



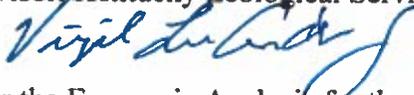
United States Department of the Interior

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MEMORANDUM

To: Michelle Manion, Senior Associate, Abt Associates

From: Virgil Lee Andrews, Jr., Field Supervisor, Kentucky Ecological Services Field Office


Subject: Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Kentucky Arrow Darter

This memorandum provides information to serve as a basis for conducting an economic analysis for the proposed designation of critical habitat for the Kentucky arrow darter. Section 4(b)(2) of the Endangered Species Act (Act) requires the Secretary of Interior (Secretary) and, by delegation, the U.S. Fish and Wildlife Service (Service), to consider the economic, national security, and other impacts of designating a particular area as critical habitat. The Secretary may exclude an area from critical habitat if she determines that the benefits of exclusion outweigh the benefits of including the area as critical habitat, unless the exclusion will result in the extinction of the species. In part to comply with section 4(b)(2) of the Act and consider the economic impacts of a proposed critical habitat designation, the Service prepares an economic analysis that describes and monetizes, where possible, the probable economic impacts of the proposed regulation. The data in the economic analysis may be used in the discretionary balancing evaluation under section 4(b)(2) of the Act to consider any particular area for exclusion from the final designation.

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

There are a number of ways that designation of critical habitat could influence activities, but one of the important functions of this memorandum is to explain any differences between actions required to avoid jeopardy to the species versus actions that may be required to avoid destruction or adverse modification of critical habitat. The Service is analyzing whether destruction or adverse modification would occur based on whether the Federal agency's action is likely "to result in the destruction or adverse modification of habitat which is determined by the Secretary... to be critical." To perform this analysis, the Service considers how the proposed action is likely to affect the function of the critical habitat unit in serving its intended conservation role relative to the entire designation. The information provided below is intended to identify the possible differences for this species under the two different section 7 standards (i.e., jeopardy to the species and adverse modification of critical habitat). Ultimately, however, a determination of whether an activity may result in the destruction or adverse modification of critical habitat is based on the effects of the action to the designated critical habitat in its entirety. The information provided below is intended to identify the possible differences for the Kentucky arrow darter under the different section 7 standards for jeopardy to the species and destruction or adverse modification of critical habitat.

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

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

Therefore, at the time of any consultation under section 7 of the Act, the species of interest may not be present within the action area for the purposes of the section 7 consultation, even if that action area is within the "geographical area occupied by the species." This possibility, however, does not change the "geographical area occupied by the species" as stated under section 3(5)(A)(i) for the species. It must however, be reflected in our analysis of the economic impacts of a critical habitat designation. How we implement each critical habitat designation under section 7 is important because, even when an area is determined to be within the general geographical area occupied by the species at the time of listing, the specific area where a consultation may occur is based on the presence of the species with the action area and the effects to that species. If a species is not present and the action is not likely to adversely affect

the species within a particular area designated as critical habitat at the time of consultation, the economic effects of the consultation would likely be considered an incremental effect of the critical habitat because, in almost all cases, the consultation would not have occurred absent the critical habitat designation¹. These incremental economic effects would derive both from changes in management, such as costs resulting from restrictions on development and other activities due solely to critical habitat, and changes in the scope of administrative review, i.e., the added costs of considering effects to critical habitat during consultation. (Additional administrative costs would also occur in *occupied* areas due to the need to analyze destruction or adverse modification of critical habitat along with jeopardy to the species.)

In this memorandum, when we describe occupancy for purposes of estimating the probable incremental impacts and, therefore, potential economic costs of critical habitat designation, we are referring to the occupancy status within the action area of a particular Federal action at the time of a consultation under section 7 of the Act. In this context, the “geographical area occupied by the species” under section 3(5)(A)(i) and the area where a species may be present or may be affected by a particular Federal action under a section 7 consultation may differ. The difference lies in the implementation of the critical habitat designation for purposes of the section 7 consultation, although within the geographical range occupied by the species under 3(5)(A)(i), the species may or may not be present at the time of consultation. The purpose of this memorandum is to describe how the Service will implement the critical habitat designation; however, it is only on a case by case basis that we are able to evaluate whether or not a Federal action may affect the listed species or its critical habitat while considering the species’ presence within the action area.

I. BACKGROUND

Species Information: The Kentucky arrow darter (*Etheostoma spilotum*) is a small, brightly-colored fish that is restricted to the upper Kentucky River drainage in eastern Kentucky. The species typically inhabits pools or transitional areas between riffles and pools (glides and runs) in moderate- to high-gradient, first- to third-order streams with rocky substrates. Kentucky arrow darters utilize shallow riffles during the spawning season (April to June) and have an average life span of 3-4 years. The species preys on aquatic insects, especially mayflies, but larger individuals may feed on small crayfishes.

The Kentucky arrow darter occurred historically in at least 74 streams in the upper Kentucky River drainage of eastern Kentucky. Its distribution spanned portions of 6 sub-drainages (North Fork Kentucky River, Middle Fork Kentucky River, South Fork Kentucky River, Silver Creek, Sturgeon Creek, and Red River) in 10 Kentucky counties (Breathitt, Clay, Harlan, Jackson, Knott, Lee, Leslie, Owsley, Perry, and Wolfe).

The species has been extirpated from about 49 percent of its historical range (36 of 74 streams), with 16 of these extirpations occurring since the mid-1990s. Remaining populations are fragmented and isolated, and the species continues to be at risk throughout all of its range due to

¹ If the area is not currently occupied and there is no critical habitat designated, it is unlikely that a Federal Agency would consult under section 7 in the first instance unless it is clear that activities in the unoccupied areas “may affect” nearby occupied areas.

the immediacy, severity, and scope of threats from three of the five threat factors under section 4(a)(1) of the Act: habitat degradation and range curtailment (Factor A), inadequacy of existing regulatory mechanisms (Factor D), and other natural or manmade factors affecting its continued existence (Factor E).

Anthropogenic activities such as surface coal mining, logging, oil/gas development, land development, agriculture, and inadequate sewage treatment have all contributed to the degradation of stream habitats within the species' range (Factor A). These land use activities have led to chemical and physical changes to stream habitats that continue to affect the species. Existing regulatory mechanisms (e.g., the Clean Water Act) have provided for some improvements in water quality and habitat conditions across the species' range, but these laws and regulations have been insufficient in protecting the species' habitat (Factor D), which continues to be degraded. The Kentucky arrow darter's vulnerability to habitat loss and inadequate regulatory mechanisms is even greater due to its reduced range, fragmented populations, and small or declining population sizes (Factor E). The effects of certain threats, particularly habitat degradation and loss, increase in magnitude when population size is small.

Designation Objectives: The proposed critical habitat units for the Kentucky arrow darter are based on known occurrence records for the species. The 38 proposed critical habitat units for the Kentucky arrow darter were chosen based on the primary constituent elements of physical or biological features essential to the conservation of the species including: (1) riffle-pool complexes and transitional areas (glides and runs) of geomorphically stable, first- to third-order streams with connectivity between spawning, foraging, and resting sites to promote gene flow throughout the species' range; (2) stable bottom substrates composed of relatively silt-free gravel, cobble, boulders, bedrock ledges, and woody debris piles; (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) adequate water quality characterized by moderate stream temperatures, acceptable dissolved oxygen concentrations, moderate pH, 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); and (5) a prey base of aquatic macroinvertebrates, including mayfly nymphs, midge larvae, caddisfly larvae, stonefly nymphs, and small crayfishes.

Designation Summary: The Service is proposing to designate approximately 395 stream kilometers (skm) (246 stream miles (smi)) in 38 units as critical habitat for the Kentucky arrow darter (Table 1). All the critical habitat units are located in Kentucky in portions of Breathitt, Clay, Harlan, Jackson, Knott, Lee, Leslie, Owsley, Perry, and Wolfe Counties. None of these proposed units contain co-occurring listed species or existing critical habitat for other listed species. In Kentucky, landowners own the land under non-navigable streams (e.g., the stream channel or bottom), but the water is under State jurisdiction. Included lands are under Federal, State, and private ownership and are subject to different levels of siltation and water pollution associated with surface coal mining, inadequate sewage treatment, logging, oil and natural gas exploration, agriculture, inadequate riparian buffers, construction and maintenance of county roads, and off-road vehicle use.

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

Unit	Stream	County	Ownership – skm (smi)			Total Length skm (smi)
			Private	Federal	State	
1	Buckhorn Creek	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	22.5 (13.9)	0	0	22.5 (13.9)
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	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	Clay	0	5.7 (3.5)	0	5.7 (3.5)
19	Upper Bear Creek	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	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	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	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)

(Table 1 continued)			Ownership – skm (smi)			
Unit	Stream	County	Private	Federal	State	Total Length skm (smi)
30	Horse Creek	Clay	3.0 (1.9)	2.0 (1.2)	0	5.0 (3.1)
31	Bullskin Creek	Clay	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	Jackson, 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			273.8 (170.3)	103.7 (64.7)	17.9 (11.1)	395.4 (246.1)

All proposed critical habitat units are considered to be within the geographical area occupied by the species at the time of listing. All proposed units 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. Therefore, the conservation function of each unit is to provide for all life stages of the species. We are not currently proposing to designate any areas outside the geographical area occupied by the species, because we have determined occupied areas are adequate to ensure the conservation of the species.

II. BASELINE ANALYSIS

A. Identify conservation plans and regulatory mechanisms that provide protection to the species and its habitat absent the critical habitat designation

1. Conservation Plans/Efforts

The following are ongoing conservation efforts that provide some benefits to the Kentucky arrow darter and are considered part of the baseline because these activities will occur with or without critical habitat designation.

The Service and U.S. Forest Service (USFS) are working cooperatively to develop a candidate conservation agreement (CCA) for the Kentucky arrow darter on lands located in the Daniel Boone National Forest (DBNF). About half of the species' extant streams occur at least partially on lands administered by the DBNF, with public ownership in these watersheds ranging from about 50 to 100 percent. Conservation of DBNF populations is essential to the species' recovery, and a DBNF-specific conservation plan is needed to support these efforts. The CCA is intended to conserve the Kentucky arrow darter on the DBNF by (a) protecting known populations and habitat, (b) reducing threats to its survival, (c) conserving the watersheds and ecosystems on which it depends, and (d) enhancing and/or restoring degraded habitat. Both

agencies are currently working on action items and completion of the CCA is expected in 2015. Streams located on the DBNF receive management and protection through DBNF's Land and Resource Management Plan (LRMP) (USFS 2004, pp. 7-16). The LRMP is implemented through a series of project-level decisions based on appropriate site-specific analysis and disclosure. It does not contain a commitment to select any specific project; rather, it sets up a framework of "desired future conditions" with goals, objectives, standards, and prescription areas to guide project proposals. Projects are proposed to solve resource management problems, move the forest environment toward desired future conditions, and supply goods and services to the public (USFS 2004, pp. 7-16). The LRMP contains a number of protective standards (e.g., DB-ENG-5, DB-VEG-27) that, in general, are designed to avoid and minimize potential adverse effects to the Kentucky arrow darter and other sensitive species; however, the DBNF will continue to consult with the Service when its activities may adversely affect streams supporting Kentucky arrow darters.

2. Federal Regulations/Acts and Programs

The following Federal laws/regulations and programs provide some benefits to the Kentucky arrow darter and are considered part of the baseline because these benefits will continue with or without critical habitat designation.

Endangered Species Act

Concurrent with the proposed designation of critical habitat, the Kentucky arrow darter is being proposed for listing as threatened under the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*). Listing provides the opportunity for conservation and protection under sections 6, 7, 9, and 10 of the Act. These sections include cooperative actions with States (Section 6), consultation with Federal agencies for actions that may affect the species (Section 7(a)(2)); protection against take of the species ("take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct) (Section 9); cooperative actions with other entities and landowners for the purpose of scientific or enhancement of survival activities involving take (Section 10(a)(1)(A) permit); and lastly, habitat conservation planning under Section 10(a)(1)(B). In our proposed listing of the Kentucky arrow darter, we have included a proposed 4(d) rule which adopts the prohibitions under 50 CFR 17.31 and 17.32, except that stream habitat restoration, bank protection, and stream crossing improvements would be exempted from take prohibitions provided the action (1) abides by conservation measures of the 4(d) rule, (2) is otherwise legal, and (3) is conducted in accordance with applicable State, Federal, and local laws and regulations. This will reduce the number of Section 7 consultations on the Kentucky arrow darter on projects where a Federal nexus exists.

Clean Water Act

The Federal Water Pollution Control Act of 1977 (33 U.S.C. 1251 *et seq.*), commonly referred to as the Clean Water Act (CWA), establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Under the CWA, the U.S. Environmental Protection Agency (EPA) has implemented pollution control programs, such as setting wastewater standards for industry, and has set water quality standards for all contaminants in surface waters. Section 404 of the CWA regulates the

discharge of dredged or fill material into waters of the United States. Currently, waters of the United States have been defined to include tributaries to navigable waters (including Kentucky arrow darter streams), interstate wetlands, wetlands which could affect interstate or foreign commerce, and wetlands adjacent to other waters of the United States. Section 404 of the CWA requires parties to obtain a permit from the U.S. Army Corps of Engineers (Corps) prior to discharging dredge or fill material into “waters of the United States.” Activities within the current range of the Kentucky arrow darter that may require section 404 permitting include: land development; surface coal mining; transportation and utilities; and other actions involving dredging, impoundment, and channelization. The Corps’ review of projects for the issuance of section 404 permits requires Section 7 consultation with the Service to the extent that the project may affect listed species or critical habitat. As part of the section 404 permit process, the Corps reviews the potential effects of the proposed action on plant and animal populations and recommends efforts to avoid adverse effects to these populations in addition to the wetlands themselves.

Surface Mining Control and Reclamation Act

The Federal Surface Mining Control and Reclamation Act of 1977 (SMCRA; 33 U.S.C. 1201 *et seq.*) is the primary Federal law that regulates the environmental effects of coal mining in the U.S. SMCRA activities are subject to the provisions of the Act as long as there is a Federal nexus between the regulatory authority and the action taken. Any incidental take of listed species related to activities regulated under SMCRA is covered under a 1996 programmatic biological opinion (1996 BO) between the Service and the Office of Surface Mining Reclamation and Enforcement. SMCRA, in conjunction with 1996 BO, requires the development of protection and enhancement plans that attempt to provide a conservation benefit to listed species, thereby contributing to their continued existence and helping to prevent the adverse modification of designated critical habitat.

National Forest Management Act

About half of the Kentucky arrows darter’s proposed critical habitat units have some level of Federal ownership (administered by the USFS) and are located in relatively undisturbed, forested watersheds located on the DBNF. These watersheds are afforded some protection under the National Forest Management Act of 1976 (NFMA; 16 U.S.C. 1600 *et seq.*) because they occur on lands managed by the USFS that are occupied by federally listed species, such as the Indiana bat (*Myotis sodalis*) or northern long-eared bat (*Myotis septentrionalis*). DBNF’s Land and Resource Management Plan (LRMP) includes provisions supporting recovery of endangered and threatened species. As a result, stream habitats supporting the Kentucky arrow darter will receive indirect benefits related to implementation of the LRMP.

Emergency Watershed Protection Program

Through the Emergency Watershed Protection (EWP) program, the U.S. Department of Agriculture’s Natural Resources Conservation Service (NRCS) helps communities address watershed impairments that pose imminent threats to lives and property caused by flood, fire, drought, windstorm, or other natural occurrences. The EWP program addresses watershed impairments such as debris-clogged stream channels, undermined and unstable stream banks, jeopardized water control structures and

public infrastructures, wind-borne debris removal, and damaged upland sites exposed to fire or drought. Over the last year, NRCS reviewed or implemented 33 projects within the upper Kentucky River basin. NRCS is aware of the Kentucky arrow darter's distribution within eastern Kentucky and screens these projects for the potential presence of the species. NRCS will continue to coordinate with and seek technical assistance from the Service if they suspect that the species may be present within a given EWP project area.

3. Federal Land Management

The USFS (DBNF) administers lands within some of the areas that are proposed to be designated as critical habitat. Implementation of DBNF's LRMP will provide conservation benefits to the Kentucky arrow darter with or without critical habitat designation. For those future proposed activities that may affect the Kentucky arrow darter or its critical habitat, section 7 consultation will occur and may be considered as part of the incremental effects of critical habitat designation.

As stated above, at least a portion of 18 proposed critical habitat units are within the DBNF. Streams located on the DBNF receive management and protection through the DBNF's LRMP (USFS 2004, pp. 7-16). At this time, the LRMP does not include management actions specifically designed to conserve the Kentucky arrow darter; however, the LRMP contains a number of protective standards that, in general, are designed to avoid and minimize potential adverse effects to streams occupied by the species, and the DBNF will continue to consult with the Service when their activities may adversely affect streams supporting Kentucky arrow darters. Additional conservation benefits for the species will be provided through a CCA that is currently being developed by the Service and USFS (DBNF). The CCA is intended to provide conservation benefits to the Kentucky arrow darter by (a) protecting known populations and habitat, (b) reducing threats to its survival, (c) conserving the watersheds and ecosystems on which it depends, and (d) enhancing and/or restoring degraded habitat.

There are no other conservation plans or protections specifically targeting the Kentucky arrow darter that we are aware of at this time.

4. Tribal Regulations

There are no tribal lands included in the proposed designation of critical habitat for the Kentucky arrow darter.

5. State Laws that may provide protections/conservation

The following Kentucky laws and regulations benefit the species and are considered part of the baseline, because these benefits will continue with or without critical habitat designation.

Under the authority of the CWA, the Kentucky Environmental Protection Cabinet (Kentucky Division of Water) sets, maintains, and enforces water quality standards in Kentucky. State water quality standards are reviewed by the EPA as part of the triennial review process to ensure that they comply with national minimum protections under the CWA. All discharges to Kentucky waters require a permit through the Kentucky Pollution Discharge Elimination System (KPDES) (section 402 of the CWA). Such permits include effluent limitations that are

developed from technology-based and water quality-based criteria. In Kentucky, streams supporting federally threatened or endangered species are considered unique and typically receive additional protection under Kentucky's water quality standards. Pursuant to 401 Kentucky Administrative Regulation (KAR) 10:031, Section 8, the existing water quality and habitat of these Outstanding State Resource Waters (OSRWs) shall be maintained and protected, unless it can be demonstrated that lowering of water quality or a habitat modification will not have a harmful effect on the threatened or endangered species that the water supports. KPDES permits associated with OSRWs typically contain additional requirements (e.g., biological surveys) designed to protect waters supporting listed species.

Proposed critical habitat Units 3 (Coles Fork and Snag Ridge Fork) and 4 (Clemons Fork) are currently protected from the effects of surface coal mining due to a 1990 "lands unsuitable for mining" designation (405 KAR 24:040). Both streams are located within 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 UK Department of Forestry in the College of Agriculture, Food, and Environment. The designation was made by the Secretary of the Kentucky Energy and Environment Cabinet (KEEC) in response to a petition from the Sierra Club; Kentucky Resources Council, Inc.; and the Kentucky Conservation Foundation. The Secretary of the KEEC has the authority to designate certain lands as unsuitable for mining if these activities will (1) be incompatible with existing state and local land use plans; (2) affect fragile or historic lands in which such operations could result in significant damage to important historic, cultural, scientific, and aesthetic values, and natural systems; (3) affect renewable resource lands in which such operations could result in a substantial loss or reduction of long-range productivity of water supply or food or fiber products, and such lands to include aquifers and aquifer recharge areas; or (4) affect natural hazard lands in which such operations could substantially endanger life and property, such lands to include areas subject to frequent flooding and areas of unstable geology. The Secretary concluded that surface coal mining and reclamation operations were incompatible with UK's existing land use management plan and these activities would significantly damage important scientific resources within the petition area.

The Kentucky Forest Conservation Act (KFCA) of 1998 (KRS 149.330-149.355) and Agriculture Water Quality Act (AWQA) of 1994 (KRS 224.71-100 to 224.71-140) regulate commercial logging activities within the Commonwealth (Stringer and Thompson 2000, p. 2-3). The KFCA has provisions for enabling the monitoring of Kentucky's forest resources, promoting forest and forestry education, and regulating timber harvesting operations. The latter requires that a Kentucky Master Logger be on-site and in charge of commercial logging operations (except where animals are used as the primary means of skidding). The KFCA also requires that all timber harvesting operators use appropriate best management practices (BMPs) for protection of water quality as specified by the AWQA. The Kentucky Division of Forestry is charged with the development of administrative regulations and enforcement of the KFCA. The AWQA requires that persons owning 10 or more contiguous acres engaging in agriculture or silvicultural (forestry) operations must have an individual, written water quality plan, regardless of the size of the operation. As specified in the State Agriculture Water Quality Plan, the individual plan must state the BMPs that will be used to protect water quality (Stringer and Thompson 2000, pp. 2-3).

B. Federal agencies and other project proponents that are likely to consult with the Service under section 7 absent the critical habitat designation

In the baseline scenario, section 7 of the Act requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of the Kentucky arrow darter.

Some of the Federal agencies and projects that would likely go through the section 7 consultation process whether or not critical habitat is designated include actions on State, local, or private lands that require a Federal permit (such as a permit from the Corps under section 404 of the CWA) or a permit from the Service under section 10 of the Act); actions on lands administered by the USFS; or actions that involve some other Federal action (such as funding from the Federal Highway Administration, Federal Energy Regulatory Commission, Federal Emergency Management Agency, or NRCS).

Examples of activities that could significantly degrade, fragment, or alter the suitability of Kentucky arrow darter habitat include, but are not limited to: land development, removal of riparian vegetation, surface coal mining, oil and gas development, road or utility construction, and other activities involving direct channel disturbance (i.e., dredging, impoundment, and straightening).

C. What Types Of Project Modifications Are Currently Recommended Or Will Likely Be Recommended By The Service To Avoid Jeopardy (i.e., The Continued Existence Of The Species)?

There is a close relationship between the health of Kentucky arrow darter populations and the characteristics of their habitat. Alterations of habitat that diminish the quality (e.g., actions which degrade water quality or cause physical disturbance) and the amount of available habitat for the Kentucky arrow darter are likely to affect the population size and distribution, as well as cause further range declines, and could, therefore, appreciably reduce the likelihood of survival in the wild and constitute jeopardy. These alterations can be direct (i.e., occur within the stream habitat that is or could be used by the Kentucky arrow darter) or indirect (i.e., occur within watersheds that have stream habitat that is or could be used by the Kentucky arrow darter). The results of consultation under the adverse modification and jeopardy standards are likely to be similar because the physical or biological features that define critical habitat are also essential for the survival of the Kentucky arrow darter.

1. Provide Examples Representing Typical Recommendations To Avoid Jeopardy.

Recommendations for avoiding jeopardy include avoiding activities that cause physical habitat disturbance (i.e., sedimentation of substrates necessary for spawning or to support the species' prey base) and degradation of water quality in streams occupied by the species. Activities to be avoided include any channel disturbance (e.g., placement of fill, dredging, and channelization); sedimentation, either through bank erosion or as runoff from roads, agricultural areas, or other disturbed sites; inputs of dissolved solids; removal of riparian vegetation; and inputs of animal waste or untreated domestic sewage.

- 2. What Types Of Project Modifications Might The Service Make During A Section 7 Consultation To Avoid Jeopardy.*

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

III. ONCE CRITICAL HABITAT IS DESIGNATED, WILL THE OUTCOME OF SECTION 7 CONSULTATIONS IN OCCUPIED HABITAT BE DIFFERENT?

No. Once the proposed listing and proposed critical habitat designation for the Kentucky arrow darter take effect, the Service does not anticipate differences in the outcome of section 7 consultations in occupied habitat because actions that affect occupied habitat and its ability to function normally would typically also adversely affect the species.

IV. INCREMENTAL IMPACTS ANALYSIS

A. Adverse Modification Analysis

Project modifications requested by the Service to avoid jeopardy to the species are the same as those likely to avoid adverse modification of critical habitat.

- 1. What Federal Agencies Or Project Proponents Are Likely To Consult With The Service Under Section 7 With Designation Of Critical Habitat? What Kinds Of Additional Activities Are Likely To Undergo Consultation With Critical Habitat?*

Federal agencies and project proponents that would likely or potentially go through the section 7 consultation process if critical habitat is designated include the same agencies that would go through consultation without designation of critical habitat, as stated in Section II, B., above.

- 2. Provide Examples Representing Typical Recommendations to Avoid Adverse Modification Of Critical Habitat Applicable Across A Broad Suite Of Projects. Where Significant Uncertainty Exists, Provide Ranges Of Potential Outcomes.*

Examples of recommendations are described above under “Typical Recommendations to Avoid Jeopardy” as presented in Section II, C., above.

- 3. What Types Of Project Modifications Might The Service Make During A Section 7 Consultation To Avoid Destruction Or Adverse Modification Of Critical Habitat That Are Different Than Those For Avoiding Jeopardy?*

None.

4. *If The Species is Only Seasonally Or Sporadically Present Would The Outcome Of The Consultation Be The Same If Present at Time of Section 7 Consultation?*

Not applicable to this species.

5. *What Project Proponents Are Likely To Pursue HCPs Under Section 10 After The Designation Of Critical Habitat?*

None known at this time.

B. Unoccupied Areas Or Areas Where The Species Is Not Present

Does the designation include unoccupied habitat that was not previously subject to the requirements of section 7?

No.

C. Behavior Changes

Will the designation provide new information to stakeholders resulting in different behavior?

We do not anticipate any behavior changes as a direct result of the designation.

D. Administrative Efforts

How Much Additional Administrative Effort Will Be Spent To Address Adverse Modification In Section 7 Consultations With Critical Habitat? Estimate The Difference Compared To Baseline.

We have no baseline for administrative efforts undertaken by the Service as critical habitat is being designated concurrent with the listing for this species. Previous studies by Industrial Economics, Inc. have indicated that a range of 10 to 15 percent increase in administrative costs is generally expected when addressing adverse modification in addition to jeopardy in a consultation.

E. Probable Projects

We know of no new probable projects within the proposed critical habitat areas; however, based on previous consultations within the upper Kentucky River drainage, it is likely that some projects will arise. The Service routinely consults with the USFS on projects occurring on the DBNF, and other development projects (e.g., surface coal mining permits, road construction) may arise within the drainage.

1. Land Use Sectors Within The Critical Habitat Designation Area

Unit 1 (Buckhorn Creek): Mining, Oil and Gas, Recreation, Silviculture/Timber, Transportation, Water Quality.

Unit 2 (Eli Fork): Mining, Oil and Gas, Recreation, Silviculture/Timber, Transportation, Water Quality.

Unit 3 (Coles Fork and Snag Ridge Fork): Conservation/Restoration, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 4 (Clemons Fork): Conservation/Restoration, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 5 (Laurel Fork Quicksand Creek and tributaries): Agriculture, Mining, Oil and Gas, Development, Grazing, Recreation, Silviculture/Timber, Transportation, Water Quality.

Unit 6 (Middle Fork Quicksand Creek and tributaries): Agriculture, Mining, Oil and Gas, Development, Grazing, Recreation, Silviculture/Timber, Transportation, Water Quality.

Unit 7 (Spring Fork Quicksand Creek): Mining, Oil and Gas, Development, Grazing, Recreation, Silviculture/Timber, Transportation, Water Quality.

Unit 8 (Hunting Creek and tributaries): Agriculture, Mining, Oil and Gas, Development, Grazing, Recreation, Silviculture/Timber, Transportation, Water Quality.

Unit 9 (Frozen Creek and tributaries): Agriculture, Mining, Oil and Gas, Development, Grazing, Recreation, Silviculture/Timber, Transportation, Water Quality.

Unit 10 (Holly Creek and tributaries): Agriculture, Mining, Oil and Gas, Development, Grazing, Recreation, Silviculture/Timber, Transportation, Water Quality.

Unit 11 (Little Fork): Oil and Gas, Development, Recreation, Silviculture/Timber, Transportation, Water Quality.

Unit 12 (Walker Creek and tributaries): Oil and Gas, Development, Grazing, Recreation, Silviculture/Timber, Transportation, Water Quality.

Unit 13 (Hell Creek and tributaries): Oil and Gas, Development, Recreation, Silviculture/Timber, Transportation, Water Quality.

Unit 14 (Big Laurel Creek): Mining, Oil and Gas, Development, Recreation, Silviculture/Timber, Transportation, Water Quality.

Unit 15 (Laurel Creek): Conservation/Restoration, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 16 (Hell For Certain Creek and tributaries): Agriculture, Conservation/Restoration, Development, Mining, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 17 (Squabble Creek): Agriculture, Conservation/Restoration, Development, Mining, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Grazing, Transportation, Water Quality.

Unit 18 (Blue Hole Creek): Conservation/Restoration, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 19 (Upper Bear Creek): Agriculture, Conservation/Restoration, Development, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 20 (Katies Creek): Conservation/Restoration, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 21 (Spring Creek): Conservation/Restoration, Development, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 22 (Bowen Creek and tributaries): Conservation/Restoration, Development, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 23 (Elisha Creek): Agriculture, Conservation/Restoration, Development, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 24 (Gilberts Big Creek): Agriculture, Conservation/Restoration, Development, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 25 (Sugar Creek): Agriculture, Conservation/Restoration, Development, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 26 (Big Double Creek): Conservation/Restoration, Development, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 27 (Little Double Creek): Conservation/Restoration, Development, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 28 (Jacks Creek): Agriculture, Conservation/Restoration, Development, Mining, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Grazing, Transportation, Water Quality.

Unit 29 (Long Fork): Conservation/Restoration, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 30 (Horse Creek): Agriculture, Conservation/Restoration, Development, Mining, Recreation, Silviculture/Timber, Forest Management, Grazing, Transportation, Water Quality.

Unit 31 (Bullskin Creek): Agriculture, Conservation/Restoration, Development, Mining, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Grazing, Transportation, Water Quality.

Unit 32 (Buffalo Creek and tributaries): Agriculture, Conservation/Restoration, Development, Mining, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Grazing, Transportation, Water Quality.

Unit 33 (Lower Buffalo Creek): Agriculture, Conservation/Restoration, Development, Mining, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Grazing, Transportation, Water Quality.

Unit 34 (Silver Creek): Agriculture, Conservation/Restoration, Development, Mining, Oil and Gas, Recreation, Silviculture/Timber, Transportation, Water Quality.

Unit 35 (Travis Creek): Agriculture, Conservation/Restoration, Development, Mining, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 36 (Wild Dog Creek): Agriculture, Conservation/Restoration, Development, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 37 (Granny Dismal Creek): Agriculture, Conservation/Restoration, Development, Oil and Gas, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

Unit 38 (Rockbridge Fork): Conservation/Restoration, Recreation, Silviculture/Timber, Forest Management, Transportation, Water Quality.

A Federal nexus exists for any actions undertaken by a Federal agency which would be the majority of the area in Unit 15 and Units 18-29, which are at least partially federally-owned (administered by DBNF). The specific actions likely to be undertaken by the DBNF include: Conservation/ Restoration, Recreation, Forest Management, Silviculture/Timber, and Water Quality. For in-holdings within these units, conversion of lands for Agriculture, Development, Mining, Oil and Gas, and Transportation may require consultation, if it involves Federal funding or requires a Federal permit, such as an authorization to use DBNF roads to access the in-holding. The remaining units are in State ownership (Units 3 and 4) or private ownership (multiple units). A Federal nexus may exist for land conversion to Agriculture, Development, Mining, Oil and Gas, and Transportation and may require consultation. Land clearing for roads (Transportation) and Utilities will often have a Federal nexus (e.g., federal funding through the Federal Highway Administration) on all lands within the critical habitat units.

Are there energy supply, distribution, or use sectors that are reasonably likely to be affected by this critical habitat designation?

Yes. Surface coal mining, oil and gas leases, gas pipelines, or power lines could potentially occur in any of the proposed critical habitat units but are most likely to occur on private lands.

2. Consultation History Within The Critical Habitat Designation Area

The consultation history (2010-2015) within the critical habitat designation area is limited to three informal consultations with the USFS (DBNF). Two projects are ongoing and the third project is complete. The first two projects involve culvert replacements on the Redbird District of the DBNF on Gilberts Big Creek (Unit 24) and Sugar Creek (Unit 25). The USFS contacted the Service regarding potential impacts to snuffbox (*Epioblasma triquetra*), a federally endangered mussel, and other sensitive species. The Service responded with a “no effect” determination for snuffbox as no suitable habitat is located within the proposed project area. The Service is awaiting receipt of a biological assessment/evaluation (BAE) that will address potential impacts to Kentucky arrow darters.

The third project, which is complete, involved the construction of a retaining wall and reconditioning of approximately 450 linear feet of Big Double Creek Road, which is adjacent to proposed Unit 26 on the DBNF in Clay County. The USFS proposed improvements to Big Double Creek Road in order to minimize the amount of sediment leaving the road and entering Big Double Creek. The Service concurred with the USFS’ determination that proposed conservation measures detailed in the biological assessment and evaluation (BAE) were adequate and the project would have no effect on listed species. The USFS BAE did conclude that implementation of the project may cause direct adverse impacts to Kentucky arrow darters in Big Double Creek. To alleviate these impacts, the USFS agreed to apply stringent sediment and erosion control measures during all construction activities and to follow all requirements of State and Federal water quality certifications. To avoid mortality of Kentucky arrow darters during construction activities, the USFS conducted project activities during low flow periods (late summer to fall) and, prior to dewatering, they collected and move all fishes (including Kentucky arrow darters) away from (upstream of) the impact area. Block nets were placed to prevent fish movement back into the impact area. Based on these conservation measures, the Service agreed that adverse impacts to Kentucky arrow darters would be minimal, and the project would not elicit population or species-level responses which could lead to jeopardy.

For the period 2010 to 2015, the Service’s Kentucky Ecological Services Field Office also completed numerous informal consultations outside the critical habitat designation area but within the species’ historical range (upper Kentucky River drainage). These consultations can be grouped into five general categories: (1) Corps section 404 permits (for highway construction, surface coal mining, oil/gas exploration activities); (2) development projects, including highway construction, commercial development, and water line installations; (3) mining permits; (4) USFS activities (prescribed burns, mid-story removal, fuels treatments, pre-commercial thinning); and (5) intra-Service reviews of section 10 recovery permits. Our conservation recommendations varied with the activity, but most of our comments were focused on listed bats (e.g., Indiana bat and gray bat). With respect to aquatic habitats, we provided general comments about eliminating or minimizing threats to water quality and instream habitat quality. Our major concerns were siltation, water pollution, disturbance of riparian corridors, and changes in channel morphology.

V. CONCLUSION

Because all of the units being proposed for designation as critical habitat are occupied, we do not expect that the critical habitat designation will result in any additional consultations. All currently occupied habitats for the Kentucky arrow darter are being proposed for designation as critical habitat. The anticipated project modifications to avoid adverse modification to Kentucky arrow darter critical habitat will be similar to the management recommendations to avoid jeopardy. Thus, it is unlikely that we would determine that a project would result in adverse modification of critical habitat and not also jeopardy. Furthermore, because the critical habitat and known species range are identical, the implementation of reasonable and prudent alternatives associated with avoidance of jeopardy of the species would also avoid adverse modification of the critical habitat.

In projects where we determine that an adverse modification finding may be likely, we work with the Federal agency involved to identify reasonable and prudent alternatives that would eliminate or reduce those impacts to a point where adverse modification is no longer likely. The resulting project modifications would appropriately be considered to be incremental costs of the critical habitat designation. However, as stated above, we do not expect a situation where a project would result in an adverse modification finding absent a jeopardy finding.



Blihovde, Stefanie <stefanie_blihovde@fws.gov>

Edits to Exhibit 1 in Economic Screening Analysis - KY Arrow Darter

Floyd, Mike <mike_floyd@fws.gov>

Wed, Sep 2, 2015 at 12:55 PM

To: Stefanie Blihovde <stefanie_blihovde@fws.gov>, Colleen Donovan <CDonovan@stratusconsulting.com>

Cc: Carey Galst <carey_galst@fws.gov>

I reviewed the land use sector information provided in the IEM for Units 17, 33-35. "Conservation/Restoration" should not be included as a land use sector for these units, so I believe it is appropriate to modify Exhibit 1 by removing the "Y" for these units in the last column of the table (Conservation Efforts in the Area).

Michael

—

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Memorandum

Environment and Natural Resources Division



Date September 11, 2015

To Carey Galst, Stefanie Blihovde, U.S. Fish and Wildlife Service

From Colleen Donovan, Michelle Manion, Cristina Cornejo, Susie Bresney, and Annie Brown, Abt Associates Inc.

Subject Screening Analysis of the Likely Economic Impacts of Critical Habitat Designation for the Kentucky Arrow Darter

The U.S. Fish and Wildlife Service (Service) intends to publish a proposed rule to designate critical habitat for the Kentucky arrow darter (*Etheostoma spilotum*). As part of the rulemaking process, the Service must consider the economic impacts, including costs and benefits, of the proposed rule and fulfill two requirements:

- **Executive Order (EO) 12866 Regulatory Planning and Review:** directs Agencies to assess the costs and benefits of regulatory actions. If an action may have an effect on the U.S. economy of \$100 million or more in any one year, these costs and benefits must be quantified; and
- **Section 4(b)(2) of the Endangered Species Act (the Act):** requires the Secretary of the Interior and the Service to consider the economic, national security, and other impacts prior to designating CH.

This memorandum provides the Service with information on the economic impacts of the proposed critical habitat designation (CHD) with the goal of determining the likelihood of costs exceeding \$100 million in a single year. If the costs and benefits do not exceed \$100 million in one year, then a qualitative assessment may be sufficient according to EO 12866.

To prepare this assessment, we relied on: (1) the draft proposed rule and associated geographic information systems data layers; (2) the Service's incremental effects memorandum (IEM), which is described in greater detail later in this memorandum; (3) the results of the Service's outreach efforts to other Federal agencies concerning the likely effects of CHD; (4) outreach efforts to local and state agencies to determine whether CH would trigger additional requirements under local ordinances or state regulations.

Summary of Findings

Critical habitat for the Kentucky arrow darter is unlikely to generate costs exceeding \$100 million in a single year. The potential benefits associated with critical habitat designation are highly uncertain, and quantification of these benefits is beyond the scope of this memorandum and Executive Order 12866.

Section 7 Costs

Because all CH units are occupied by the species, it is unlikely that costs will result from consultations considering CH alone, consultations resulting in adverse modifications alone, or project modifications attributable to CH alone. The only incremental costs we anticipate are administrative costs due to the additional consideration of adverse modification of critical habitat (CH) during section 7 consultations. Based on limited data and conversations with various federal and state agencies we predict 3.3 to 4.2 technical assistance, 57.6 to 67.1 informal consultations, and 2.7 to 3.6 formal consultations per year that will consider CH.

Other Costs

- Based on conversations with state and local agencies, we do not anticipate that the proposed critical habitat designation (CHD) will trigger additional requirements under state regulations or local ordinances and therefore do not anticipate any costs associated with them.
- Approximately one quarter of the total proposed CH acreage lies within the Daniel Boone National Forest (DBNF), which already takes measures to protect the Kentucky arrow darter and its habitat and is therefore unlikely to experience stigma effects. The 4.5 percent of the total proposed CH acreage within state-owned lands are also unlikely to experience stigma effects. The remaining proposed CH acreage occurs on private lands with limited development potential. For these reasons, any stigma or perceptual effects on private lands, if they occur, will likely be minimal. Due to limited data availability, however, we are unable to monetize these other costs associated with stigma or perceptual effects.

Benefits

Based on the finding that stigma or perceptual effects, if they occur, will likely be minimal, we can assume that benefits will also be minimal. Due to limited data availability, however, we are unable to monetize these benefits.

Geographic Distribution of Costs

We do not have sufficient data at this time to indicate that any concentration of impacts to any geographic area or sector are likely at this time. Other incremental costs, such as those that could occur due to stigma effects, could affect private CH units disproportionately to federal and state units.

1. Background

The Kentucky arrow darter (*Etheostoma spilotum*) is a small, brightly colored fish that is restricted to the upper Kentucky River drainage in eastern Kentucky. The species typically inhabits pools or transitional areas between riffles and pools (glides and runs) in moderate- to high-gradient, first- to third-order streams with rocky substrates. Kentucky arrow darters use shallow riffles during the spawning season (April to June) and have an average lifespan of 3 to 4 years. The Service will propose listing the Kentucky arrow darter as a threatened species and designate CH for the species under the Act.

The Service is proposing to designate approximately 395 stream kilometers (skm) (246 stream miles) in 38 units as CH for the Kentucky arrow darter. All of the proposed CH units are located in Kentucky in portions of Breathitt, Clay, Harlan, Jackson, Knott, Lee, Leslie, Owsley, Perry, and Wolfe Counties. All units are occupied by the species, and none of these proposed units contain co-occurring listed species or existing CH for other listed species. Within the proposed designation, some of the units fall within the

Daniel Boone National Forest (DBNF) and are managed by the U.S. Forest Service (USFS). A Candidate Conservation Agreement (CCA) between the USFS, the DNBF, and the Service for the Kentucky arrow has been finalized as of August 31, 2015. The units affected by this agreement or other conservation efforts that benefit the Kentucky arrow darter are noted within Exhibit 1, which summarizes land ownership for each proposed CH unit. Exhibit 2 provides a map of the proposed CHD.

Exhibit 1. Summary of Land Ownership in Proposed Critical Habitat for the Kentucky Arrow Darter

CH Unit	County	Ownership (skm)			Conservation Efforts in the Area ¹
		Private	Federal	State	
1	Knott	1.1	0	0	
2	Knott	1.0	0	0	
3	Breathitt, Knott	0	0	11.0	Yes
4	Breathitt	0.1	0	6.9	Yes
5	Knott	19.8	0	0	
6	Knott	22.5	0	0	
7	Breathitt	2.2	0	0	
8	Breathitt	15.6	0	0	
9	Breathitt	26.4	0	0	
10	Wolfe	18.3	0	0	
11	Wolfe	3.8	0	0	
12	Lee, Wolfe	25.0	0	0	
13	Lee	12.0	0	0	
14	Harlan	9.1	0	0	
15	Leslie	0.7	3.4	0	Yes
16	Leslie	11.4	4.4	0	Yes
17	Perry	12.0	0	0	
18	Clay	0	5.7	0	Yes
19	Clay	0.2	6.6	0	Yes
20	Clay	1.7	4.0	0	Yes
21	Clay	3.6	5.6	0	Yes
22	Leslie	2.0	11.6	0	Yes
23	Leslie	3.0	6.6	0	Yes
24	Clay, Leslie	2.0	5.2	0	Yes
25	Clay, Leslie	1.1	6.1	0	Yes
26	Clay	0	10.3	0	Yes
27	Clay	0	3.4	0	Yes
28	Clay	5.4	0.5	0	Yes
29	Clay	0	2.2	0	Yes
30	Clay	3.0	2.0	0	Yes
31	Clay	21.3	0.4	0	Yes
32	Owsley	23.2	14.9	0	Yes
33	Lee, Owsley	7.3	0	0	
34	Lee	6.2	0	0	
35	Jackson	4.1	0	0	
36	Jackson, Owsley	4.3	3.8	0	Yes

¹ Personal communication with Michael Floyd at the Service on September 2, 2015.

CH Unit	County	Ownership (skm)			Conservation Efforts in the Area ¹
		Private	Federal	State	
37	Jackson, Owsley	4.4	2.5	0	Yes
38	Wolfe	0	4.5	0	Yes
Total		273.8	103.7	17.9	-
Total Length of proposed CH		395.4			-

The species has not been listed under the Act, therefore there have been no official consultations directly related to the species. However, two agencies, the USFS and the Kentucky Transportation Cabinet (KYTC), have been voluntarily conferring regarding the Kentucky arrow darter because it has been a candidate species since 2010. The Service has also provided a list of consultations for other species in the vicinity of the proposed CH area, including three informal consultations with the USFS and numerous others related to development projects, mining, and U.S. Army Corps of Engineers (USACE) Section 404 permits. The Service has identified the following land use sectors that may affect the Kentucky arrow darter habitat: Agriculture; Conservation/Restoration; Development; Forest Management; Grazing; Mining; Oil and Gas Development; Silviculture/Timber; Transportation; and Water Quality.² Through conversations with state and federal agencies³, we have identified specific activities within these sectors that may affect the Kentucky arrow darter and its habitat, including right of way expansions, bridge replacements, sand and gravel mining, culvert replacements, stream restoration, vegetation management (e.g., timber sales and timber stand improvement/thinning), and recreation management (e.g., trail and road maintenance).

2. Framework

The Office of Management and Budget (OMB) calls for the Service to conduct an economic analysis to measure the cost and benefits of any regulatory action against a baseline. The economic impact of the CHD includes any effects incremental to this baseline. The OMB defines the baseline as the “best assessment of the way the world would look absent the proposed action.”⁴ This baseline includes any existing regulatory and socio-economic impacts experienced by landowners, managers, and other resource owners who may be affected by the CHD. The economic impact of the listing of the species under the Act is also included in the baseline, even if this listing is concurrent with the CHD. This screening analysis memorandum addresses impacts of CHD that are incremental to the baseline and are thus solely attributable to the designation of CH.

In this memo we categorize the economic impact of the proposed CH into two key areas: (1) incremental effects generated by section 7 of the Act and (2) other incremental impacts beyond section 7.

Incremental section 7 impacts: Activities with a Federal nexus (e.g., via Federal funding, or Federal permits) that may affect listed species require Federal agencies to take part in a section 7 consultation. This consultation considers whether the proposed action may jeopardize the existence of the species even

² U.S. Fish and Wildlife Service, Incremental Effects Memo for Critical Habitat Designation for the Kentucky Arrow Darter.

³ Personal communication with Biologist at the DBNF on Aug 18, 2015. Personal communication with Environmental Protection Specialist at the USDOT on Aug 18, 2015. Personal communication with Senior Biologist at the KYTC on Aug 19, 2015. Personal communication with Chief of the South Section Regulatory Branch, USACE on Aug 18, 2015.

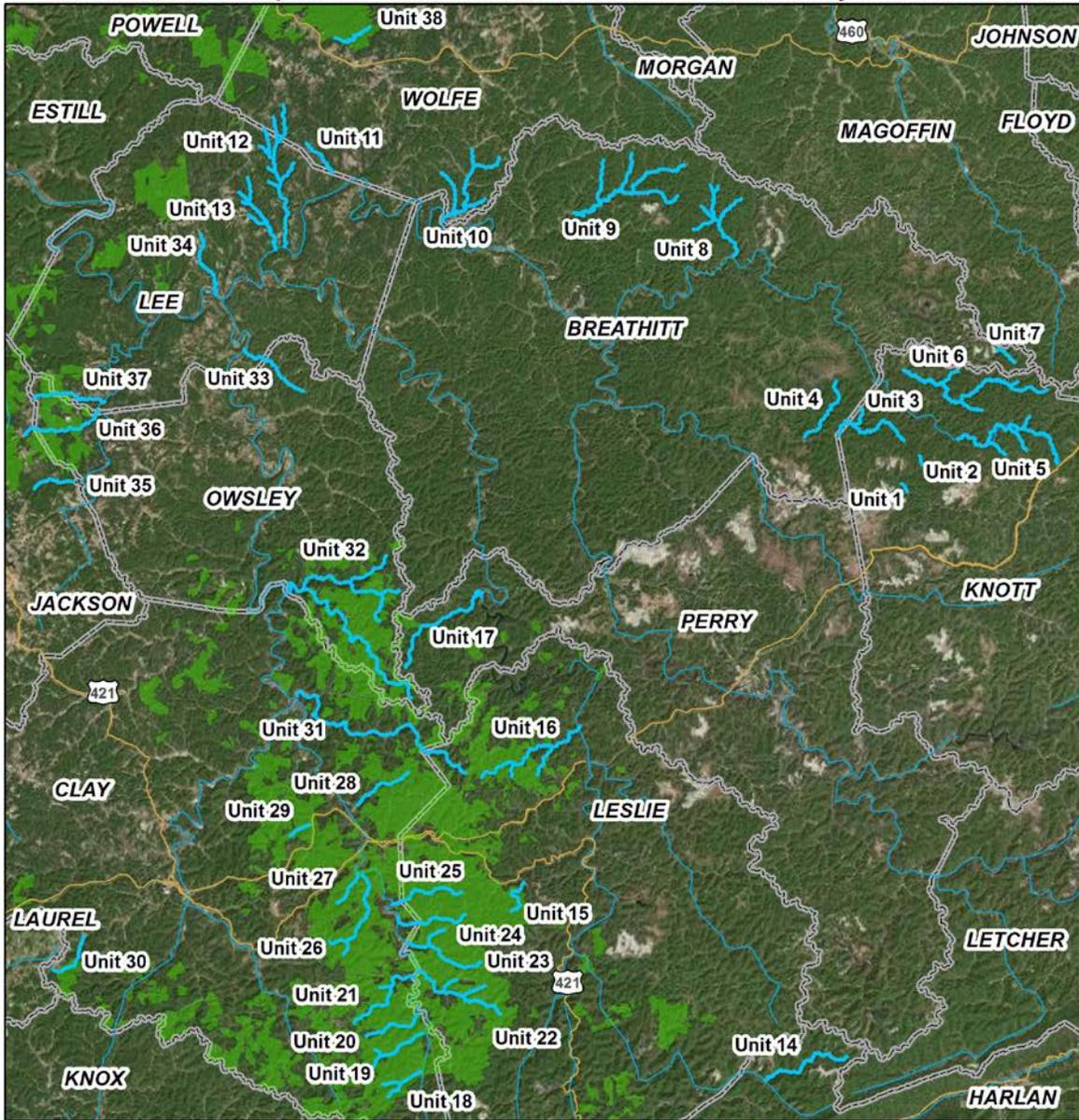
⁴ OMB, “Circular A-4,” September 17, 2003, available at http://www.whitehouse.gov/omb/circulars_a004_a-4. Circular A-4 provides “guidance to Federal Agencies on the development of regulatory analysis as required under Section 6(a)(3)(c) of Executive Order 12866...” (p. 1)

if the Service has not designated CH for a particular species. The designation of CH requires an additional analysis within these section 7 consultations to determine if the action will result in the destruction or adverse modification of the designated CH and diminish its recovery potential and conservation value. These consultations are the means through which the Service implements the CH designation. Any time and effort spent on this additional adverse modification analysis as well as the costs and benefits of the recommendations or project modifications resulting from this review are considered an incremental effect of CH.

Other incremental effects: A CHD may have other incremental effects including, additional regulatory changes in government agencies, changes in behavior by landowners, or stigma (perceptual) effects. For example, Federal, state, and local permitting or regulatory agencies may make changes or expand standards or requirements because of CH. In addition, landowners, buyers and other stakeholders may perceive that CHD imposes costs, restrictions, or prohibitions on activities *beyond its actual impacts*. For example, developers may incorrectly perceive that land is less valuable after it is designated as CH, or that costs associated with CHD are too high to justify conducting certain activities on lands designated as CH.

Exhibit 2. Overview of Proposed CH for the Kentucky Arrow Darter

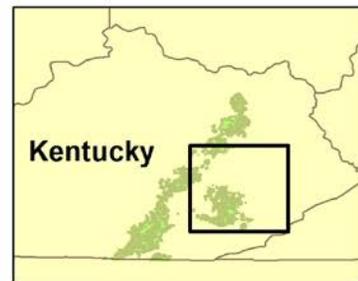
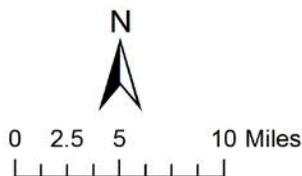
Overview of Proposed Critical Habitat for the Kentucky Arrow Darter



Legend

-  Proposed Critical Habitat
-  Daniel Boone National Forest
-  Counties

Sources:
1. U.S. Fish and Wildlife Service
2. ESRI



3. Incremental Section 7 Impacts

3.1 Estimated Number of Future Section 7 Consultations

3.1.1 Federal Land (Units 15, 18-29)

A Federal nexus exists for any actions undertaken by a Federal agency, and this includes the majority of areas in Unit 15 and Units 18-29. This land is at least partially federally-owned and is administered and managed by the USFS's DBNF. Activities undertaken by the USFS in DBNF that will likely require a consultation include: forest management (vegetation management, timber stand improvement (thinning of trees), prescribed burning, wildfire suppression), mining, oil and gas, recreation (trail and road maintenance), silviculture/timber, transportation (road repairs), and water quality (culvert replacements for aquatic organism passage).⁵ On in-holdings managed by the USFS within these CH units, conversions of lands for agriculture, development, oil and gas, and transportation may require a consultation if federally funded or if the action requires a Federal permit such as a road use permit, while conversions of lands for mining in this area will always have a Federal nexus.⁶

The DBNF has designated the Kentucky arrow darter as a forest-sensitive species because it is a candidate for listing under the Act. The USFS has an internal requirement to analyze project effects on forest-sensitive species and discuss this with the Service, similar to the section 7 consultation process. All candidate species for Federal listing under the Act are included on the USFS DBNF's list of forest-sensitive species. This is an informal process that is not required by the Service and therefore the USFS refers to these discussions as conference opinions rather than consultations. DBNF estimates that it has carried out 12 conference opinions within the past year for the Kentucky arrow darter, even though the species has not yet been listed under the Act.⁷

When the species is listed, the USFS anticipates consultation for the following projects: 1) Emergency Relief for Federally Owned roads program (a project called ERFO); 2) a project dealing with road repairs; 3) a culvert replacement on Granny's Branch among other culvert replacements; 4) a vegetation management project in Spring Creek; 5) other small projects such as oil well roads; 6) and other restoration projects which are still in the early planning phases.⁸

The USFS conducts 10 to 12 consultations over the course of the year, and rarely are any of these consultations initiated for only one species.⁹ They estimate about 15 percent of the consultations they do are Technical Assistance, 84 percent are informal, and 1 percent or fewer are formal. They do not anticipate that adding the Kentucky arrow darter to consultations already considering multiple species will substantially increase their work load for consultations.¹⁰ For this reason, we assume that the USFS will not see an increase in the quantity or complexity of consultations due to the listing or CHD of the Kentucky arrow darter. Using the distribution of consultation type (15%, 84%, <1%) provided by the USFS, we calculate how many of the 10 to 12 yearly consultations are projected to be technical assistance, informal, and formal consultations. The results of these calculations are in Exhibit 3.

⁵ Personal communication with Biologist at the DBNF on Aug 18, 2015. U.S. Fish and Wildlife Service, Incremental Effects Memo for Critical Habitat Designation for the Kentucky Arrow Darter.

⁶ U.S. Fish and Wildlife Service, Incremental Effects Memo for Critical Habitat Designation for the Kentucky Arrow Darter.

⁷ Ibid

⁸ Personal communication with Biologist at the DBNF on Aug 18, 2015.

⁹ Personal communication with Biologist at the DBNF on Aug 18, 2015.

¹⁰ Ibid.

3.1.2 State (Units 3 and 4) and Private Land (1-2, 5-14, 16-17, 30-38)

The remaining units are owned by the State (Unit 3 and 4) or by private landowners (all other units). Activities in these units that may require consultation include land conversion to agriculture, development, mining, oil and gas, and transportation, provided that a Federal nexus exists.

The KYTC consults frequently with the Service because all state highway projects have a Federal nexus through the U.S. Department of Transportation (USDOT), and these projects are often highly impactful. Agreements between the state and the Service place the majority of the responsibility of consultations on the KYTC; therefore, the USDOT is not heavily involved with the consultation process. Types of projects that the KYTC has consulted on in the past and that it anticipates will require consultation for the Kentucky arrow darter in the future include: new alignments (new road construction), right-of-way expansions, and bridge replacements and removal. Similarly to the USFS, KYTC has already been informally conferring with the Service regarding the Kentucky arrow darter for the past two years. This is because many projects are ongoing and long-term, and the KYTC wants to ensure that it will not have to reinitiate consultation after a project has started due to the official listing and CHD of the species.¹¹

An individual at KYTC estimates that KYTC has completed 10 to 15 informal consultations so far this year (over 8 months) for the Kentucky arrow darter.¹² Because KYTC has been consulting the Service as if the Kentucky arrow darter is already listed, it does not anticipate an increase in the number of consultations due to the proposed listing or CHD. Using this number to calculate a monthly estimate for informal consultation, we can then extrapolate and estimate the number of informal consultations the KYTC can expect in one year. As shown in Exhibit 3, this equals 15 to 22.4 consultations. An estimated 90 percent of the consultations the KYTC completes are informal; the remaining consultations are formal. Using this distribution and the estimate we gathered for annual number of informal consultations, we can calculate the projected annual number of formal consultations.¹³

Additionally, the NRCS administers the Emergency Watershed Program, which is a recovery program for areas affected by natural disasters. Within the past year, the NRCS has reviewed or implemented 33 projects through this program in the ten counties containing the proposed CH. Although the number of projects varies greatly because they are weather-related, the NRCS assumes that on average about the same number of projects, and therefore informal consultations, will occur yearly into the future.¹⁴

The majority of other projects with a Federal nexus in the area require a section 404 permit from the USACE. USACE consults often for projects requiring a section 404 permit. The type of projects requiring these permits include: housing developments, building warehouses, commercial development, activities with facilities located on rivers, sand and gravel mining, and coal mining. Since 2011, USACE has consulted with the Service on 13 projects for the blackside dace. Because the blackside dace and its habitat are similar to the Kentucky arrow darter, we assume that, on average, the same number of consultations will occur for the Kentucky arrow darter once it is listed and CH is designated. On average, USACE participates in three to four consultations per year for the blackside dace. Of these consultations, 39 percent are informal and 61 percent are technical assistance; there have been no formal consultations.¹⁵

¹¹ Personal communication with Senior Biologist at the KYTC on Aug 19, 2015.

¹² Ibid.

¹³ We know that a range of 15 to 22.4 represents approximately 90 percent of the total number of consultations. In order to find the total number of consultations, we use a simple proportion $\frac{15}{x} = \frac{90}{100}$ and $\frac{22.4}{x} = \frac{90}{100}$; $x = 16.66, 24.8$ so the range for the annual number of formal consultations is 1.66 to 2.4 ($16.66 - 15 = 1.66, 24.8 - 22.4 = 2.4$)

¹⁴ NRCS IEM Response Letter to the Service dated July 8, 2015.

¹⁵ Information pulled from the Service's TAILS database on Sept. 3, 2015.

Using this distribution, we calculate the annual number of formal, informal and technical assistance consultations. The results of these calculations are in Exhibit 3.

3.1.3 All Critical Habitat Units

In all units, there are some activities that often have a Federal nexus and will require a section 7 consultation. In particular, activities involving transportation (such as land clearing for roads funded through the Federal Highway Administration) and utilities will likely require a section 7 consultation.¹⁶

Exhibit 3 summarizes the projected activities and number of section 7 consultations required for the Kentucky arrow darter. It should be noted that the USDOT occasionally participates in the KYTC consultations as the appropriate Federal action agency. Similarly, the USACE often participates in consultations for all projects requiring section 404 permits, but we have not included them in Exhibit 3 to avoid double-counting consultations.

¹⁶ U.S. Fish and Wildlife Service, Incremental Effects Memo for Critical Habitat Designation for the Kentucky Arrow Darter.

Exhibit 3. Summary of Estimated Number of Section 7 Consultations Addressing the Kentucky Arrow Darter and its Critical Habitat^a

Units	Project Lead (Acting Agency)	Annual number			Activities (No. of Projects Projected) ^d
		Technical Assistance	Informal consultations	Formal consultations	
15, 18-29	USFS ^b	1.5-1.8	8.4-10.1	1-1.2	Forest management (1) Mining Oil and gas (1) Recreation Silviculture/timber Transportation (1) Water Quality (1)
1-14, 16-17, 30-38	KYTC (USDOT)	Unknown	15-22.4 ^c	1.7-2.4	Bridge replacement (1) New alignments Right of way expansions Bridge removal
1-14, 16-17, 30-38	State/ private entities (USACE)	1.8-2.4	1.2-1.6 ^e	0	Housing developments Building warehouses Commercial development Sand and gravel mining Coal mining Activities for facilities located on rivers
All units	NRCS	Unknown	33	Unknown	Emergency Watershed Program (30)

^a We assumed that all projected consultations included consideration for CHD. Rationale for this assumption is further explained in section 3.2 below.

^b Values include NRCS and Bureau of Land Management activities where USFS is the acting agency.

^c Estimated range of 10 to 15 over 8 months was extrapolated to 12 months.

^d All activities in the “Activities” column are likely to require consultation for the Kentucky arrow darter in the future. Numbers in parentheses refer to number of projects known or planned at the time of this analysis that involve that activity. For example, although only 4 specific future projects for the USFS are known at this time, the USFS still anticipates completing 10 to 12 informal, formal, or technical assistance consultations each year for any of the activities listed.

^e Sample calculation that applies to both USFS estimates and USACE estimates: The total number of yearly consultations for USACE is 3 to 4 and 39 percent of these are informal. So $0.39 \times 3 = 1.17$ and $0.39 \times 4 = 1.56$; the range of informal consultations is 1.2 to 1.6

3.2 Incremental Effects of Section 7 Consultations

When considering incremental effects of CHD, we first evaluate the outcomes of section 7 consultations in the proposed CH area. In order to determine this impact, we must consider four questions:

- (1) Will CH initiate new consultations for projects where Federal action agencies would not have otherwise considered effects of CHD?
- (2) Is it possible for the Service to find that a project may adversely modify or destroy CH without jeopardizing the existence of the species if the species is present at the time of consultation?
- (3) Will consultations occur that require consideration for both the jeopardy standard and CH within the same consultations?
- (4) Will the consideration of the adverse modification of CH alter the outcome of consultations for the jeopardy analysis which in turn results in additional project modifications?

If the answer is affirmative for any of these three questions, it is possible that incremental effects would result from the proposed CHD.

3.2.1 Potential for New Section 7 Consultations Initiated Solely due to Critical Habitat

Section 7 consultations initiated solely because of the CHD would constitute an incremental effect of the CHD. In the case of the Kentucky arrow darter, we do not anticipate any new projects to initiate a section 7 consultation as a result of CHD alone. The bullets below outline the logic for this finding.

- The Service states in the IEM that all proposed CH units are "within the geographical area occupied by the species at the time of listing." Because the proposed CH units are all occupied, any section 7 consultation will be initiated because of the occupancy of the species *and* the potential effects to the species.
- The Service states in the IEM that all proposed CH units "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." Therefore, threats to the species' habitat are threats to the species itself.

For these reasons, we anticipate that section 7 consultations for the Kentucky arrow darter are most likely to be initiated because of the listing rather than due to the CHD. We therefore assume there will be no substantial incremental administrative costs associated with section 7 consultations initiated solely on the basis of CHD.

3.2.2 Potential for Adverse Modification without Jeopardy

We have determined that consultations considering CH alone without considering the jeopardy standard are not likely. For the same reason this is not likely, it is also unlikely that there will be a consultation that determines a project adversely modifies habitat without also jeopardizing the species. Because the Kentucky arrow darter is so linked to its habitat, if the species is jeopardized, the habitat is also likely at risk of adverse modification and vice versa. For this reason, the Service notes that it is very unlikely that a consultation would determine that a project will result in adverse modification of CH without a jeopardy finding.¹⁷ We assume there will be no substantial incremental costs due to adverse modifications findings alone.

3.2.3 Potential for Section 7 Consultations Considering Jeopardy and Critical Habitat

Although we do not anticipate any section 7 consultations will occur that consider CH alone, we do anticipate there will be consultations that consider both the jeopardy of the species and CH. For reasons stated previously, we have assumed that all projected consultations within each unit will be of this type. The additional administrative effort to include CH in these consultations is considered incremental. We have estimated these incremental administrative costs in section 3.3 below.

3.2.4 Potential for Incremental Project Modifications

During the section 7 consultation process, the Service may suggest project modifications to ensure the project does not jeopardize the continued existence of a species or adversely modify its habitat. We do not have evidence suggesting that this designation would result in project modifications or conservation measures required to prevent adverse modification of the habitat that would not be required to prevent

¹⁷ U.S. Fish and Wildlife Service, Incremental Effects Memo for Critical Habitat Designation for the Kentucky Arrow Darter.

jeopardy of the species. The Service has noted the close relationship between the Kentucky arrow darter populations and the characteristics of their habitat. In fact, the physical or biological features that define CH are also essential for the survival of the Kentucky arrow darter; therefore, any alterations of habitat are likely to affect the viability of the Kentucky arrow darter. For this reason, the results of the consultation under the adverse modification and jeopardy standards are likely to be similar and therefore, we do not anticipate any incremental effects from additional project modifications or other requirements.

The USFS noted that in general, project implementation costs may increase as a result of CHD due to tighter restrictions on projects or the requirement to use best management practices (BMPs). However, in the case of the Kentucky arrow darter, the USFS does not anticipate any of its projects would result in adverse modifications and therefore additional project modifications due to the strict BMPs, strong stream and riparian area protective buffers and other standards already in place within the forest. This further supports our assumption that there will not be additional project modification requirements to address adverse modification. Based on this information, we expect that project modifications will not differ considerably from those recommended under the jeopardy standard; therefore we assume there will be no substantial incremental costs for additional project modifications due to CH.

3.3 Incremental Administrative Costs for Section 7 Consultations

3.3.1 Incremental Administrative Costs for Federal Agencies

Section 7 consultations that address both the jeopardy standard and adverse modification will result in incremental administrative costs. The administrative costs associated with the analysis to ensure that the project will not adversely modify the CH, which are additional to the costs for the analysis to ensure that the project will not jeopardize the species, are considered incremental. These are the only incremental costs we anticipate resulting from this proposed CH rule. Previous analyses have estimated that the additional effort associated with adverse modification results in a 10 to 15 percent increase in administrative costs.¹⁸ Although the Federal agencies we contacted were not able to quantify these costs from past consultations, two agencies confirmed that adding consideration for CHD to a consultation also initiated for the jeopardy standard does not substantially increase administrative time or cost required.¹⁹

3.3.2 Incremental Administrative Costs for State and Private Entities

When there is a Federal nexus for state or private projects, the state or private entity is often responsible for the majority of the work associated with section 7 consultations.²⁰ Although the available evidence suggests that administrative costs for CHD consultation incurred by Federal agencies are minimal, they may vary considerably at the state or private level. For transportation projects, KYTC staff estimated that adding CHD to a consultation could increase the overall cost by 50 to 75 percent.²¹ We were unable to gain estimates for non-transportation projects involving a Federal nexus and thus requiring consultation with the Service. Examples of projects in this category include those requiring a section 404 permit or involving participation in an NRCS program. Therefore, we assume that incremental costs to state and

¹⁸ Previous studies cited in the U.S. Fish and Wildlife Service in the Incremental Effects Memo for Critical Habitat Designation for the Kentucky Arrow Darter.

¹⁹ Personal communication with USFS Biologist at the DBNF on Aug 18, 2015. Personal communication with Environmental Protection Specialist at the USDOT on Aug 18, 2015.

²⁰ Personal communication with Environmental Protection Specialist at the USDOT on Aug 18, 2015. Personal communication with Senior Biologist at the KYTC on Aug 19, 2015.

²¹ Personal communication with Senior Biologist at the KYTC on Aug 19, 2015.

private entities are similar to those borne by Federal agencies for non-transportation projects, which are minimal.²²

For transportation projects in the proposed CH area involving a Federal nexus, we estimated the maximum and minimum incremental costs of consultations to state and private agencies (see Exhibit 4) based on the following assumptions.

- All projected section 7 consultations will address both the jeopardy standard and adverse modification of CH. This assumption makes our estimation of consultations more conservative because consultations may exist outside of the proposed CH area that addresses the jeopardy standard only.
- The costs of an informal consultation considering jeopardy and adverse modification could range from \$15,000 to \$50,000 per consultation.²³
- The cost of a formal consultation with the same considerations could range from \$75,000 to \$150,000.²⁴
- We use these estimates to calculate the incremental cost associated with adding CHD to a consultation on a transportation project. However, it is important to note that this estimate and the associated costs were based on the opinion of a single KYTC staff and were not validated by additional discussions with other staff.
- At the high end of the range, based on a 75 percent increase in costs due to CH²⁵, 43 percent of the total cost is a result of the additional analysis needed for the CHD.²⁶ For example, if the cost of a consultation for jeopardy alone is \$100, then adding the additional analysis needed for CH would increase the cost by \$75 (75 percent of \$100), bringing the total to \$175. The \$75 increase is 43 percent (\$75 divided by \$175) of the total cost for considering jeopardy and adverse modification. In other words, 43 percent of the new total consultation cost is due to the CHD. At the low end of the range, based on a 10 percent increase in costs due to CH²⁷, nine percent of the total cost is a result of the additional analysis needed for the CHD.²⁸

3.3.3 Summary of Incremental Administrative Costs

In Exhibit 4, we present the estimated incremental administrative costs for section 7 consultations for the Kentucky arrow darter. The bullets below outline our assumptions regarding the incremental administrative costs of section 7 consultations for the Kentucky arrow darter.

- A minimal increase in administrative costs for Federal agencies
- Administrative costs for state entities involved in transportation projects are based on the information provided by the KYTC (see bullets in Section 3.3.2).

²² Personal communication with the Service on Sept. 3, 2015.

²³ Personal communication with Senior Biologist at the KYTC on Aug 19, 2015.

²⁴ Ibid.

²⁵ Ibid.

²⁶ $\$100 + \$75 = \$175, \frac{\$75}{\$175} = 0.43; 1.00 + 0.75 = 1.75, \frac{0.75}{1.75} = 0.43$

²⁷ Previous studies cited in the U.S. Fish and Wildlife Service in the Incremental Effects Memo for Critical Habitat Designation for the Kentucky Arrow Darter.

²⁸ $1.00 + 0.10 = 1.10, \frac{0.10}{1.10} = 0.09$

- A minimal increase in administrative costs for state and private entities for non-transportation projects. Because of the unique nature and larger scope of transportation projects we cannot make the assumption that non-transportation projects will have a similar cost profile.

The cost estimates presented in Exhibit 4 are not based on actual cost data but rather on estimates gathered from conversations with members of various federal and state agencies. For this reason we do not present an exact total estimate for incremental administrative costs associated with CH in Exhibit 4. Based on the limited information we gathered, however, it is unlikely that these costs will exceed \$100 million per year.

Exhibit 4. Summary of Estimated Incremental Administrative Costs of Section 7 Consultations (\$2015)

Agency	Technical Assistance ^a		Informal consultation ^a		Formal consultations ^a	
	Annual number	Incremental cost per consultation ^b	Annual number	Incremental cost per consultation ^b	Annual number	Incremental cost per consultation ^b
USFS	1.5-1.8	Minimal	8.4 - 10.1	Minimal	1-1.2	Minimal
KYTC (USDOT)	Unknown	n/a	15-22.4	\$1,350 ^c - 21,500 ^d	1.7-2.4	\$6,750 ^e - 64,500 ^f
State/private entities (USACE)	1.8-2.4*	Minimal*	1.2 – 1.6*	Minimal*	0*	Minimal*
NRCS	Unknown	Minimal*	33	Minimal*	Unknown	Minimal*

^a Costs marked as minimal are based on personal communications with two federal agencies who stated that adding CHD to a consultation already considering the jeopardy standard does not substantially increase administrative costs.²⁹

^b The likely maximum costs are calculated using the maximum cost estimates, maximum frequency estimates and an assumed 75 percent increase in costs due to CHD. The likely minimum total costs are calculated using the minimum cost estimates, minimum frequency estimates and an assumed 10 percent increase in cost due to CHD.

^c Calculated as \$15,000*0.09

^d Calculated as \$50,000*0.43 Note: These estimates came from personal conversation with an individual KYTC staff.

^e Calculated as \$75,000*0.09

^f Calculated as \$150,000*0.43 Note: These estimates came from personal conversation with an individual KYTC staff.

*We do not have firsthand evidence of these numbers – they have been inferred from estimations from firsthand information from other agencies or information on consultation history of similar species with similar critical habitat.

4. Other Incremental Effects

4.1.1 Federal, State, or Local Trigger Effects

Aside from the incremental costs of additional analysis associated CHD, the CHD could result in other indirect costs on projects in the area. One potential source of these costs is state and local laws and policies that can be triggered by the CHD. In some instances, state laws and local ordinances may expand standards or requirements for land and water use in an area after it has been designated as CH. Based on

²⁹ Personal communication with USFS Biologist at the DBNF on Aug 18, 2015.

Personal communication with Environmental Protection Specialist at the USDOT on Aug 18, 2015.

its experience, the Service believes that the designation of CH for the Kentucky arrow darter is unlikely to trigger additional requirements or project modifications under state or local laws or policies³⁰ Although we did not speak with officials in every county, conversations with local officials in two counties containing proposed CH supported this finding. Specifically, zoning and development laws do not exist at the county level, and they were not aware of additional ordinances triggered by CHD.³¹ A state official confirmed there are no ordinances at the state level and a city official stated he was unaware of any ordinances at the city level.³²

4.1.2 Perceptual or Stigma Effects

A second source of indirect costs associated with CH relates to the perceptual effects of CHD. Sometimes known as stigma effects, in some cases uncertainty about a future regulation and restrictions on land and water use in an area may cause landowners and buyers to devalue resources that fall within the CHD. These effects can be seen through changes in property values in the time after a CHD is announced. Stigma effects can be difficult to estimate and quantify.³³ In the case of the Kentucky arrow darter, there is reason to believe that these stigma effects will be minimal or unlikely, depending on what entity owns the land.

- **Federal land** is predominant in Units 15, 19–27, and 38 of CH. In these units, the USFS’s DBNF makes up over 50 percent of the acreage, which accounts for 26.3 percent of the total proposed critical habitat acreage. The DBNF already evaluates the effect of potential projects on this species because the Kentucky arrow darter is listed as a forest-sensitive species. The Kentucky arrow darter is also the subject of a new CCA between the USFS and the Service.³⁴ The agreement seeks to formalize existing conservation efforts in the DBNF and calls for the Service to make recommendations to DBNF to avoid or minimize potential impacts to the Kentucky arrow darter and its habitat.³⁵ Because the USFS has already been voluntarily conferring with the Service about the KAD and because the CCA formalizes existing conservation efforts, stigma effects are unlikely to occur.
- **State lands** are located in Units 3 and 4 and make up 4.5 percent of the total proposed critical habitat acreage. The Service does not anticipate any stigma effects for these areas known as the Robinson Forest streams.³⁶
- **Private lands** are located in all but six units and account for 69.2 percent of the total proposed CH acreage. Stigma effects may arise if land owners believe their property will decrease in value as a result of the proposed CHD. Certain land development actions in the proposed CH area could

³⁰ Personal communication with Michael Floyd, U.S. Fish and Wildlife Service, July 30, 2015.

³¹ Personal communications with the Perry County Judge Executive Office and Clay County judge’s office on Aug 18, 2015.

³² Personal communications with the Kentucky Department of Fish and Wildlife Resources office and Hazard City Manager on Aug 18, 2015.

³³ Changes in property values can result from changes in a wide range of variables, such as deteriorating macroeconomic or local conditions (e.g., an increase in property foreclosures). As such, it is difficult to establish whether a change in property values in or near an area designated as CH is solely attributable to stigma effects without employing advanced survey or other economic valuation techniques which can isolate the influence of CHD on property values. Employing these analytic techniques usually requires significant resources which are beyond the scope of this analysis.

³⁴ U.S. Fish and Wildlife Service, Incremental Effects Memo for Critical Habitat Designation for the Kentucky Arrow Darter.

³⁵ Personal communication with Michael Floyd, U.S. Fish and Wildlife Service, July 30, 2015.

³⁶ Personal communication with Michael Floyd, U.S. Fish and Wildlife Service September 9, 2015.

have a Federal nexus thus requiring a section 7 consultation. For example, land owners in southeastern Kentucky may be interested in new residential development, sand and gravel mining, the addition or expansion of stream crossings or other activities with a Federal nexus that may adversely affect the proposed CH. However, information indicates that the incremental effects related to potential stigma effects will be minimal on privately owned lands for two reasons:

- Approximately 40 percent of the CH unit stream lengths are located in a high flood risk floodplain, as determined by FEMA, which decreases the likelihood of new development in that area.
- All of the counties with proposed CH have undergone population decreases from 2010 to 2014³⁷, signifying that population increase and new residential development is unlikely in the proposed CH areas.

Based on the available information for federal, state and private lands within the proposed CH area, stigma effects, if they occur, are likely to be minimal. Without more information, however, we are unable to quantify this effect.

5. Other Economic Benefits

If perceptual effects described in section 4 cause changes in future land and water use, there may be benefits to the species and environmental quality such as improved water quality, stream habitat and other ecosystem services. The primary benefit of designating critical habitat is to support the conservation of threatened and endangered species, such as the Kentucky arrow darter. In order to quantify and monetize species conservation benefits one needs information on (1) how the critical habitat designation incrementally changes the probability of arrow darter conservation and (2) the public's willingness to pay for this incremental change. Due to existing data limitations, we are unable to assess the possible magnitude of such benefits.

6. Summary

In conclusion, the designation of CH for the Kentucky arrow darter is unlikely to result in costs exceeding \$100 million in one year. All of the units in the proposed CH are occupied so we do not expect any new section 7 consultations initiated because of CH alone. Based on limited data on consultation history for similar species and conversations with various federal and state agencies we forecast 3.3 to 4.2 technical assistance, 57.6 to 67.1 informal, and 2.7 to 3.6 formal consultations per year that will consider CH. Because the physical and biological features that define the CH are also essential to the Kentucky arrow darter's survival, we do not expect the outcomes of these consultations to differ from those under the jeopardy standard. It is also very unlikely that a consultation would result in an adverse modification finding and not also jeopardy. Thus overall incremental costs of consultations will likely be limited to additional administrative costs for CH analysis, which are unlikely to exceed \$100 million in one year.

Furthermore, based on the Service's past experience and analyses done for other species in the area, it is unlikely that CH will trigger any state or local ordinances that will further restrict land or water use in the area. It is also unlikely that stigma effects will exceed \$100 million in one year. On public land, a history

³⁷ Based on the U.S. Census Bureau 2010 Census of Population and their Population Estimates Program (PEP).

of conservation efforts and other endangered species already within the lands adjacent to the proposed CH, especially within the DBNF, suggests that in these areas project proponents are already taking the Kentucky arrow darter into account in their plans. As a result, we do not anticipate stigma effects on public lands. On privately owned land, a declining population and the fact that 40 percent of the land acreage is located within a high flood risk area suggests that development in the area will be minimal. Thus we expect any stigma effects associated with CHD, if they occur on private lands, to be minimal.

In summary, CH for the Kentucky arrow darter is unlikely to generate incremental costs exceeding \$100 million in a single year, trigger additional state regulations or local ordinances, generate substantial stigma effects on private lands or any stigma effects on public lands, or generate substantial benefits.