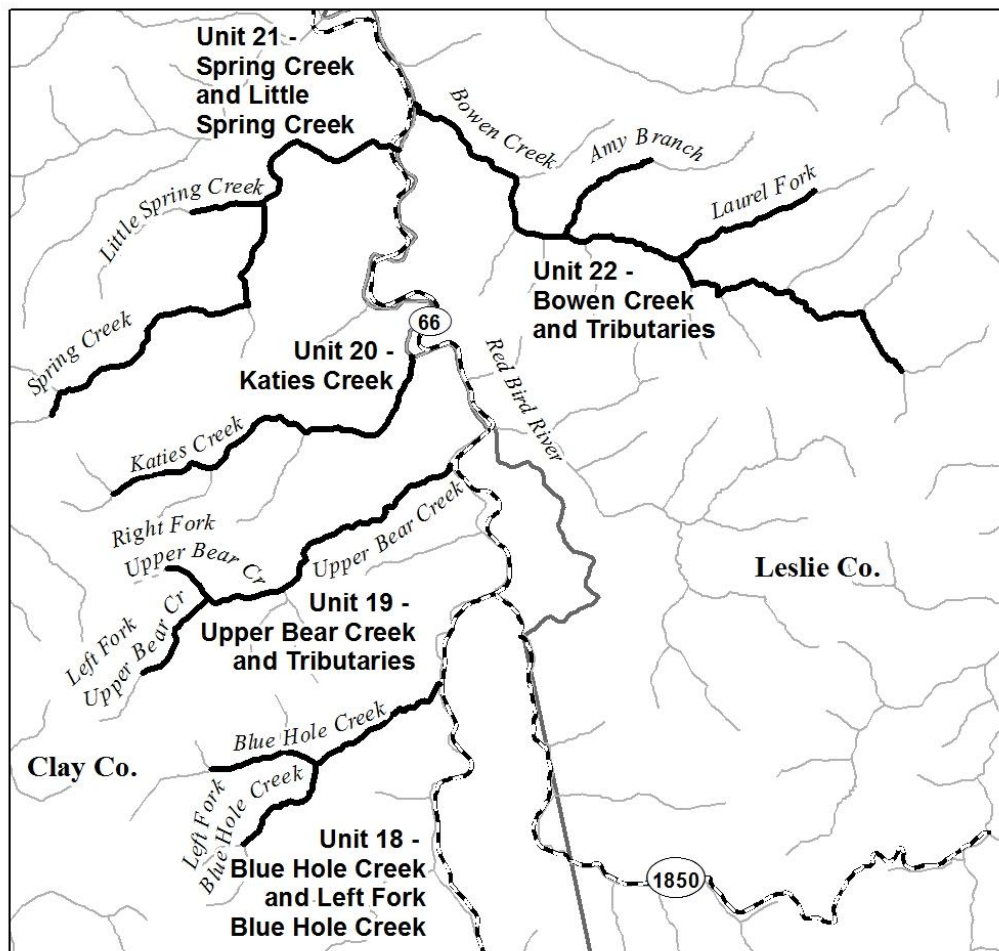
Unit 18 - Blue Hole Creek and Left Fork Blue Hole Creek: Clay County, Kentucky

Unit 19 - Upper Bear Creek and Tributaries: Clay County, Kentucky

Unit 20 - Katies Creek: Clay County, Kentucky

Unit 21 - Spring Creek and Little Spring Creek: Clay County, Kentucky

Unit 22 - Bowen Creek and Tributaries: Leslie County, Kentucky



(20) Unit 23: Elisha Creek and Tributaries, Leslie County; and Unit 24: Gilberts Big Creek, and Unit 25: Sugar Creek, Clay and Leslie Counties, Kentucky.

(i) Unit 23 includes 4.4 skm (2.7 smi) of Right Fork Elisha Creek from its headwaters at (37.07255, -83.47839), downstream to its confluence with Elisha Creek (37.08165, -83.51802); 2.3 skm (1.4 smi) of Left Fork Elisha Creek from its headwaters at (37.09632, -83.51108), downstream to its confluence with Elisha Creek (37.08528, -83.52645); and 2.9 skm (1.8 smi) of Elisha Creek from its confluence with Right Fork Elisha Creek (37.08165, -83.51802), downstream to its confluence with the Red Bird River (37.08794, -83.54676) in Leslie County, Kentucky.

(ii) Unit 24 includes 7.2 skm (4.5 smi) of Gilberts Big Creek from its headwaters at (37.10825, -83.49164) in Leslie County, downstream to its confluence with the Red Bird River (37.10784, -83.55590) in Clay County, Kentucky.

(iii) Unit 25 includes 7.2 skm (4.5 smi) of Sugar Creek from its headwaters at (37.12446, -83.49420) in Leslie County, downstream to its confluence with the Red Bird River (37.11804, -83.55952) in Clay County, Kentucky.

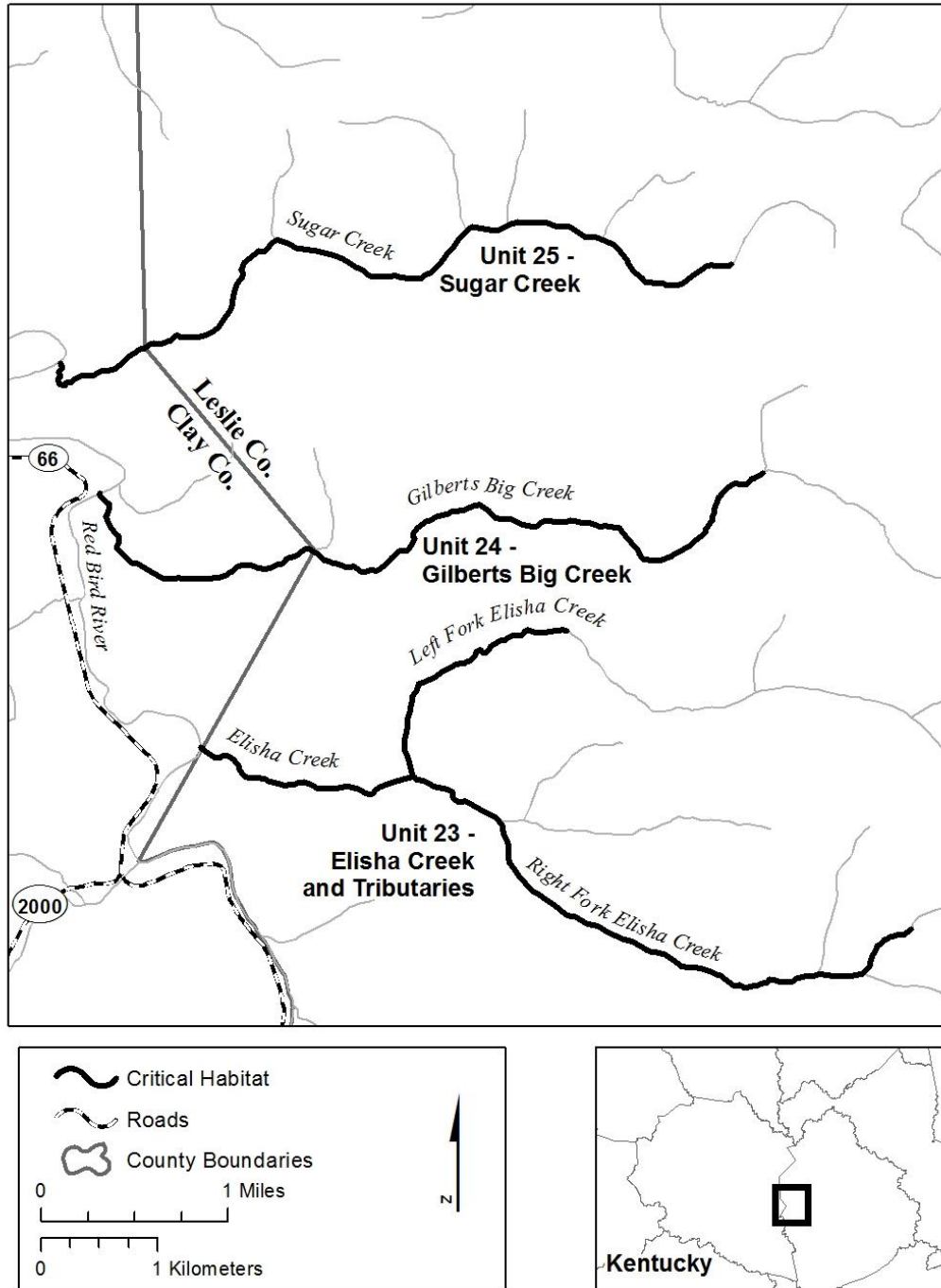
(iv) Map of Units 23, 24, and 25 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)

Unit 23 - Elisha Creek and Tributaries: Leslie County, Kentucky

Unit 24 - Gilberts Big Creek: Clay and Leslie Counties, Kentucky

Unit 25 - Sugar Creek: Clay and Leslie Counties, Kentucky



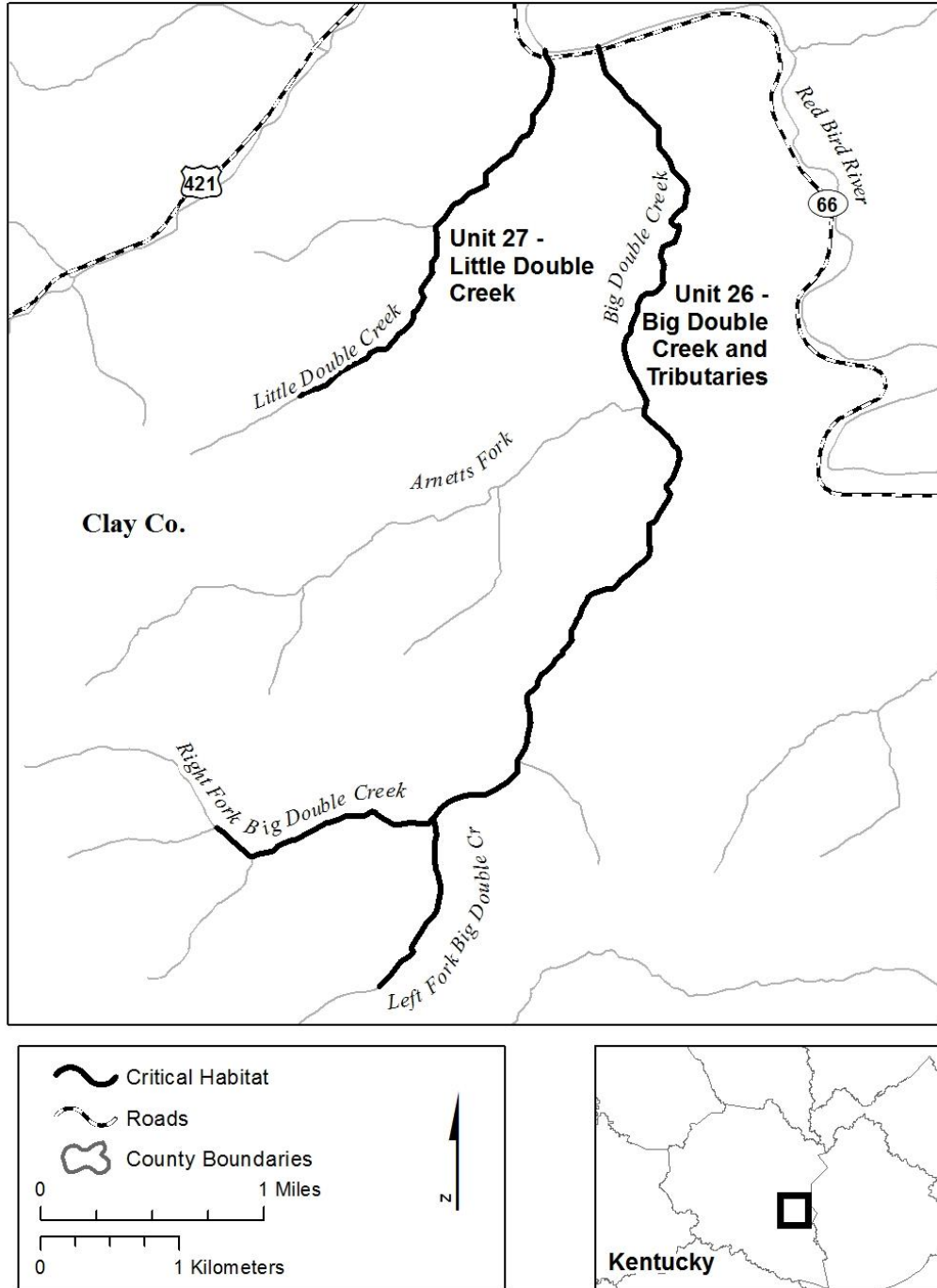
(21) Unit 26: Big Double Creek and Tributaries, and Unit 27: Little Double Creek, Clay County, Kentucky.

(i) Unit 26 includes 1.4 skm (0.9 smi) of Left Fork Big Double Creek from its headwaters at (37.07967, -83.60719), downstream to its confluence with Big Double Creek (37.09053, -83.60245); 1.8 skm (1.1 smi) of Right Fork Big Double Creek from its headwaters at (37.09021, -83.62010), downstream to its confluence with Big Double Creek (37.09053, -83.60245); and 7.1 skm (4.4 smi) of Big Double Creek from its confluence with the Left and Right Forks (37.09053, -83.60245), downstream to its confluence with the Red Bird River (37.14045, -83.58768) in Clay County, Kentucky.

(ii) Unit 27 includes 3.4 skm (2.1 smi) of Little Double Creek from its headwaters at (37.11816, -83.61251), downstream to its confluence with the Red Bird River (37.14025, -83.59197) in Clay County, Kentucky.

(iii) Map of Units 26 and 27 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 26 - Big Double Creek and Tributaries: Clay County, Kentucky
Unit 27 - Little Double Creek: Clay County, Kentucky



(22) Unit 28: Jacks Creek, and Unit 29: Long Fork, Clay County, Kentucky.

(i) Unit 28 includes 5.9 skm (3.7 smi) of Jacks Creek from its headwaters at (37.21472, -83.54108), downstream to its confluence with the Red Bird River (37.19113, -83.59185) in Clay County, Kentucky.

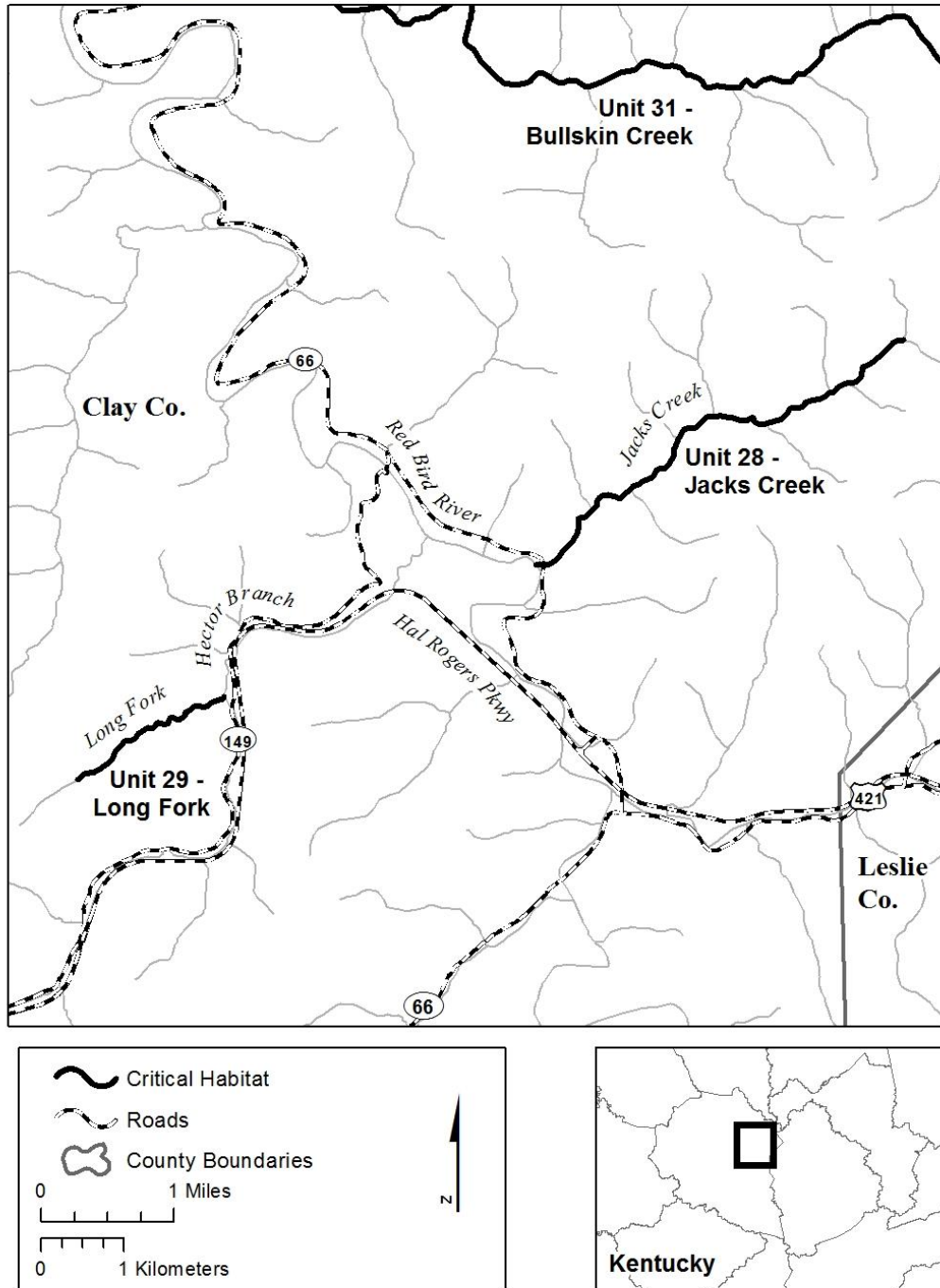
(ii) Unit 29 includes 2.2 skm (1.4 smi) of Long Fork from its headwaters at (37.16889, -83.65490), downstream to its confluence with Hector Branch (37.17752, -83.63464) in Clay County, Kentucky.

(iii) Map of Units 28 and 29 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)

Unit 28 - Jacks Creek: Clay County, Kentucky

Unit 29 - Long Fork: Clay County, Kentucky

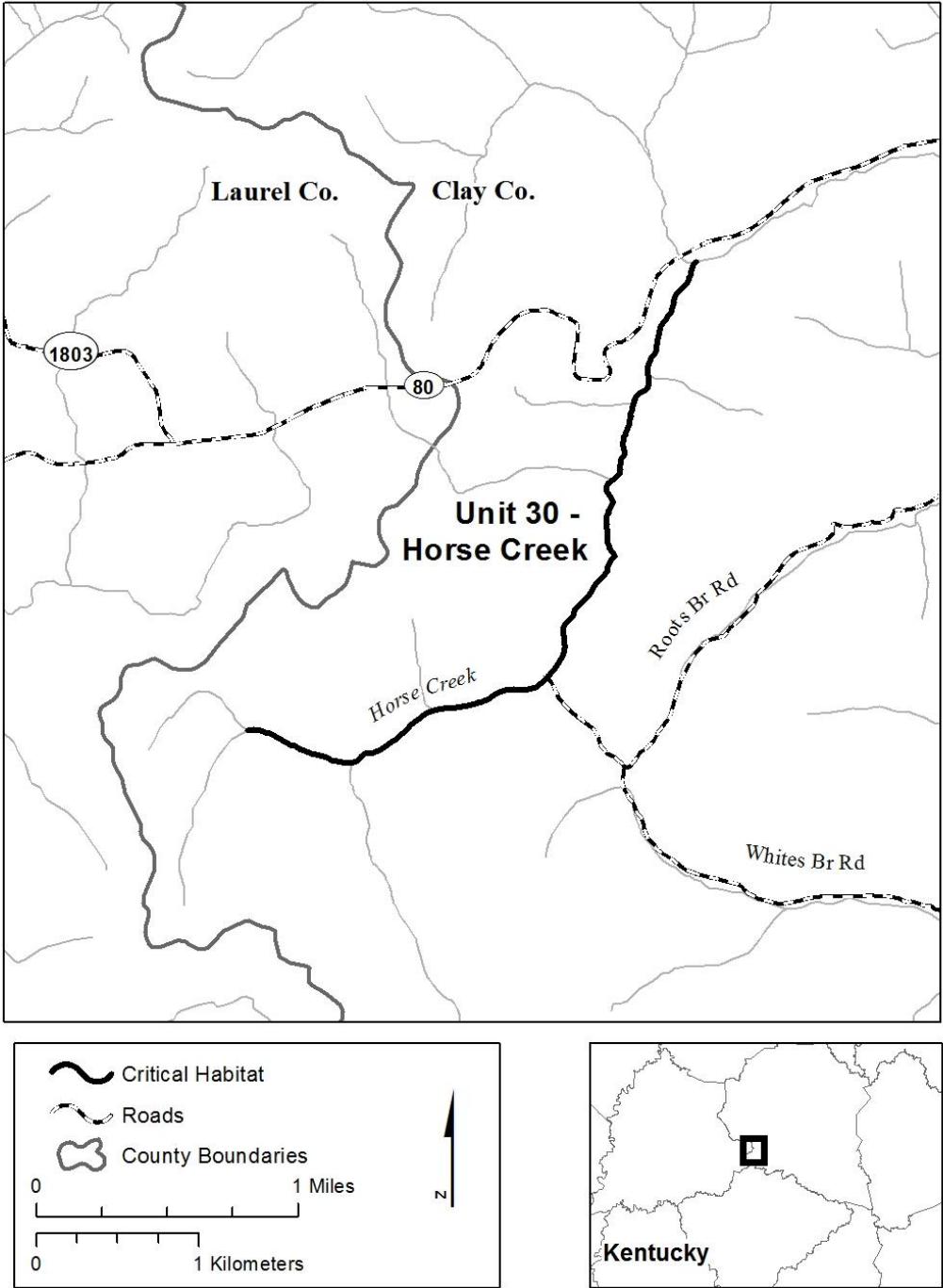


(23) Unit 30: Horse Creek, Clay County, Kentucky.

(i) Unit 30 includes 5.0 skm (3.1 smi) of Horse Creek from its headwaters at (37.07370, -83.87756), downstream to its confluence with Pigeon Roost Branch (37.09926, -83.84582) in Clay County, Kentucky.

(ii) Map of Unit 30 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 30 - Horse Creek: Clay County, Kentucky

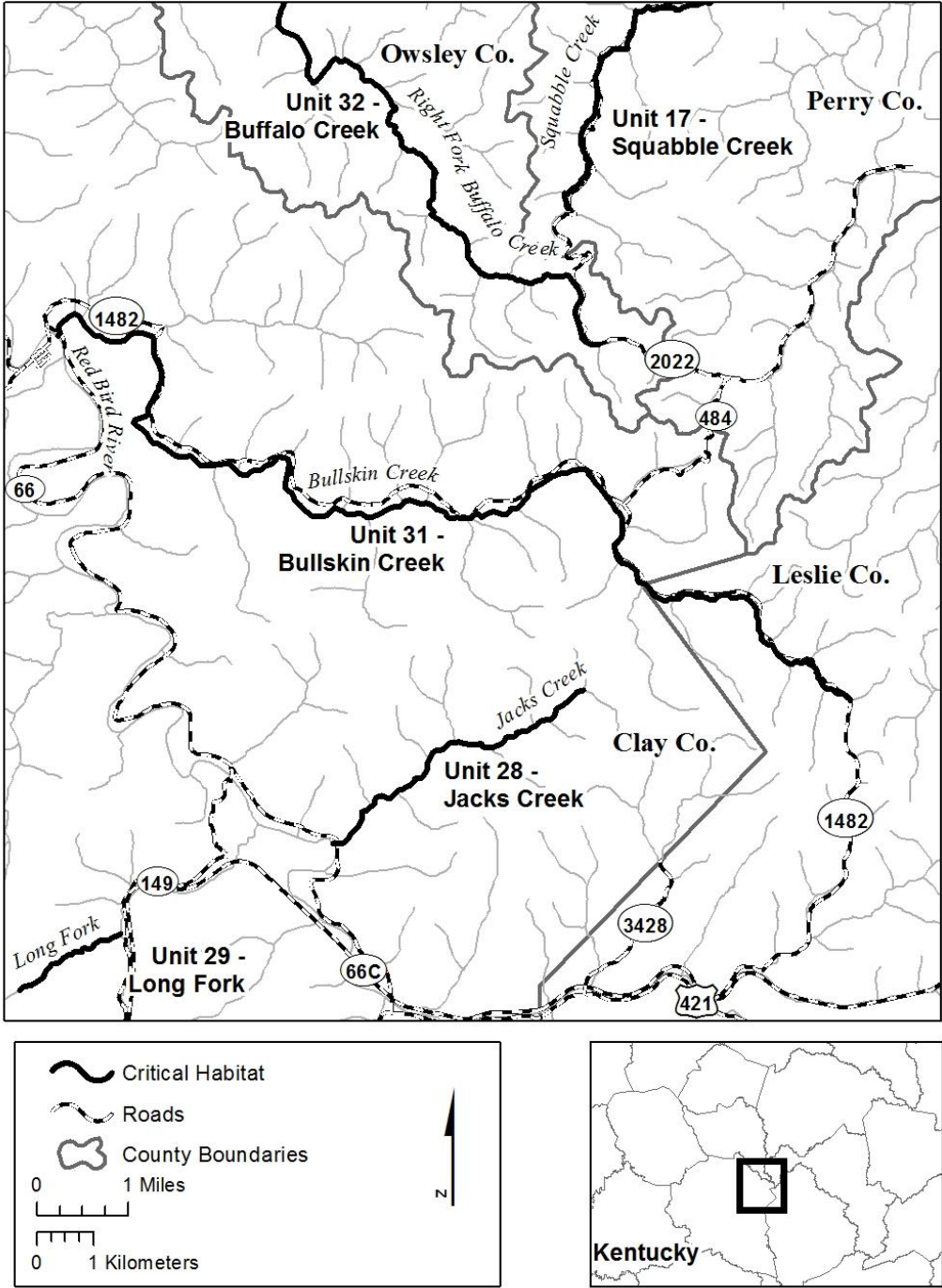


(24) Unit 31: Bullskin Creek, Clay and Leslie Counties, Kentucky.

(i) Unit 31 includes 21.7 skm (13.5 smi) of Bullskin Creek from its confluence with Old House Branch (37.21218, -83.48798) in Leslie County, downstream to its confluence with the South Fork Kentucky River (37.27322, -83.64441) in Clay County, Kentucky.

(ii) Map of Unit 31 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 31 - Bullskin Creek: Clay and Leslie Counties, Kentucky

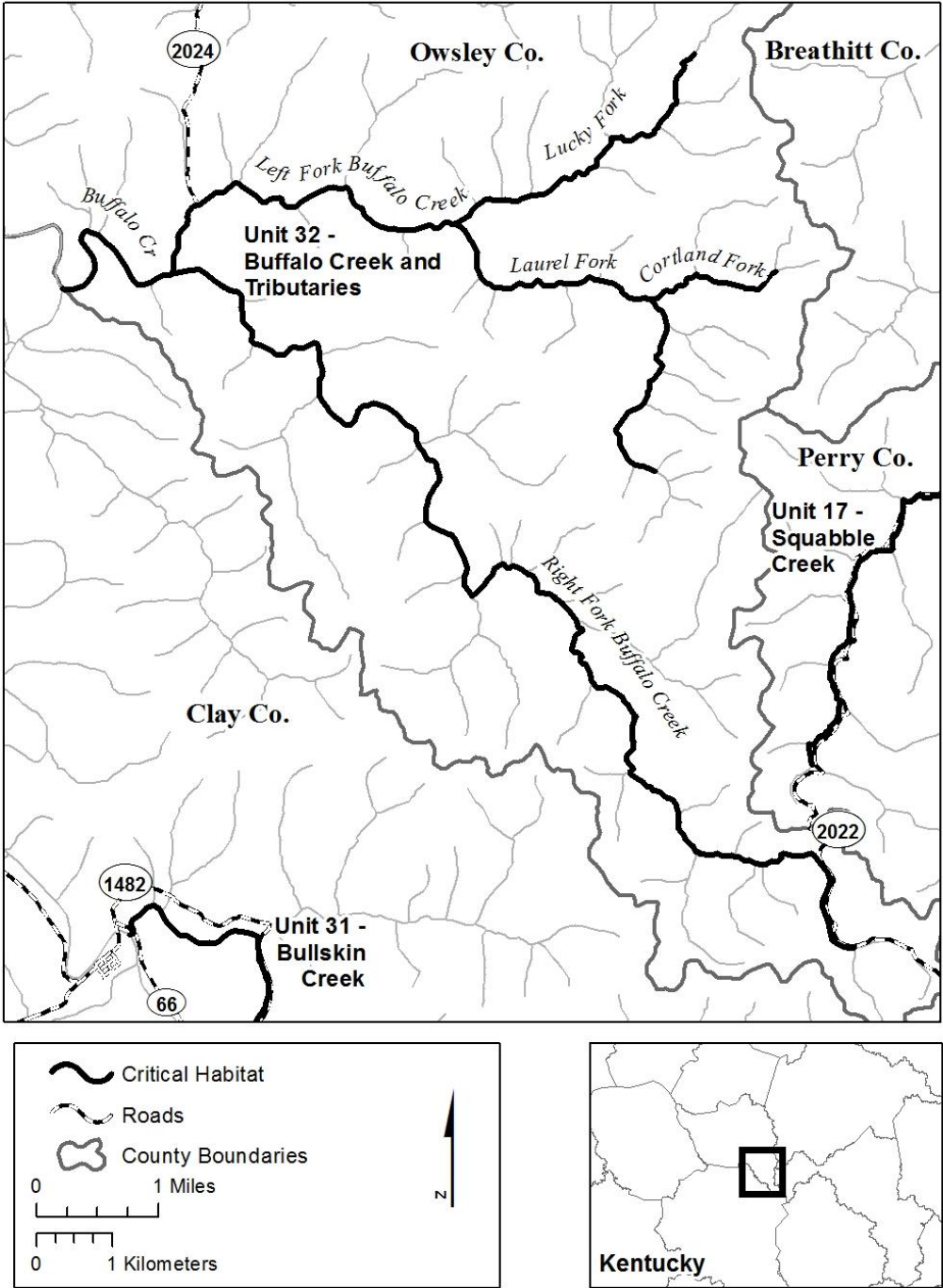


(25) Unit 32: Buffalo Creek and Tributaries, Owsley County, Kentucky.

(i) Unit 32 includes 2.0 skm (1.2 smi) of Cortland Fork from its headwaters at (37.35052, -83.54570), downstream to its confluence with Laurel Fork (37.34758, -83.56466); 6.4 skm (4.0 smi) of Laurel Fork from its headwaters at (37.32708, -83.56450), downstream to its confluence with Left Fork Buffalo Creek (37.347758, -83.56466); 4.6 skm (2.9 smi) of Lucky Fork from its headwaters at (37.37682, -83.55711), downstream to its confluence with Left Fork Buffalo Creek (37.35713, -83.59367); 5.1 skm (3.2 smi) of Left Fork Buffalo Creek from its confluence with Lucky Fork and Left Fork (37.35713, -83.59367), downstream to its confluence with Buffalo Creek (37.35197, -83.63583); 17.3 skm (10.8 smi) of Right Fork Buffalo Creek from its headwaters at (37.26972, -83.53646), downstream to its confluence with Buffalo Creek (37.35197, -83.63583); and 2.7 skm (1.7 smi) of Buffalo Creek from its confluence with the Left and Right Forks (37.35197, -83.63583), downstream to its confluence with the South Fork Kentucky River (37.35051, -83.65233) in Owsley County, Kentucky.

(ii) Map of Unit 32 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 32 - Buffalo Creek and Tributaries: Owsley County, Kentucky

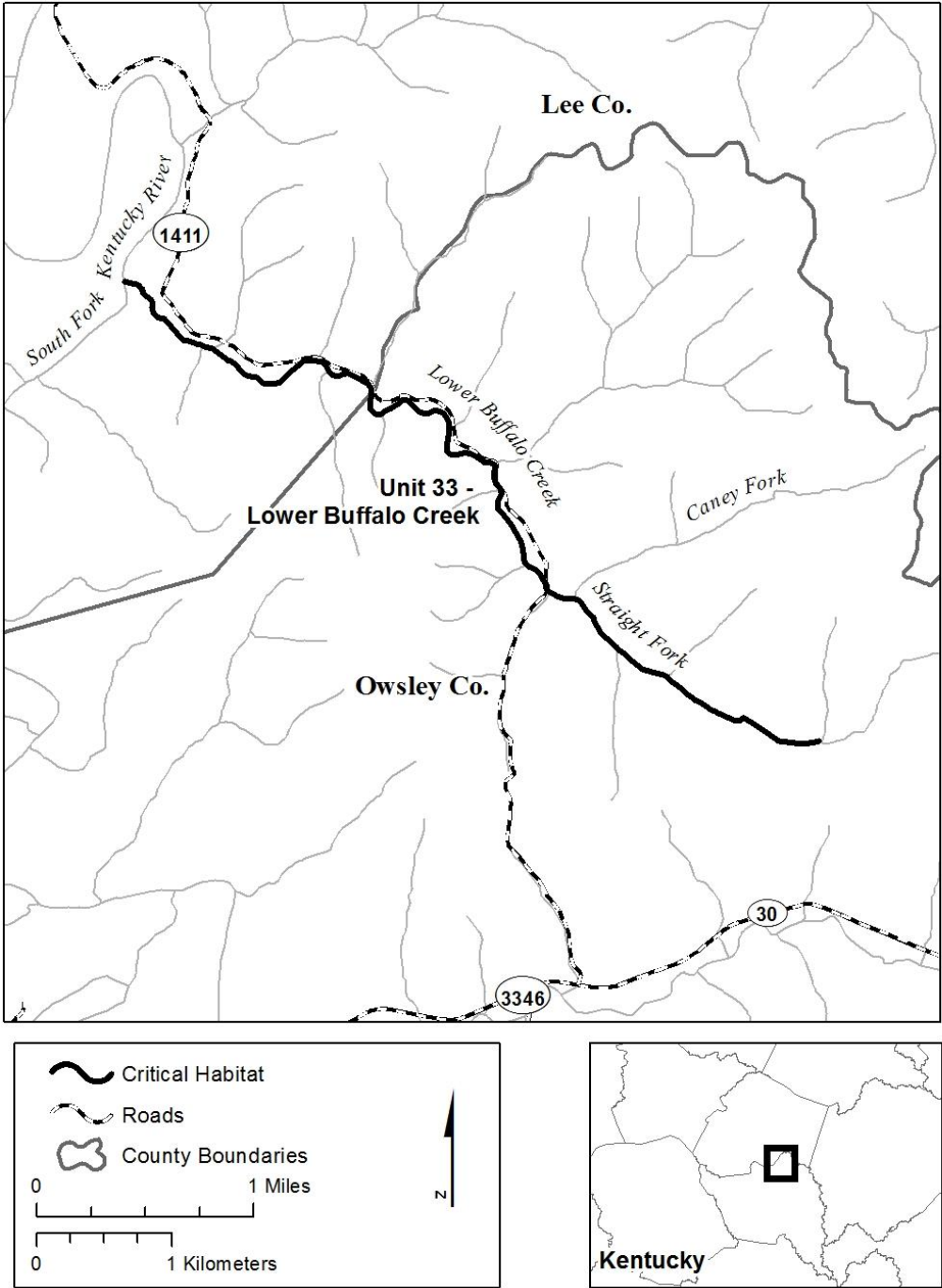


(26) Unit 33: Lower Buffalo Creek, Lee and Owsley Counties, Kentucky.

(i) Unit 33 includes 2.2 skm (1.4 smi) of Straight Fork from its headwaters at (37.49993, -83.62996), downstream to its confluence with Lower Buffalo Creek (37.50980, -83.65015) in Owsley County; and 5.1 skm (3.2 smi) of Lower Buffalo Creek from its confluence with Straight Fork (37.50980, -83.65015) in Owsley County, downstream to its confluence with the South Fork Kentucky River (37.53164, -83.68732) in Lee County, Kentucky.

(ii) Map of Unit 33 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 33 - Lower Buffalo Creek: Owsley and Lee Counties, Kentucky

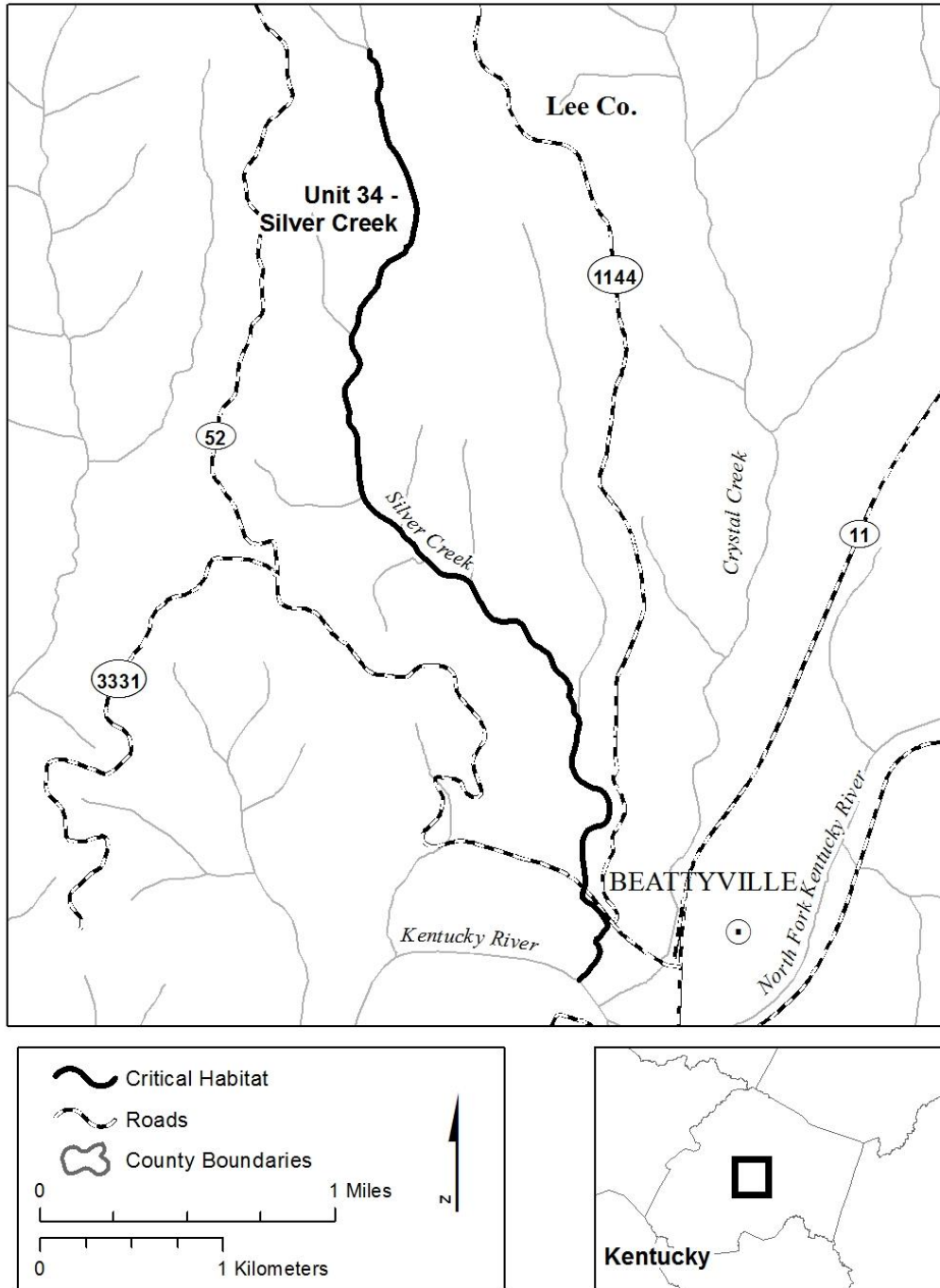


(27) Unit 34: Silver Creek, Lee County, Kentucky.

(i) Unit 34 includes 6.2 skm (3.9 smi) of Silver Creek from its headwaters at (37.61857, -83.72442), downstream to its confluence with the Kentucky River (37.57251, -83.71264) in Lee County, Kentucky.

(ii) Map of Unit 34 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 34 - Silver Creek: Lee County, Kentucky



(28) Unit 35: Travis Creek, Jackson County; Unit 36: Wild Dog Creek, Jackson and Owsley Counties; and Unit 37: Granny Dismal Creek, Owsley and Lee Counties, Kentucky.

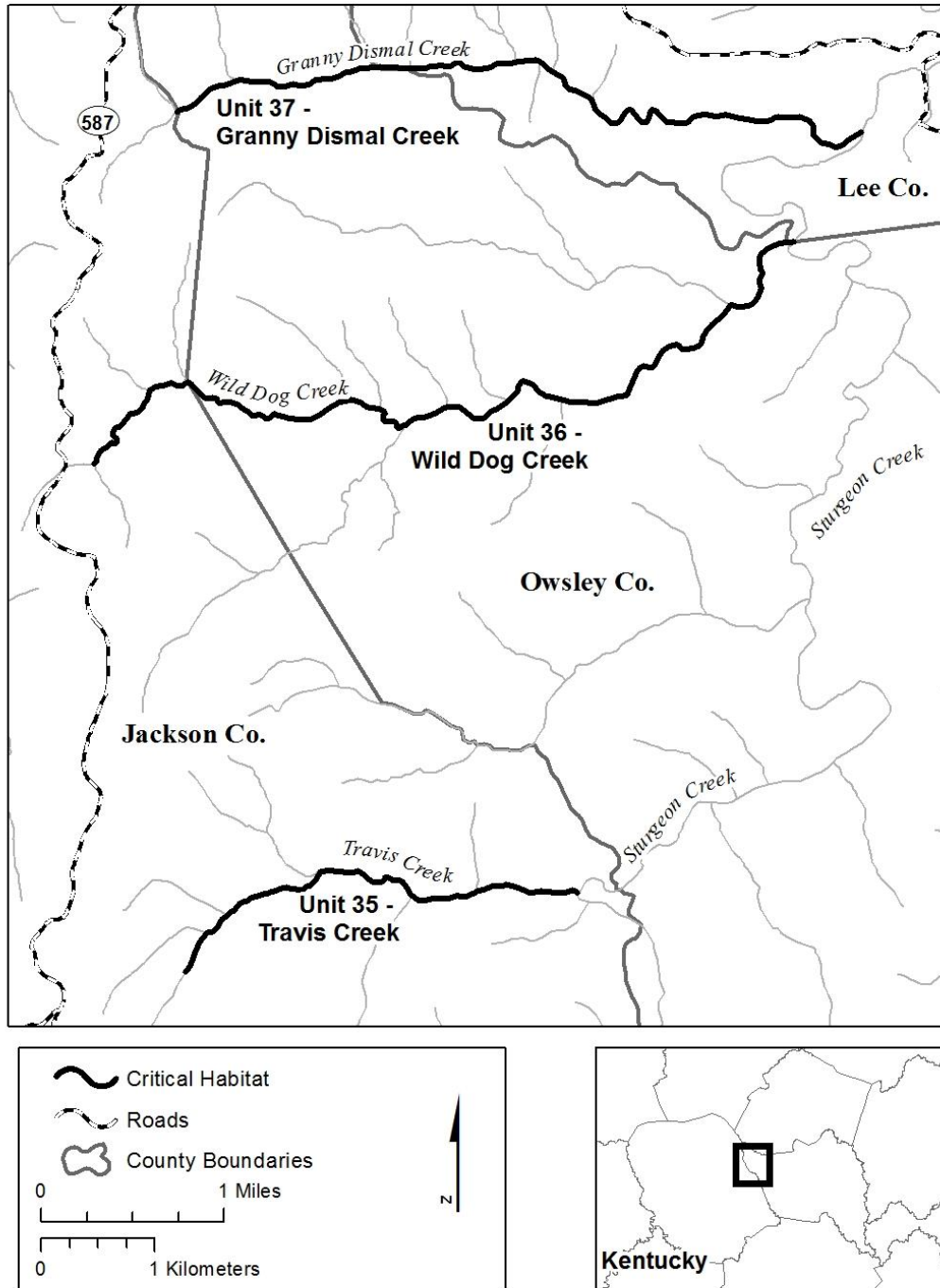
(i) Unit 35 includes 4.1 skm (2.5 smi) of Travis Creek from its headwaters at (37.43039, -83.88516), downstream to its confluence with Sturgeon Creek (37.43600, -83.84609) in Jackson County, Kentucky.

(ii) Unit 36 includes 8.1 skm (5.1 smi) of Wild Dog Creek from its headwaters at (37.47081, -83.89329) in Jackson County, downstream to its confluence with Sturgeon Creek (37.48730, -83.82319) in Owsley County, Kentucky.

(iii) Unit 37 includes 6.9 skm (4.3 smi) of Granny Dismal Creek from its headwaters at (37.49862, -83.88435) in Owsley County, downstream to its confluence with Sturgeon Creek (37.49586, -83.81629) in Lee County, Kentucky.

(iv) Map of Units 35, 36, and 37 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 35 - Travis Creek: Jackson County, Kentucky
Unit 36 - Wild Dog Creek: Jackson and Owsley Counties, Kentucky
Unit 37 - Granny Dismal Creek: Owsley and Lee Counties, Kentucky

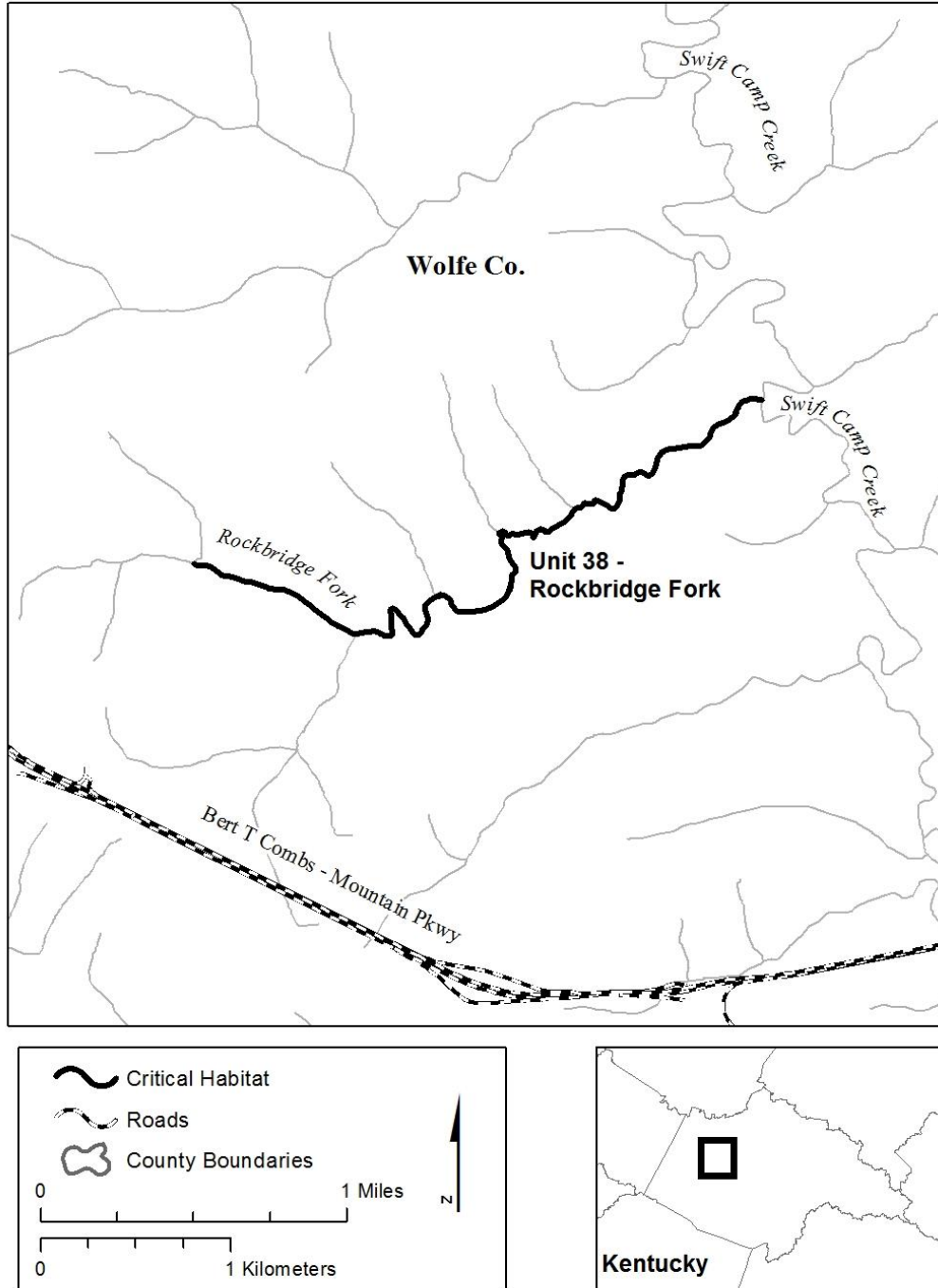


(29) Unit 38: Rockbridge Fork, Wolfe County, Kentucky.

(i) Unit 38 includes 4.5 skm (2.8 smi) of Rockbridge Fork from its headwaters at (37.76228, -83.59553), downstream to its confluence with Swift Camp Creek (37.76941, -83.56134) in Wolfe County, Kentucky.

(ii) Map of Unit 38 follows:

Critical Habitat for Kentucky Arrow Darter (*Etheostoma spilotum*)
Unit 38 - Rockbridge Fork: Wolfe County, Kentucky



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Dated: September 20, 2016.

Karen Hyun,

*Acting Principal Deputy Assistant Secretary for Fish and Wildlife and
Parks.*

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