DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R4–ES–2018–0046; 4500030113]

RIN 1018–BD12

Endangered and Threatened Wildlife and Plants; Threatened Species Status With Section 4(d) Rule and Critical Habitat Designation for Atlantic Pigtoe

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule and 12-month finding.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce a 12-month finding on a petition to list the Atlantic pigtoe (*Fusconaia masoni*) as endangered or threatened under the Endangered Species Act of 1973, as amended (Act). The Atlantic pigtoe is a freshwater mussel native to Virginia, North Carolina, South Carolina, and Georgia. After review of the best available scientific and commercial information, we find that listing the Atlantic pigtoe as a threatened species is warranted. Accordingly, we propose to list it as a threatened species with a rule issued under section 4(d) of the Act (''4(d) rule''). We also propose to designate critical habitat under the Act. In total, approximately 542 river miles (872 river kilometers) in Virginia and North Carolina fall within the boundaries of the proposed critical habitat designation. Finally, we announce the availability of a draft economic analysis (DEA) of the proposed designation of critical habitat.

DATES: We will accept comments received or postmarked on or before December 10, 2018. Comments submitted electronically using the Federal eRulemaking Portal (see **ADDRESSES**, below) must be received by 11:59 p.m. Eastern Time on the closing date. We must receive requests for public hearings, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** by November 26, 2018.

ADDRESSES:

Written comments: You may submit comments by one of the following methods:

(1) *Electronically:* Go to the Federal eRulemaking Portal: *http://www.regulations.gov.* In the Search box, enter FWS–R4–ES–2018–0046, which is the docket number for this rulemaking. Then, click on the Search button. On the resulting page, in the Search panel on the left side of the screen, under the Document Type heading, click on the Proposed Rule box to locate this document. You may submit a comment by clicking on ''Comment Now!''

(2) *By hard copy:* Submit by U.S. mail or hand-delivery to: Public Comments Processing, Attn: FWS–R4–ES–2018–0046, U.S. Fish and Wildlife Service, MS: BPHC, 5275 Leesburg Pike, Falls Church, VA 22041–3803.

We request that you send comments only by the methods described above. We will post all comments on *http://www.regulations.gov.* This generally means that we will post any personal information you provide us (see Information Requested, below, for more information).

Availability of supporting materials: For the critical habitat designation, the coordinates or plot points or both from which the maps are generated are included in the administrative record and are available at *https://www.fws.gov/southeast/,* at *http://www.regulations.gov* under Docket No. FWS–R4–ES–2018–0046, and at the Raleigh Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**). Any additional tools or supporting information that we may develop for the critical habitat designation will also be available at the Service website and Field Office set out above, and may also be included in the preamble and/or at *http://www.regulations.gov.*

FOR FURTHER INFORMATION CONTACT: Pete Benjamin, Field Supervisor, U.S. Fish and Wildlife Service, Raleigh Ecological Services Field Office, 551F Pylon Drive, Raleigh, NC 27606; telephone 919–856–4520; or facsimile 919–856–4556. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, if we determine that a species may be an endangered or threatened species throughout all or a significant portion of its range, we are required to promptly publish a proposal in the **Federal Register** and make a determination on our proposal within 1 year. To the maximum extent prudent and determinable, we must designate critical habitat for any species that we determine to be an endangered or threatened species under the Act. Listing a species as an endangered or threatened species and designation of critical habitat can only be completed by issuing a rule.

This rule proposes the listing of the Atlantic pigtoe (*Fusconaia masoni*) as a threatened species with a 4(d) rule and proposes the designation of critical habitat.

The basis for our action. Under the Act, we may determine that a species is an endangered or threatened species based on any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. We have determined that habitat degradation (Factor A), resulting from the cumulative impacts of land use change and associated watershed-level effects on water quality, water quantity, habitat connectivity, and instream habitat suitability, poses the largest risk to future viability of the Atlantic pigtoe. This stressor is primarily related to habitat changes: The buildup of fine sediments, the loss of flowing water, instream habitat fragmentation, and impairment of water quality, and it is exacerbated by the effects of climate change (Factor E).

Section 4(b)(2) of the Act requires the Secretary of the Interior (Secretary) to designate critical habitat on the basis of the best available scientific data after taking into consideration the economic impact, the impact on national security, and any other relevant impact of specifying any particular area as critical habitat. The Act defines critical habitat as (i) the specific areas within the geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed if such areas are essential to the conservation of the species. In accordance with section 4(b)(2) of the Act, we prepared an analysis of the economic impacts of the proposed critical habitat designation.

Peer Review. In accordance with our joint policy on peer review published in the **Federal Register** on July 1, 1994 (59 FR 34270) and our August 22, 2016, memorandum updating and clarifying the role of peer review of listing actions under the Act, we sought the expert opinions of six appropriate specialists regarding the species status assessment report, which informed th this proposed rule. The purpose of peer review is to ensure that the science behind our listing determination, the critical habitat

determination, and 4(d) rule are based on scientifically sound data, assumptions, and analyses. The peer reviewers have expertise in mussel biology, habitat, and stressors to the species.

Information Requested

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or information from other concerned governmental agencies, Native American tribes, the scientific community, industry, or any other interested parties concerning this proposed rule. Because we will consider all comments and information we receive during the comment period, our final determinations may differ from this proposal. We particularly seek comments concerning:

(1) The Atlantic pigtoe's biology, range, and population trends, including:

(a) Biological or ecological requirements of the species, including habitat requirements for feeding, breeding, and sheltering;

(b) Genetics and taxonomy;

(c) Historical and current range, including distribution patterns;

(d) Historical and current population levels, and current and projected trends; and

(e) Past and ongoing conservation measures for the species, its habitat, or both.

(2) Factors that may affect the continued existence of the species, which may include habitat modification or destruction, overutilization, disease, predation, the inadequacy of existing regulatory mechanisms, or other natural or manmade factors.

(3) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to this species and existing regulations that may be addressing those threats.

(4) Additional information concerning the historical and current status, range, distribution, and population size of this species, including the locations of any additional populations of this species.

(5) Information on activities that are necessary and advisable for the conservation of the Atlantic pigtoe to include in a 4(d) rule for the species. The Service is proposing such measures that are necessary and advisable for the conservation of the species, and will evaluate ideas provided by the public in considering the prohibitions we should include in the 4(d) rule.

(6) The reasons why we should or should not designate habitat as ''critical habitat'' under section 4 of the Act including whether there are threats to the species from human activity, the degree of which can be expected to increase due to the designation, and whether that increase in threat outweighs the benefit of designation such that the designation of critical habitat may not be prudent.

(7) Specific information on:

(a) The amount and distribution of Atlantic pigtoe habitat;

(b) What areas, that were occupied at the time of listing and that contain the physical or biological features essential to the conservation of the species, should be included in the designation and why;

(c) Special management considerations or protection that may be needed in critical habitat areas we are proposing, including managing for the potential effects of climate change; and

(d) What areas not occupied at the time of listing are essential for the conservation of the species and why.

(8) Land use designations and current or planned activities in the subject areas and their possible impacts on proposed critical habitat.

(9) Any probable economic, national security, or other relevant impacts of designating any area that may be included in the final designation, and the benefits of including or excluding areas that may be impacted.

(10) Information on the extent to which the description of probable economic impacts in the draft economic analysis is a reasonable estimate of the likely economic impacts and the description of the environmental impacts in the draft environmental assessment is complete and accurate.

(11) Whether any specific areas we are proposing for critical habitat designation should be considered for exclusion under section 4(b)(2) of the Act, and whether the benefits of potentially excluding any specific area outweigh the benefits of including that area under section 4(b)(2) of the Act.

(12) Whether we could improve or modify our approach to designating critical habitat in any way to provide for greater public participation and understanding, or to better accommodate public concerns and comments.

You may submit your comments and materials concerning this proposed rule by one of the methods listed in **ADDRESSES**. We request that you send comments only by the methods described in **ADDRESSES**.

Please include sufficient information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include. All comments submitted electronically via *http://www.regulations.gov* will be presented on the website in their entirety as submitted. For comments submitted via hard copy, we will post your entire comment—including your personal identifying information—on *http://www.regulations.gov.* You may request at the top of your document that we withhold personal information such as your street address, phone number, or email address from public review; however, we cannot guarantee that we will be able to do so.

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on *http://www.regulations.gov,* or by appointment, during normal business hours, at the U.S. Fish and Wildlife Service, Raleigh Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Please note that submissions merely stating support for or opposition to the listing action under consideration without providing supporting information, although noted, will not be considered in making a determination, as section 4(b)(1)(A) of the Act directs that determinations as to whether any species is an endangered or threatened species must be made ''solely on the basis of the best scientific and commercial data available.''

Public Hearing

Section 4(b)(5) of the Act provides for one or more public hearings on this proposal, if requested. Requests for public hearings must be received by the date specified in **DATES** at the address shown in **FOR FURTHER INFORMATION CONTACT**. We will schedule public hearings on this proposal, if any are requested, and announce the dates, times, and places of those hearings, as well as how to obtain reasonable accommodations, in the **Federal Register** and local newspapers at least 15 days before the hearing.

Species Status Assessment

A species status assessment (SSA) team prepared an SSA report for the Atlantic pigtoe. The SSA team was composed of Service biologists, in consultation with other species experts. The SSA report represents a compilation of the best scientific and commercial data available concerning the status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the species. The SSA report underwent independent peer review by scientists with expertise in mussel

biology, habitat management, and stressors (factors negatively affecting the species) to the species. The SSA report and other materials relating to this proposal can be found on the Service's Southeast Region website at *https://www.fws.gov/southeast/ and at http://www.regulations.gov* under Docket No. FWS–R4–ES–2018–0046. The draft economic analysis is available at *https://www.fws.gov/southeast/,* at *http://www.regulations.gov* under Docket No. FWS–R4–ES–2018–0046, and at the Raleigh Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Previous Federal Actions

We identified the Atlantic pigtoe as a Category 2 candidate species in our November 21, 1991, Animal Candidate Review for Listing as Endangered or Threatened Species (56 FR 58804). Category 2 candidates were defined as taxa for which we had information that listing was possibly appropriate, but conclusive data on biological vulnerability and threats were not available to support a proposed rule. In the February 28, 1996, CNOR (61 FR 7596), we discontinued the designation of species as Category 2 candidates; therefore, the Atlantic pigtoe was no longer a candidate species.

On April 20, 2010, we were petitioned to list 404 aquatic species in the southeastern United States, including Atlantic pigtoe. In response to the petition, we completed a partial 90-day finding on September 27, 2011 (76 FR 59836), in which we announced our finding that the petition contained substantial information that listing may be warranted for numerous species, including the pigtoe. On June 17, 2014, the Center for Biological Diversity (CBD) filed a complaint against the Service for failure to complete a 12-month finding for the Atlantic pigtoe in accordance with statutory deadlines. On September 22, 2014, the Service and the CBD filed stipulated settlements in the District of Columbia, agreeing that the Service would submit to the **Federal Register** a 12-month finding for the Atlantic pigtoe no later than September 30, 2018 (*Center for Biological Diversity* v. *Jewell,* case 1:14–CV–01021–EGS/JMF). This document constitutes our concurrent 12-month warranted petition finding, proposed listing rule, and proposed critical habitat rule.

I. Proposed Listing Determination

Background

A thorough review of the taxonomy, life history, and ecology of the Atlantic pigtoe is presented in the SSA report (Service 2017; available at *https://www.fws.gov/southeast/*).

The Atlantic pigtoe is a small freshwater mussel with a sub-rhomboidal shaped shell. Although larger specimens exist, the Atlantic pigtoe rarely exceeds 50 millimeters (mm) (2 inches (in)) in length. The known historical range of the Atlantic pigtoe included 12 populations in Atlantic river basins from Virginia to Georgia. However, surveys conducted from 2005 to 2015 indicate that the currently occupied range of the Atlantic pigtoe consists of seven populations in Virginia and North Carolina. The Atlantic pigtoe is dependent on clean, moderate-flowing water with high dissolved oxygen content in creek and riverine environments. Historically, the most abundant populations existed in creeks and rivers with excellent water quality, and where stream flows were sufficient to maintain clean, silt-free substrates. It is associated with gravel and coarse sand substrates at the downstream edge of riffles (shallow water with rapid currents running over gravel or rocks), and less commonly occurs in cobble, silt, or sand detritus mixtures. Because this species prefers more pristine conditions, it typically occurs in headwaters of rural watersheds.

The Atlantic pigtoe is presumed to be an omnivore. Adults primarily filter feed on a wide variety of microscopic particulate matter suspended in the water column, including phytoplankton, zooplankton, bacteria, detritus, and dissolved organic matter, although juveniles tend to pedal feed in the sediment (Alderman and Alderman 2014, p. 9).

Like most freshwater mussels, the Atlantic pigtoe has a unique life cycle that relies on fish hosts for successful reproduction. Following release from the female mussel, sticky packets of floating glochidia (larvae) attach to the gills and scales of host minnows. The larvae stay attached to the host fish until they complete metamorphosis, when they release from the fish and fall to the substrate.

The Atlantic pigtoe has been documented in all major river basins in the Atlantic coastal drainages from the James River Basin in Virginia south to the Altamaha River Basin in Georgia, and from the foothills of the Appalachian Mountains to the Coastal Plain. However, abundance and distribution of the species has declined, with the species currently occupying approximately 40% of its historical range. Most of the remaining populations are small and fragmented, only occupying a fraction of reaches that were historically occupied. Current surveys found Atlantic pigtoes remain in seven populations in Virginia and North Carolina, however only three populations have multiple documented occurrences within the past 10 years. This decrease in abundance and distribution has resulted in largely isolated contemporary populations. Evidence suggests that the range reduction of the species corresponds to habitat degradation resulting from the cumulative impacts of land use change and associated watershed-level effects on water quality, water quantity, habitat connectivity, and instream habitat suitability.

Summary of Biological Status and Threats

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an ''endangered species'' or a ''threatened species.'' The Act defines an endangered species as a species that is ''in danger of extinction throughout all or a significant portion of its range,'' and a threatened species as a species that is ''likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' The Act requires that we determine whether any species is an ''endangered species'' or a ''threatened species'' because of any of the following factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species' continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

We use the term ''threat'' to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term ''threat'' includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or

required resources (stressors). The term ''threat'' may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an ''endangered species'' or a ''threatened species.'' In determining whether a species meets either definition, we must evaluate all identified threats by considering the expected response by the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species—such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an ''endangered species'' or a ''threatened species'' only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

In our determination, we correlate the threats acting on the species to the factors in section 4(a)(1) of the Act. We summarize the status assessment for Atlantic pigtoe below.

The SSA report documents the results of our comprehensive biological status review for the Atlantic pigtoe, including an assessment of the potential stressors to the species. It does not represent a decision by the Service on whether the species should be proposed for listing as an endangered or threatened species under the Act. It does, however, provide the scientific basis that informs our regulatory decision, which involves the further application of standards within the Act and its implementing regulations and policies. The following is a summary of the key results and conclusions from the SSA report.

To assess Atlantic pigtoe viability, we used the three conservation biology principles of resiliency, representation, and redundancy (together, ''the three Rs,'' (3Rs)) (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency refers to the ability of a species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years); representation refers to the ability of the species to adapt over time to long-term changes in the environment (for example, climate changes); and redundancy refers to the ability of the species to withstand catastrophic events (for example, droughts, hurricanes). In general, the more redundant and resilient a species is and the more representation it has, the more likely it is to sustain populations over time, even under changing environmental conditions. Using these principles, we identified the species' ecological requirements for survival and reproduction at the individual, population, and species levels, and described the beneficial and risk factors influencing the species' viability.

The SSA process can be categorized into three sequential stages. During the first stage, we used the 3Rs to evaluate individual mussel life-history needs. During the next stage, we assessed the historical and current condition of species' demographics and habitat characteristics, including explaining how the species arrived at its current condition. In the final stage of the SSA, we made predictions about the species' responses to positive and negative environmental and anthropogenic influences. This process used the best available information to characterize viability as the ability of a species to sustain populations in the wild over time. We used this information to inform our regulatory decision in this finding.

To evaluate the current and future viability of the Atlantic pigtoe, we assessed a range of conditions to allow us to consider the species' resiliency, representation, and redundancy. Populations were delineated using the 12 river basins that Atlantic pigtoe mussels historically occupied: the James, Chowan, Roanoke, Tar, Neuse, Cape Fear, Pee Dee, Catawba, Edisto, Savannah, Ogeechee, and Altamaha River basins. Because the river basin level is at a very coarse scale, populations were further delineated using management units (MUs). The MUs were defined as one or more U.S. Geological Survey Hydrological Unit Code (HUC) 10 watersheds that species experts identified as the most appropriate unit for assessing population-level resiliency. To provide context for the current condition of the species using the 3Rs, we considered the historic range as context for the species' resiliency, redundancy, and representation on the landscape in the past. However, in addressing the current condition of the 3Rs, only extant populations were analyzed.

To assess resiliency, we qualitatively analyzed data related to three population factors (MU occupancy, recruitment, and abundance) and four habitat elements (water quality/flow, water quantity, instream substrate, and habitat connectivity). Overall population condition rankings and habitat condition rankings were determined by combining these factors and elements.

We described representation for the Atlantic pigtoe in terms of river basin variability (known from 12 historical river basins, currently extant in 7), physiographic variability (Mountains, Piedmont, and Coastal Plain), and historic latitudinal variability (Virginia south to Georgia). We assessed Atlantic pigtoe redundancy by first evaluating occupancy within each of the hydrologic units (*i.e.,* HUC10s) that constitute MUs, and then evaluating occupancy at the MU, and ultimately the population, level.

Current Condition of Atlantic Pigtoe

The historical range of the Atlantic pigtoe included 12 populations in Atlantic river basins from Virginia to Georgia. The surveys conducted from 2005 to 2015 indicate that the currently occupied range of the Atlantic pigtoe consists of 14 MUs within 7 populations in Virginia and North Carolina, in the Tar, Neuse, James, Chowan, Roanoke, Cape Fear, and Yadkin-Pee Dee River basins. The species is presumed extirpated from the southern portion of its range, including the Catawba, Edisto, Savannah, Ogeechee, and Altamaha River basins. The Atlantic pigtoe currently (defined as the observation of at least one specimen from 2005 to 2015) occupies 14 of the 81 historically occupied MUs. At the population level, the overall current condition (= resiliency) of the extant populations was estimated to be high for the Tar Population; moderate for the Neuse Population; and low for the James, Chowan, Roanoke, Cape Fear, and Yadkin-Pee Dee populations.

The Atlantic pigtoe currently has reduced adaptive potential due to limited representation (compared with historical representation) in seven river basins and three physiographic regions. The species retains 58 percent of its known river basin variability, but as discussed above distribution has been reduced in the James, Chowan, Roanoke, Cape Fear, and Yadkin-Pee Dee populations. In addition, although the species continues to maintain physiographic representation in all three regions it historically occupied, occupancy has decreased in each region. A 67 percent estimated loss has occurred in the Mountain region's watersheds, 48 percent loss in the Piedmont region's watersheds, and 76 percent loss in the Coastal Plain region's

watersheds. Latitudinal variability is also reduced and is largely limited to the central portions of its historical range, primarily in the Tar and Neuse basins.

Redundancy was estimated as the number of historically occupied MUs that remain currently occupied. The species has limited redundancy within the James, Chowan, Roanoke, and Cape Fear River populations, and only two populations (Tar and Neuse) have multiple moderate or highly resilient MUs. Overall, the species has decreased redundancy across its range due to an estimated 60 percent reduction in occupancy compared to historical levels.

Risk Factors for Atlantic Pigtoe

Aquatic systems face a multitude of natural and anthropogenic factors that may impact the status of species within those systems (Neves *et al.* 1997, p. 44). Generally, these factors can be categorized as either environmental stressors (*e.g.,* development, agriculture practices, or forest management) or systematic changes (*e.g.,* climate change, invasive species, dams or other barriers). The largest threats to the future viability of the Atlantic pigtoe consist of habitat degradation (Factor A) from stressors influencing water quality, water quantity, instream habitat, and habitat connectivity. All of these threats are exacerbated by the effects of climate change (Factor E). A brief summary of these primary stressors is presented below; for a full description of these stressors, refer to chapter 4 of the SSA report. No existing regulatory mechanisms adequately address these threats to the Atlantic pigtoe such that it does not warrant listing under the Act (Factor D). We did not find that the species faces significant threats from overutilization for commercial, recreational, scientific, or education purposes (Factor B), or from disease or predation (Factor C).

Environmental Stressors

Development: Development refers to urbanization of the landscape, including (but not limited to) land conversion for urban and commercial use, infrastructure (roads, bridges, utilities), and urban water uses (water supply reservoirs, wastewater treatment, etc.). The effects of urbanization may include alterations to water quality, water quantity, and habitat (both in stream and streamside) (Ren *et al.* 2003, p. 649; Wilson 2015, p. 424). These alterations adversely affect both Atlantic pigtoe adults, which require clear, flowing water with a temperature less than 35 degrees Celsius (°C) (95 degrees Fahrenheit (°F)) and a dissolved oxygen greater than 3 milligrams per liter (mg/L), and juveniles, which require very specific interstitial chemistry to complete that life stage: low salinity (similar to 0.9 parts per thousand (ppt)), low ammonia (similar to 0.7 mg/L), low levels of copper and other contaminants, and dissolved oxygen greater than 1.3 mg/L.

Impervious surfaces associated with development negatively affect water quality when pollutants that accumulate on impervious surfaces are washed directly into the streams during storm events. Storm water runoff affects such water quality parameters as temperature, pH, dissolved oxygen, and salinity, which in turn alter the water chemistry and could make habitat unsuitable for the Atlantic pigtoe. Concentrations of contaminants, including nitrogen, phosphorus, chloride, insecticides, polycyclic aromatic hydrocarbons, and personal care products, increase with urban development (Giddings *et al.* 2009, p. 2; Bringolf *et al.* 2010, p. 1311).

Urban development can also lead to increased variability in streamflow, typically increasing the amount of water entering a stream after a storm and decreasing the time it takes for the water to travel over the land before entering the stream (Giddings *et al.* 2009, p. 1). Stream habitat is altered either directly via channelization or clearing of riparian areas, or indirectly via high stream flows that reshape the channel and cause sediment erosion (Giddings *et al.* 2009, p. 2). Impervious surfaces associated with increased development cause rain water to accumulate and flow rapidly into storm drains, thereby becoming overheated, which can stress or kill mussels when it enters streams. Pollutants like gasoline, oil, and fertilizers are also washed directly into streams and can kill mussels and other aquatic organisms. The large volumes and velocity of water, combined with the extra debris and sediment entering streams following a storm, can stress, displace, or kill Atlantic pigtoe and the host fish species on which they depend. Many of the known host fish of the Atlantic pigtoe can tolerate short periods of turbidity associated with rain events; however, the cyprinid host fish typically do not persist in streams with consistently high sedimentation. Changes in flow may also result in turbidity that can reduce feeding efficiency and eliminate spawning habitat due to lack of clean gravel substrate.

A further risk of urbanization is the accompanying road development that often results in improperly constructed culverts at stream crossings. These culverts act as barriers, either if flow through the culvert varies significantly from the rest of the stream, or if the culvert ends up being perched above the stream bed so that host fish (and, therefore, the Atlantic pigtoe) cannot pass through them. This leads to loss of access to quality habitat, as well as fragmented habitat and a loss of connectivity between populations. This can limit both genetic exchange and recolonization opportunities.

All of the river basins within the range of this species are affected to some extent by development, ranging from 3 percent of the Black River subbasin in the Cape Fear River Basin to 70 percent of the Crabtree Creek subbasin in the Neuse River Basin (based on the 2011 National Land Cover Data). The Neuse River basin in North Carolina contains one-sixth of the entire State's population, indicating heavy development pressure on the watershed. As another example, the Middle James MU (in the James population) contains 159 impaired stream miles, 2 major discharges, 32 minor discharges, and over 1,300 road crossings. Similarly, the Muddy Creek MU is currently made up of 12.3 percent impervious surfaces. For complete data on all of the populations, refer to appendix C of the SSA report.

Agricultural Practices: The main impacts to the Atlantic pigtoe from agricultural practices are from nutrient pollution and water pumping for irrigation. Fertilizers and animal manure, which are both rich in nitrogen and phosphorus, are the primary sources of nutrient pollution from agricultural sources when agricultural best management practices are not used. Excess nutrients impact water quality when it rains or when water and soil containing nitrogen and phosphorus wash into nearby waters or leach into the water table and ground waters causing algal blooms. These algal blooms can harm freshwater mussels by suffocating host fish and decreasing available oxygen in the water column.

It is common practice to pump water for irrigation from adjacent streams or rivers into a reservoir pond, or to spray the stream or river water directly onto crops. If the water withdrawal is excessive or done illegally, this may cause impacts to the amount of water available to downstream sensitive areas during low flow months, resulting in dewatering of channels and stranding of mussels, leading to desiccation and death. The Cape Fear River basin has 33 reservoirs, many of them supplying water to some of the most populated areas in North Carolina, including the Triad (Greensboro and High Point),

Chapel Hill, Fayetteville, and Wilmington. All told, this basin contains one-fifth of the entire State's population and is the most industrialized basin, as well as home to the most large-scale livestock operations in the State. However, according to the 2011 National Land Cover Data, all of the watersheds within the range of the Atlantic pigtoe are affected by agricultural land uses, most with 20 percent or more of the watershed having been converted for agricultural use.

Forest Management: A forested landscape provides many ideal conditions for aquatic ecosystems, and managed forested watersheds tend to have more natural watershed functions and better water quality than other land uses (Edwards et al. 2015, p. 60). Silvicultural activities, when performed according to strict forest practices guidelines (FPGs) or best management practices (BMPs), can retain adequate conditions for aquatic ecosystems; however, when FPGs/BMPs are not followed, these practices can also contribute to the myriad of stressors facing aquatic systems in the Southeast. Both small- and large-scale forestry activities have been shown to have a significant impact upon the physical, chemical, and biological characteristics of adjacent small streams (Allan 1995, p. 107). The clearing of large areas of forested wetlands and riparian systems can eliminate shade provided by these canopies, exposing streams to more sunlight and increasing the instream water temperature. The increase in stream temperature and light after deforestation alters the macroinvertebrate and other aquatic species richness and abundance composition in streams (Couceiro et al. 2007, p. 272; Kishi et al. 2004, p. 283; Caldwell et al. 2014, p. 3). As stated above, the Atlantic pigtoe is sensitive to changes in temperature, and sustained temperature increases will stress and possibly lead to mortality for these mussels.

Forestry activities often include the construction of logging roads through the riparian zone, which can directly degrade nearby stream environments. Roads can cause localized sedimentation, as well as sedimentation traveling downstream into more sensitive habitats. These effects lead to stress and mortality for the Atlantic pigtoe, as discussed in ''*Development,*'' above. While BMPs are currently widely adhered to today, they were not always common practice in the past. The average implementation rate of BMPs in the southeastern States is at 92 percent, including approximately 88 percent for Virginia and 90 percent for North Carolina. While improper implementation is rare, it can have drastic negative effects on sensitive aquatic species like freshwater mussels. One small area of riparian zone that is removed can cause sedimentation and habitat degradation for miles downstream.

Systemic Changes

Effects of Climate Change: Aquatic systems are encountering changes and shifts in seasonal patterns of precipitation and runoff as a result of climate change. While mussels evolved in habitats that experience seasonal fluctuations in discharge, global weather patterns can have an impact on the normal regimes (*e.g.,* El Niño or La Niña). Both excessively high (*i.e.,* floods and storms) and excessively low (*i.e.,* droughts) flows can adversely affect the species.

As to droughts, even naturally occurring low flow events can cause mussels to become stressed, either because they exert significant energy to move to deeper waters or they may succumb to desiccation. Because late summer and early fall are stressful periods for the species due to low flows, droughts during this time of year can be especially harmful, resulting in increased mortality rates. Atlantic pigtoe habitat must have adequate flow to deliver oxygen, enable passive reproduction, and deliver food to filter-feeding mussels. Further, flow removes contaminants and fine sediments from interstitial spaces preventing mussel suffocation. Droughts have impacted all river basins within the range of Atlantic pigtoe, from an ''abnormally dry'' ranking for North Carolina and Virginia in 2001 on the Southeast Drought Monitor scale to the highest ranking of ''exceptionally dry'' for the entire range of the species in 2002 and 2007. In 2015, the entire Southeast ranged from ''abnormally dry'' to ''moderate drought'' or ''severe drought.'' These data covered the first week in September, which, as noted above, is a very sensitive time for drought to be affecting the species. The Middle Neuse tributaries of the Neuse River basin had consecutive drought years from 2005 through 2012, indicating sustained stress on the species over a long period of time.

Increases in the frequency and strength of storms events alter stream habitat. Stream habitat is altered either directly via channelization or clearing of riparian areas, or indirectly via high stream flows that reshape the channel and cause sediment erosion. The large volumes and velocity of water, combined with the extra debris and sediment entering streams following a storm, stress, displace, or kill Atlantic pigtoe and the host fish species on which they depend.

Sedentary freshwater mussels have limited ability to seek refuge from droughts and floods, and they are completely dependent on specific water temperatures to complete their physiological requirements. Changes in water temperature lead to stress, increased mortality, and also increase the likelihood of extinction.

Invasive Species: Nonnative species are invading aquatic communities and altering biodiversity by competing with native species for food, light, or breeding and nesting areas in many areas across the range of Atlantic pigtoe. For example, the Asian clam (*Corbicula fluminea*) alters benthic substrates, competes with native species for limited resources, and causes ammonia spikes in surrounding water when they die off en masse. Juvenile mussels need low levels of ammonia to survive, and studies show that freshwater mollusks are more sensitive than previously known to some chemical pollutants, including ammonia. The Asian clam is ubiquitous across the southeastern United States and is present in watersheds across the range of the Atlantic pigtoe.

The flathead catfish (*Pylodictis olivaris*) is an apex predator that feeds on almost anything, including other fish, crustaceans, and mollusks. Predation by flathead catfish diminishes host fish communities, reducing the amount of fish available as hosts for the mussels to complete their glochidia life stage. Introductions of flathead catfish into rivers in North Carolina and Georgia have led to steep declines in numbers of native fish (Service 2017). The flathead catfish has been documented in six of the seven river systems currently inhabited by the Atlantic pigtoe (James, Roanoke, Tar, Neuse, Cape Fear, and Yadkin-Pee Dee).

Hydrilla (*Hydrilla verticillata*), an aquatic plant, alters habitat, decreases flows, and contributes to sediment buildup in streams. Hydrilla occurs in several watersheds where the Atlantic pigtoe occurs, including recent documentation from the upper Neuse system and the Tar River. The dense growth is altering the flow in these systems and causing sediment buildup, which can cause suffocation in filter-feeding mussels. While data are lacking on hydrilla currently having population-level effects on Atlantic pigtoe, the spread of this invasive plant is expected to increase in the future.

Barriers: Extinction and extirpation of North American freshwater mussels can

be traced to impoundment and inundation of riffle habitats in all major river basins of the central and eastern United States. Upstream of dams, the change from flowing to impounded waters, increased depths, increased buildup of sediments, decreased dissolved oxygen, and the drastic alteration in resident fish populations can threaten the survival of mussels and their overall reproductive success. Downstream of dams, fluctuations in flow regimes, minimal releases and scouring flows, seasonal dissolved oxygen depletion, reduced or increased water temperatures, and changes in fish assemblages can also threaten the survival and reproduction of many mussel species. Because Atlantic pigtoes use smaller host fish (*e.g.,* darters and minnows), they are even more susceptible to impacts from habitat fragmentation due to increasing distance between suitable habitat patches and a low likelihood of host fish swimming over that distance. Even improperly constructed culverts at stream crossings can act as significant barriers and have some similar effects as dams on stream systems (see discussion under *Development,* above). These barriers not only fragment habitats along a stream course, they also contribute to genetic isolation of the Atlantic pigtoe. Nearly all of the MUs containing Atlantic pigtoe populations have been impacted by dams, with as few as 2 dams in Mill Creek in the James River basin to 237 dams throughout the Middle Neuse basin (Service 2017, appendix D). The Middle Neuse also contains over 5,000 stream crossings, so connectivity in that basin has been severely affected by barriers. Only the Edisto River basin within the range of the Atlantic pigtoe has not been impacted by dams.

Synergistic Effects

In addition to impacting the species individually, it is likely that several of the above summarized risk factors are acting synergistically or additively on the species. The combined impact of multiple stressors is likely more harmful than a single stressor acting alone. For example, in the Meherrin River MU, there are four stream reaches with 34 miles of impaired streams. They have low benthic-macroinvertebrate scores, low dissolved oxygen, low pH, and contain *Escherichia coli* (also known as *E. coli*). There are 16 non-major and 2 major discharges within this MU, along with 7 dams, and 676 road crossings. Additionally, droughts were recorded for 4 consecutive years (2007–2010) in this MU. The combination of all of these stressors on the sensitive aquatic species in this habitat has probably impacted Atlantic pigtoe, in that only two individuals have been recorded here since 2005.

Conservation Actions

The Service and State wildlife agencies are working with numerous partners to provide technical guidance and offering conservation tools to meet both species and habitat needs in aquatic systems in North Carolina. Land trusts are targeting key parcels for acquisition; Federal and State biologists are surveying and monitoring species occurrences; and, recently, there has been a concerted effort to ramp up captive propagation and species population restoration via augmentation, expansion, and reintroduction efforts. In 2014, North Carolina Wildlife Resources Commission staff and partners began a concerted effort to propagate the Atlantic pigtoe in hopes of augmenting existing populations in the Tar and Neuse River basins. In July 2015, 250 Atlantic pigtoes were stocked into Sandy Creek, a tributary of the Tar River. Annual monitoring to evaluate growth and survival is planned, and additional propagation and stocking efforts will continue in upcoming years (Service 2017, p. 59).

Future Scenarios

For the purpose of this assessment, we define viability as the ability of the species to sustain populations in the wild over time. To help address uncertainty associated with the degree and extent of potential future stressors and their impacts on the needs of the species, the 3Rs were applied using four plausible future scenarios. We devised these scenarios by eliciting expert information on the primary stressors anticipated to affect the species into the future: Habitat loss and degradation due to urbanization and the effects of climate change. The models that were used to forecast both urbanization and climate change projected out 50 years in the future. For more detailed information on these models and their projections, please see the SSA report (Service 2017, chapter 3).

For example, in scenario one, the ''status quo'' scenario, factors that influence current populations of the Atlantic pigtoe were assumed to remain constant over the 50-year time horizon. Climate models predict that, if emissions of greenhouse gasses continue to increase, the Southeast will experience an increase in low flow (drought) events. Likewise, this scenario assumed the ''business as usual'' pattern of urban growth, which predicts that urbanization will continue to increase rapidly (using simulations that point to a future in which the extent of urbanization in the Southeast is projected to increase by 101 to 192 percent). This continued growth in development means increases in impervious surfaces, increased variability in streamflow, channelization of streams or clearing of riparian areas, and other negative effects explained above under *Development.* The ''status quo'' scenario also assumes that current conservation efforts would remain in place but that no new conservation actions would be taken. In this scenario, a substantial loss of resiliency, representation, and redundancy is expected. Under this scenario, we predict the condition of MUs as: Zero in high condition, two in moderate condition, and six in low condition, with the remaining six likely to be extirpated. With the likely extirpation of 6 out of 14 currently extant MUs, and only the Tar population retaining more than one moderately resilient MU, redundancy would be reduced. Representation would be reduced, with only five (42 percent) of the former river basins occupied, and with extremely limited variability in the Mountains and Coastal Plain, and reduced variability in the Piedmont.

In the SSA Report we describe results for three more scenarios that represent the full likely range of plausible future outcomes for development, possible climate changes, and the species' expected response to threats. Results for our full resiliency analysis for the future projections is summarized in Table 1 below.

TABLE 1—FUTURE SCENARIOS OF POPULATION CONDITIONS

Populations: management units	Current	Status Quo	Pessimistic	Optimistic	Opportunistic
James: Craig Creek Subbasin	Moderate	Low	x*	Moderate	Moderate.
James: Middle James	Very Low	x	x	x	x.
Chowan: Nottoway	Moderate	x	x	Low	Low.

TABLE 1—FUTURE SCENARIOS OF POPULATION CONDITIONS—Continued

Populations: management units	Current	Status Quo	Pessimistic	Optimistic	Opportunistic
Chowan: Meherrin	Low	x	x	x	x.
Roanoke: Dan River Subbasin	Low	x	x	Moderate	x.
Tar: Upper/Middle Tar	High	Low	Low	Moderate	Low.
Tar: Lower Tar	Low	Low	x	Low	x.
Tar: Fishing Creek	High	Moderate	Low	High	Moderate.
Tar: Sandy-Swift	High	Moderate	Low	High	Moderate.
Neuse: Upper Neuse	Moderate	Low	x	Moderate	Low.
Neuse: Middle Neuse	Moderate	x	x	Low	x.
Cape Fear: New Hope	Moderate	Low	x	Low	x.
Cape Fear: Deep River Subbasin	Low	x	x	Moderate	Low.
Pee Dee: Uwharrie/Little	Low	Low	Low	Low	Low.

* x= likely extirpated.

Determination

Section 4 of the Act (16 U.S.C. 1533), and its implementing regulations at 50 CFR part 424, set forth the procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(a)(1) of the Act, we may list a species based on (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the Atlantic pigtoe. The Act defines an endangered species as any species that is ''in danger of extinction throughout all or a significant portion of its range'' and a threatened species as any species ''that is likely to become endangered throughout all or a significant portion of its range within the foreseeable future.''

We considered whether the Atlantic pigtoe is presently in danger of extinction and determined that proposing endangered status is not appropriate. The historical range of the Atlantic pigtoe included streams and rivers in 12 Atlantic Slope drainages from the James River Basin to the Altamaha River Basin, with the documented historical distribution in 28 MUs within those basins. Currently, the Atlantic pigtoe is presumed extirpated from 50 percent (14) of the historically occupied MUs and 5 of the drainages. Of the remaining 14 occupied MUs, 3 (21 percent) are estimated to be highly resilient and 5 (36 percent) moderately resilient, with 6 (43 percent) having low resiliency. Eight moderate to high resiliency MUs provide the ability for the species to withstand stochastic disturbance events. Scaling up from the MU to the population level, 1 of 12 former populations (the Tar population) was estimated to have high resiliency, 1 population (the Neuse population) was estimated to have moderate resiliency, 5 populations (the James, Chowan, Roanoke, Cape Fear, and Yadkin-Pee Dee populations) had low estimated resiliency, and 5 of the former 12 populations are presumed extirpated; this means that 42 percent of the species' historic range has been eliminated. Seventy-one percent of streams that remain part of the current species' range are estimated to be in low condition as defined in the SSA report. The species continues to maintain physiographic representation in all 3 regions it historically occupied, although occupancy has decreased in each region by between 48 and 76 percent. However, while threats are currently acting on the species and many of those threats are expected to continue into the future (see below), we did not find that the species is currently in danger of extinction throughout all of its range. With eight moderately or highly resilient MUs in three physiographic regions, the current condition of the species still provides for enough resiliency, redundancy, and representation such that it is not at risk of extinction now.

However, estimates of future resiliency, redundancy, and representation for the Atlantic pigtoe are also low. The Atlantic pigtoe faces a variety of threats from declines in water quality, loss of stream flow, riparian and instream fragmentation, and deterioration of instream habitats (Factor A). These threats, which are expected to be exacerbated by continued urbanization (Factor A) and the effects of climate change (Factor E), were central to our assessment of the future viability of the Atlantic pigtoe. Given current and future decreases in resiliency, populations will become more vulnerable to extirpation from stochastic events, in turn, resulting in concurrent losses in representation and redundancy. The range of plausible future scenarios of these Atlantic pigtoe habitat conditions and population factors suggest possible extirpation in as many as five of seven currently extant populations. Even the most optimistic model predicted that only two MUs will be in high condition in 50 years and the remaining populations are expected to be characterized by low occupancy and abundance. Under most modeled scenarios, the species is likely to lose enough resiliency, redundancy, and representation such that it is at risk of not being viable. All four scenarios presented as representative of plausible future scenarios create conditions where the Atlantic pigtoe would not have enough resiliency, redundancy, or representation to sustain populations over time. While determining the probability of each scenario was not possible with the available data, the entire risk profile that was provided by looking across the range of the four plausible scenarios showed the species is continuing to lose resiliency, redundancy, and representation throughout the range in all likely scenarios. In short, our analysis of the species' current and future conditions, as well as the conservation efforts discussed above, show that the population and habitat factors used to determine the resiliency, representation, and redundancy for the species will continue to decline over the next 50 years so that the species is likely to become in danger of extinction throughout its range within the foreseeable future. Fifty years was considered ''foreseeable'' in this case because it included projections from both available models while taking into consideration that Atlantic pigtoes are slow-growing and long-lived species, and, therefore, respond more slowly on a population or species level to negative impacts on the ecosystem. We can

reasonably rely on the future of 50 years as presented in the models of predicted urbanization and climate change, and predict how those threats will affect the status of the species.

Under the Act and our implementing regulations, a species may warrant listing if it is endangered or threatened throughout all or a significant portion of its range. Because we have determined that the Atlantic pigtoe is likely to become an endangered species within the foreseeable future throughout its range, we find it unnecessary to proceed to an evaluation of potentially significant portions of the range. Where the best available information allows the Services to determine a status for the species rangewide, that determination should be given conclusive weight because a rangewide determination of status more accurately reflects the species' degree of imperilment and better promotes the purposes of the statute. Under this reading, we should first consider whether listing is appropriate based on a rangewide analysis and proceed to conduct a ''significant portion of its range'' analysis if, and only if, a species does not qualify for listing as either endangered or threatened according to the ''all'' language. We note that the court in *Desert Survivors* v. *Department of the Interior,* No. 16–cv–01165–JCS, 2018 WL 4053447 (N.D. Cal. Aug. 24, 2018), did not address this issue, and our conclusion is therefore consistent with the opinion in that case.

Therefore, on the basis of the best available scientific and commercial information, we propose to list the Atlantic pigtoe as threatened in accordance with sections 3(20) and 4(a)(1) of the Act.

Available Conservation Measures

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

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

Recovery planning includes the development of a recovery outline shortly after a species is listed and preparation of a draft and final recovery plan. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery plan also identifies recovery criteria for review of when a species may be ready for reclassification (such as ''downlisting'' from endangered to threatened) or removal from the Federal Lists of Endangered and Threatened Wildlife and Plants (''delisting''), and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available on our website (*http://www.fws.gov/endangered*), or from our Raleigh Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (*e.g.,* restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands. If we list the Atlantic pigtoe, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the States of Virginia and North Carolina would be eligible for Federal funds to implement management actions that promote the protection or recovery of the Atlantic pigtoe. Information on our grant programs that are available to aid species recovery can be found at: *http://www.fws.gov/grants.*

Although the Atlantic pigtoe is only proposed for listing under the Act at this time, please let us know if you are interested in participating in recovery efforts for this species. Additionally, we invite you to submit any new information on this species whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

II. Proposed Critical Habitat Designation

Background

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

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

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

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

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

Our regulations at 50 CFR 424.02 define the geographical area occupied by the species as: An area that may generally be delineated around 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).

Conservation, as defined under section 3 of the Act, means to use and the use of all methods and procedures that are necessary to bring an endangered or threatened species to the

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

Critical habitat receives protection under section 7 of the Act through the requirement that Federal agencies ensure, in consultation with the Service, that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation does not allow the government or public to access private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by non-Federal landowners. Where a landowner requests Federal agency funding or authorization for an action that may affect a listed species or critical habitat, the consultation requirements of section 7(a)(2) of the Act would apply, but even in the event of a destruction or adverse modification finding, the obligation of the Federal action agency and the landowner is not to restore or recover the species, but to implement reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat.

Under the first prong of the Act's definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat designation if they contain physical or biological features (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific and commercial data available, those physical or biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat). In identifying those physical or biological features within an area, we focus on the specific features that support the life-history needs of the species, including but not limited to, water characteristics, soil type, geological features, prey, vegetation, symbiotic species, or other features. A feature may be a single habitat characteristic, or a more complex combination of habitat characteristics. Features may include habitat characteristics that support ephemeral or dynamic habitat conditions. Features may also be expressed in terms relating to principles of conservation biology, such as patch size, distribution distances, and connectivity.

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. We will determine whether unoccupied areas are essential for the conservation of the species by considering the life-history, status, and conservation needs of the species. This will be further informed by any generalized conservation strategy, criteria, or outline that may have been developed for the species to provide a substantive foundation for identifying which features and specific areas are essential to the conservation of the species and, as a result, the development of the critical habitat designation. For example, an area currently occupied by the species but that was not occupied at the time of listing may be essential to the conservation of the species and may be included in the critical habitat designation.

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

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

Habitat is dynamic, and species may move from one area to another over time. We recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be needed for recovery of the species. Areas that are important to the conservation of the species, both inside and outside the critical habitat designation, will continue to be subject to: (1) Conservation actions implemented under section 7(a)(1) of the Act; (2) regulatory protections afforded by the requirement in section 7(a)(2) of the Act for Federal agencies to ensure their actions are not likely to jeopardize the continued existence of any endangered or threatened species; and (3) section 9 of the Act's prohibitions on taking any individual of the species, including taking caused by actions that affect habitat. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. These protections and conservation tools will continue to contribute to recovery of this species. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning efforts if new information available at the time of these planning efforts calls for a different outcome.

Prudency Determination

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12), require that the Secretary shall designate critical habitat at the time the species is determined to be an endangered or threatened species to the maximum extent prudent and determinable. Our regulations (50 CFR 424.12(a)(1)) state that the designation of critical habitat is not prudent when one or both of the following situations exist:

(1) The species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of threat to the species, or

(2) Such designation of critical habitat would not be beneficial to the species. In determining whether a designation would not be beneficial, the factors the Service may consider include but are not limited to: Whether the present or threatened destruction, modification, or curtailment of a species' habitat or range is not a threat to the species, or whether any areas meet the definition of ''critical habitat.''

There is currently no imminent threat of take attributed to collection or vandalism identified under Factor B for this species, and identification and mapping of critical habitat is not expected to initiate any such threat. In the absence of finding that the designation of critical habitat would increase threats to a species, we next determine whether such designation of critical habitat would not be beneficial to the species. In the information provided above on threats to the species, we determined that there are habitat-based threats to the Atlantic pigtoe, so the designation of critical habitat would be beneficial to the species through the application of section 7 of the Act to actions that affect habitat as well as those that affect the species. Because we have determined that the designation of critical habitat will not likely increase the degree of threat to the species and would be beneficial, we find that designation of critical habitat is prudent for the Atlantic pigtoe.

Critical Habitat Determinability

Having determined that designation is prudent, under section 4(a)(3) of the Act we must find whether critical habitat for the Atlantic pigtoe is determinable. Our regulations at 50 CFR 424.12(a)(2) state that critical habitat is not determinable when one or both of the following situations exist:

(i) Data sufficient to perform required analyses are lacking, or

(ii) The biological needs of the species are not sufficiently well known to identify any area that meets the definition of ''critical habitat.''

When critical habitat is not determinable, the Act allows the Service an additional year to publish a critical habitat designation (16 U.S.C. 1533(b)(6)(C)(ii)).

We reviewed the available information pertaining to the biological needs of the species and habitat characteristics where the species is located. We find that this information is sufficient for us to conduct both the biological and economic analyses required for the critical habitat determination. Therefore, we conclude that the designation of critical habitat is determinable for the Atlantic pigtoe.

Physical or Biological Features

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

(1) Space for individual and population growth and for normal behavior;

(2) Food, water, air, light, minerals, or other nutritional or physiological requirements;

(3) Cover or shelter;

(4) Sites for breeding, reproduction, or rearing (or development) of offspring; and

(5) Habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.

The features may also be combinations of habitat characteristics and may encompass the relationship between characteristics or the necessary amount of a characteristic needed to support the life history of the species. In considering whether features are essential to the conservation of the species, the Service may consider an appropriate quality, quantity, and spatial and temporal arrangement of habitat characteristics in the context of the life-history needs, condition, and status of the species.

We derive the specific physical or biological features essential for Atlantic pigtoe from studies of this species' habitat, ecology, and life history. The primary habitat elements that influence resiliency of the Atlantic pigtoe include water quality, water quantity, substrate, and habitat connectivity. A full description of the needs of individuals, populations, and the species is available from the SSA report; the individuals' needs are summarized below in Table 2.

TABLE 2—LIFE HISTORY AND RESOURCE NEEDS OF THE ATLANTIC PIGTOE

Life stage	Resources and/or circumstances needed for individuals to complete each life stage	Resource function (BFSD *)
Fertilized Eggs—early spring	• Clear, flowing water • Sexually mature males upstream from sexually mature females. • Appropriate spawning temperatures. • Presence of gravid females.	B
Glochidia—late spring to early summer	• Clear, flowing water • Just enough flow to attract drift feeding minnows. • Presence of host fish for attachment.	B, D
Juveniles—excystment from host fish to ~20mm shell length.	• Clear, flowing water • Host fish dispersal. • Appropriate interstitial chemistry. —Low salinity (~0.9 ppt). —Low ammonia (~0.7 mg/L). —Low levels of copper and other contaminants. —Dissolved oxygen >1.3 mg/L. • Appropriate substrate for settlement. • Adequate food availability.	F, S
Adult—>20 mm shell length	• Clear, flowing water • Appropriate substrate (silt-free gravel and stable, coarse sand). • Adequate food availability (phytoplankton and detritus). • High dissolved oxygen (>3mg/L).	F, S

TABLE 2—LIFE HISTORY AND RESOURCE NEEDS OF THE ATLANTIC PIGTOE—Continued

Life stage	Resources and/or circumstances needed for individuals to complete each life stage	Resource function (BFSD*)
	• Water temperature <35 °C.	

* B=breeding; F=feeding; S=sheltering; D=dispersal

Summary of Essential Physical or Biological Features

In summary, we derive the specific physical or biological features essential to the conservation of Atlantic pigtoe from studies of this species' habitat, ecology, and life history as described above. Additional information can be found in the SSA Report (Service 2017) available on *http://www.regulations.gov* under Docket No. FWS–R4–ES–2018–0046. We have determined that the following physical or biological features are essential to the conservation of Atlantic pigtoe:

(1) Suitable substrates and connected instream habitats, characterized by geomorphically stable stream channels and banks (*i.e.,* channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation) with habitats that support a diversity of freshwater mussel and native fish (such as stable riffle-run-pool habitats that provide flow refuges consisting of silt-free gravel and coarse sand substrates).

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

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

(4) The presence and abundance of fish hosts necessary for recruitment of the Atlantic pigtoe.

Special Management Considerations or Protection

When designating critical habitat, we assess whether the specific areas within the geographical area occupied by the species at the time of listing contain features which are essential to the conservation of the species and which may require special management considerations or protection. The features essential to the conservation of the Atlantic pigtoe may require special management considerations or protections to reduce the following threats: (1) Urbanization of the landscape, including (but not limited to) land conversion for urban and commercial use, infrastructure (roads, bridges, utilities), and urban water uses (water supply reservoirs, wastewater treatment, etc.); (2) nutrient pollution from agricultural activities that impact water quantity and quality; (3) significant alteration of water quality; (4) improper forest management or silviculture activities that remove large areas of forested wetlands and riparian systems; (5) culvert and pipe installation that creates barriers to movement; (6) impacts from invasive species; (7) changes and shifts in seasonal precipitation patterns as a result of climate change; and (8) other watershed and floodplain disturbances that release sediments or nutrients into the water.

Management activities that could ameliorate these threats include, but are not limited to: Use of best management practices (BMPs) designed to reduce sedimentation, erosion, and bank side destruction; protection of riparian corridors and leaving sufficient canopy cover along banks; moderation of surface and ground water withdrawals to maintain natural flow regimes; increased use of stormwater management and reduction of stormwater flows into the systems; and reduction of other watershed and floodplain disturbances that release sediments, pollutants, or nutrients into the water.

In summary, we find that the occupied areas we are proposing to designate as critical habitat contain the physical or biological features that are essential to the conservation of the species and that may require special management considerations or protection. Special management considerations or protection may be required of the Federal action agency to eliminate, or to reduce to negligible levels, the threats affecting the physical and biological features of each unit.

Criteria Used To Identify Critical Habitat

As required by section 4(b)(2) of the Act, we use the best scientific data available to designate critical habitat. In accordance with the Act and our implementing regulations at 50 CFR 424.12(b) we review available information pertaining to the habitat requirements of the species and identify specific areas within the geographical area occupied by the species at the time of listing and any specific areas outside the geographical area occupied by the species to be considered for designation as critical habitat.

The current distribution of the Atlantic pigtoe is much reduced from its historical distribution. We anticipate that recovery will require continued protection of existing populations and habitat, as well as ensure there are adequate numbers of mussels in stable populations and that these populations occur over a wide geographic area. This strategy will help to ensure that catastrophic events, such as the effects of hurricanes (*e.g.,* flooding that causes excessive sedimentation, nutrients, and debris to disrupt stream ecology), cannot simultaneously affect all known populations. Rangewide recovery considerations, such as maintaining existing genetic diversity and striving for representation of all major portions of the species' current range, were considered in formulating this proposed critical habitat.

Sources of data for this proposed critical habitat include multiple databases maintained by universities and State agencies for Virginia and North Carolina, and numerous survey reports on streams throughout the species' range (see SSA report). We have also reviewed available information that pertains to the habitat requirements of this species. Sources of information on habitat requirements include studies conducted at occupied sites and published in peer-reviewed articles, agency reports, and data collected during monitoring efforts (Service 2017).

Areas Occupied at the Time of Listing

We identified stream channels that currently support populations of the Atlantic pigtoe. We defined ''current'' as stream channels with observations of the species from 2005 to the present. Due to the breadth and intensity of survey effort done for freshwater mussels throughout the known range of the species, it is reasonable to assume that streams with no positive surveys since 2005 should not be considered occupied for the purpose of our analysis. However, since each particular area is not surveyed every year, and these cryptic mussels have a 0.42 detection probability, only one negative survey would not be sufficient to determine that the species is not present. Therefore, it is reasonable to assume that if the species had been seen within the past ten years that it could be considered currently occupied. Specific habitat areas were delineated based on Natural Heritage Element Occurrences (EOs) following NatureServe's occurrence delineation protocol for freshwater mussels (NatureServe 2018). These EOs provide habitat for Atlantic pigtoe subpopulations and are large enough to be self-sustaining over time, despite fluctuations in local conditions. The EOs contain stream reaches with interconnected waters so that host fish containing Atlantic pigtoe glochidia can move between areas, at least during certain flows or seasons.

We consider the following streams to be occupied by the species at the time of proposed listing: Craig Creek, Mill Creek, Middle James River, Nottoway River Subbasin, Meherrin River, Dan River, Aarons Creek, Upper/Middle Tar River, Sandy/Swift Creek, Fishing Creek Subbasin, Lower Tar River, Upper Neuse River Subbasin, Middle Neuse River Subbasin, New Hope Creek, Deep River Subbasin, and Little River Subbasin (see *Unit Descriptions,* below). The proposed critical habitat designation does not include all streams known to have been occupied by the species historically; instead, it includes only the occupied streams within the historical range that have also retained the physical or biological features that will allow for the maintenance and expansion of existing populations.

Areas Outside the Geographic Area Occupied at the Time of Listing

We are not proposing to designate any areas outside the geographical area currently occupied by the species because we did not find any unoccupied areas that were essential for the conservation of the species. The protection of eight moderately or highly resilient management units across the physiographic representation of the range would sufficiently reduce the risk of extinction. Improving the resiliency of populations in the currently occupied streams will increase viability to the point that the protections of the Act are no longer necessary.

General Information on the Maps of the Proposed Critical Habitat Designation

When determining proposed critical habitat boundaries, we made every effort to avoid including developed areas such as lands covered by buildings, pavement, and other structures because such lands lack physical or biological features necessary for Atlantic pigtoe. The scale of the maps we prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of such developed lands. Any such lands inadvertently left inside critical habitat boundaries shown on the maps of this proposed rule have been excluded by text in the proposed rule and are not proposed for designation as critical habitat. Therefore, if the critical habitat is finalized as proposed, a Federal action involving these lands would not trigger section 7 consultation under the Act with respect to critical habitat and the requirement of no adverse modification unless the specific action would affect the physical or biological features in the adjacent critical habitat.

The proposed critical habitat designation is defined by the map or maps, as modified by any accompanying regulatory text, presented at the end of this document under Proposed Regulation Promulgation. We include more detailed information on the boundaries of the proposed critical habitat designation in the discussion of individual units below. We will make the coordinates or plot points or both on which each map is based available to the public on *http://www.regulations.gov* under Docket No. FWS–R4–ES–2018–0046, and at the field office responsible for the designation (see **FOR FURTHER INFORMATION CONTACT**, above).

Proposed Critical Habitat Designation

We are proposing to designate approximately 542 river mi (872 river km) in 16 units as critical habitat for the Atlantic pigtoe. All of the units are currently occupied by the species and contain all of the physical and biological features essential to the conservation of the species. These proposed critical habitat areas, described below, constitute our current best assessment of areas that meet the definition of critical habitat for the Atlantic pigtoe. Table 3 shows the name, land ownership of the riparian areas surrounding the units, and approximate river miles of the proposed designated units for the Atlantic pigtoe. Because all streambeds are navigable waters, the actual critical habitat units are all owned by the State in which they are located.

TABLE 3—PROPOSED CRITICAL HABITAT UNITS FOR THE ATLANTIC PIGTOE

Critical habitat unit	Riparian ownership	River miles (kilometers)
1. JR1—Craig Creek	Federal	29 (46.7)
2. JR2—Mill Creek	Federal	1 (1.6)
3. JR3—Middle James River	Private	3 (4.8)
4. CR1—Nottoway River Subbasin	Private; Federal	50 (80.5)
5. CR2—Meherrin River	Private	5 (8)
6. RR1—Dan River	Private	7 (11.3)
7. RR2—Aarons Creek	Private	12 (19.3)
8. TR1—Upper/Middle Tar River	Private; Easements	85 (136.8)
9. TR2—Sandy/Swift Creek	Private; State; Easements	58 (93.3)
10. TR3—Fishing Creek Subbasin	Private; State; Easements	85 (136.8)
11. TR4—Lower Tar River	Private; State; Easements	30 (48.3)
12. NR1—Upper Neuse River Subbasin	Private; State; Easements	60 (95)
13. NR2—Middle Neuse River	Private; State; County; Easements	61 (98.2)
14. CF1—New Hope Creek	Private; Easements	6 (9.7)
15. CF2—Deep River	Private	10 (16.1)

TABLE 3—PROPOSED CRITICAL HABITAT UNITS FOR THE ATLANTIC PIGTOE—Continued

Critical habitat unit	Riparian ownership	River miles (kilometers)
16. YR1—Little River	Private; Easements	40 (64.4)
Total		542 (872)

Note: Area sizes may not sum due to rounding.

We present brief descriptions of all proposed units, and reasons why they meet the definition of critical habitat for Atlantic pigtoe, below.

James River Population

Unit 1: JR1—Craig Creek

Unit 1 consists of 29 river mi (46.7 river km) of Craig Creek in Craig and Botecourt Counties, Virginia. The land adjacent to Craig Creek is primarily private, although some land along the river is federally owned by George Washington and Jefferson National Forest (GWJ NF). The unit currently supports all breeding, feeding, and sheltering needs for the species.

Special management considerations or protection may be required to address excess nutrients, sediment, and pollutants that enter the creek and serve as indicators of other forms of pollution such as bacteria and toxins, reducing water quality for the species. Sources of these types of pollution are wastewater, agricultural runoff, and urban stormwater runoff. Five stream reaches, totaling approximately 21 miles, are impaired for aquatic life in the lower Craig Creek watershed. Impairment is indicated by low benthic-macroinvertebrate bioassessments, pH issues, high temperature, and fecal coliform.

The GWJ NF surrounds the Craig Creek Subbasin; protections and management of the National Forest will likely enable habitat conditions (water quality, water quantity/flow, instream substrate, and connectivity) to remain high into the future. Targeted species restoration in conjunction with current associated-species restoration efforts in Johns, Dicks, and Little Oregon Creeks within the Craig Creek Subbasin will likely improve the Atlantic pigtoe's resiliency in these areas. Maintenance of forested buffer conditions is essential to retaining high-quality instream habitat in this unit.

Unit 2: JR2—Mill Creek

Unit 2 consists of a 1-mile (1.6-km) segment of Mill Creek at the VA39 (Mountain Valley Road) crossing in Bath County, Virginia. The land surrounding the creek is privately owned. The unit currently supports all breeding, feeding, and sheltering needs for the species.

Special management considerations or protection may be required within Unit 2 to address excess nutrients, sediment, and pollutants that enter the creek and serve as indicators of other forms of pollution such as bacteria and toxins. Sources of these types of pollution are wastewater, agricultural runoff, and urban stormwater runoff.

The GWJ NF surrounds most of the Mill Creek watershed; protections and management of the National Forest will likely enable habitat conditions to remain high into the future. Targeted species restoration in conjunction with current associated-species restoration efforts in the Cowpasture River Basin will likely improve the Atlantic pigtoe's resiliency in these areas. Maintenance of forested buffer conditions is essential to retaining high-quality instream habitat in this unit.

Unit 3: JR3—Middle James River

Unit 3 consists of a 3-mile (4.8-km) segment of the Middle James River downstream of its confluence with the Slate River, under the crossing of VA Hwy 15 (James Madison Highway) along the boundary of Fluvanna and Buckingham Counties, Virginia. The riparian areas on either side of the river are privately owned. The unit currently supports all breeding, feeding, and sheltering needs for the species.

Special management considerations or protection may be required within Unit 3 to address excess nutrients, sediment, and pollutants that enter the river and serve as indicators of other forms of pollution such as bacteria and toxins. Sources of these types of pollution are wastewater, agricultural runoff, and urban stormwater runoff.

Chowan River Population

Unit 4: CR1—Nottoway River Subbasin

Unit 4 consists of 50 river miles (80.5 river km) of the Nottoway River in Nottoway, Lunenburg, Brunswick, Dinwiddie, and Greenville Counties, Virginia. The proposed designation begins downstream of the Nottoway River's confluence with Dickerson Creek and ends at its confluence with Buckskin Creek. Land bordering the river is primarily privately owned, although some of the land along the river is part of the Fort Pickett National Guard Installation (see Exemptions, below). The unit currently supports all breeding, feeding, and sheltering needs of the species.

Special management considerations or protection may be required within this unit to address a variety of threats. In the past decade, the Nottoway River suffered from several seasonal drought events, which not only caused very low dissolved oxygen conditions but also decreased food delivery because of minimal flows. In addition, these conditions led to increased predation rates on potential host fishes that were concentrated into low-flow refugia (*e.g.,* pools). Urban stormwater and nonpoint source pollution have been identified as contributing to water quality issues in this unit; therefore, special management considerations for riparian buffer restoration, reduced surface and groundwater withdrawals, and stormwater retrofits will benefit the habitat in this unit. Additional threats to this system include oil and gas pipeline projects that propose to cross streams at locations where the species occurs. Additional special management considerations or protection may be required within this unit to address low water levels as a result of water withdrawals and drought, as well as recommendation of alternate routes for oil and gas pipelines, or directional bore for those projects.

Unit 5: CR2—Meherrin River

Unit 5 consists of 5 miles (8 km) of the Meherrin River in Brunswick County, Virginia, from approximately 1.5 river miles below the confluence with Saddletree Creek under VA Hwy 46 (Christana Highway) to VA715 (Iron Bridge Road). The land on either side of the proposed critical habitat unit is privately owned. The unit currently supports all breeding, feeding, and sheltering needs for the species.

Special management considerations or protection may be required within this unit to address a variety of threats. Like the Nottoway River, the Meherrin River has been affected by seasonal droughts, resulting in low flow

conditions and low dissolved oxygen conditions. The rural nature of the unit will benefit from following agricultural and silvicultural BMPs. Additional special management considerations or protection may be required within this unit to address low water levels as a result of water withdrawals and drought.

Roanoke River Population

Unit 6: RR1—Dan River

Unit 6 consists of 7 miles (11.3 km) of the Dan River along the border of Virginia and North Carolina from the Stateline Bridge Road in Pittsylvania County, Virginia, downstream to the confluence with Williamson Creek in Rockingham County, North Carolina. The land on either side of the proposed critical habitat unit is privately owned. The unit currently supports all breeding, feeding, and sheltering needs for the species.

Special management considerations or protection may be required within this unit to address threats. For example, a Duke Energy Coal Ash spill occurred upstream of this unit in February 2014; subsequent actions related to mitigating the effects of the spill will ultimately benefit the habitat in this unit, potentially allowing species restoration efforts.

Unit 7: RR2—Aarons Creek

Unit 7 consists of 12 miles (19.3 km) of Aarons Creek, from NC96 in Granville County, North Carolina, downstream across the North Carolina-Virginia border to VA602 (White House Road) along the Mecklenburg County-Halifax County line in Virginia. Land on either side of the proposed critical habitat unit is privately owned. The unit currently supports all breeding, feeding, and sheltering needs for the species.

Special management considerations or protection may be required within this unit to address a variety of threats. There are two impaired stream reaches totaling approximately 12 miles (19.3 km) in the Aarons Creek watershed. An ''impairment'' designation by the State here is a result of low dissolved oxygen and low benthic-macroinvertebrate assessment scores. Special management focused on maintaining riparian buffers and following BMPs will be important for the habitat in this unit.

Tar River Population

Unit 8: TR1—Upper/Middle Tar River

This unit consists of 85 miles (136.8 km) of the mainstem of the upper and middle Tar River as well as several tributaries (Bear Swamp Creek, Crooked Creek, Cub Creek, and Shelton Creek), all in North Carolina. Land bordering the river and creeks is mostly privately owned (74 mi (119 km)), with some areas in public ownership or easements (11 mi (17 km)). The unit currently supports all breeding, feeding, and sheltering needs for the species.

Special management considerations or protection may be required within this unit to address a variety of threats. Excessive amounts of nitrogen and phosphorus run off the land or are discharged into the waters, causing too much growth of microscopic or macroscopic vegetation and leading to extremely low levels of dissolved oxygen. As a result, there are six ''impaired'' stream reaches (as defined on the State's 303d list) totaling approximately 32 miles in the unit. Expansion or addition of new wastewater discharges are also a threat to habitat in this unit. Special management focused on agricultural BMPs, implementing highest levels of treatment of wastewater practicable, maintenance of forested buffers, and connection of protected riparian corridors will benefit habitat for the species in this unit.

Unit 9: TR2—Sandy/Swift Creek

This unit consists of a 58-mile (93.3-km) segment of Sandy/Swift Creek in Granville, Vance, Franklin, and Nash Counties, North Carolina. Land bordering the river and creeks is mostly privately owned (50 mi (80 km)) with some areas covered by protective easements (8 mi (13km)). The unit currently supports all breeding, feeding, and sheltering needs for the species.

Special management considerations or protection may be required within this unit to address a variety of threats. Excessive amounts of nitrogen and phosphorus run off the land or are discharged into the waters, causing excessive growth of microscopic or macroscopic vegetation and leading to extremely low levels of dissolved oxygen; there is one ''impaired'' stream reach totaling approximately 5 miles (8 km) in this unit. Special management focused on agricultural BMPs, maintenance of forested buffers, and connection of protected riparian corridors will benefit habitat for the species in this unit.

Unit 10: TR3—Fishing Creek Subbasin

This unit consists of 85 miles (136.8 km) in Fishing Creek, Little Fishing Creek, Shocco Creek, and Maple Branch located in Warren, Halifax, Franklin, and Nash Counties, North Carolina. The land bordering the creeks includes private parcels (56 miles (90 km)), protective easements (14 miles (23 km)), and State game lands (15 miles (24 km)). The unit currently supports all breeding, feeding, and sheltering needs for the species.

Special management considerations or protection may be required within this unit to address a variety of threats. Excessive amounts of nitrogen and phosphorus run off the land or are discharged into the waters, causing excessive growth of microscopic or macroscopic vegetation and leading to extremely low levels of dissolved oxygen. Special management focused on agricultural BMPs, maintenance of forested buffers, and connection of protected riparian corridors will benefit habitat for the species in this unit.

Unit 11: TR4—Lower Tar River

This unit consists of 30 miles (48.3 km) of the Lower Tar River and Fishing Creek in Edgecombe County, North Carolina, from NC97 near Leggett, North Carolina, to the Edgecombe-Pitt County line near NC33. Land along the river is divided between private parcels, protective easements, State game lands, and State park land. The unit currently supports all breeding, feeding, and sheltering needs for the species.

Special management considerations or protection may be required within this unit to address a variety of threats. Excessive amounts of nitrogen and phosphorus run off the land or are discharged into the waters, causing excessive growth of microscopic or macroscopic vegetation and leading to extremely low levels of dissolved oxygen. Special management focused on agricultural BMPs, maintenance of forested buffers, and connection of protected riparian corridors will benefit habitat for the species in this unit.

Neuse River Population

Unit 12: NR1—Upper Neuse River Subbasin

This unit consists of 60 river miles (95 river km) in four subunits including Flat River, Little River, Eno River, and the Upper Eno River. The unit currently supports all breeding, feeding, and sheltering needs for the species.

The Flat River subunit consists of 19 river miles (30.6 river km) in the Flat River Subbasin in Person and Durham Counties, North Carolina, including the South Flat River downstream of Dick Coleman Road, the North Flat River near Parsonage Road, and Deep Creek near Helena-Moriah Road downstream where each river converges into the Flat River downstream of State Forest Road. Land along the Flat River subunit includes private parcels, easements, and State forest land.

The Little River subunit includes 18 river miles (29 river km) of the North Fork and South Fork Little Rivers in Orange and Durham Counties, North Carolina, bordered by both private land and easements.

The Upper Eno River subunit consists of 4 river miles (6.4 river km) in Orange County, North Carolina, including the West Fork Eno River upstream of Cedar Grove Road to the confluence with McGowan Creek. This subunit is bordered by 3 miles (4.8 km) of private land and 1 mile (1.6 km) of conservation parcels.

The Eno River subunit consists of 18 river miles (29 river km) in Orange and Durham Counties, North Carolina, from below Eno Mountain Road to NC15–501. Land bordering the river contains private land, State park land, and conservation parcels.

Special management considerations or protection may be required within this unit to address a variety of threats. Large quantities of nutrients (especially nitrogen) contributed by fertilizers and animal waste washed from lawns, urban developed areas, farm fields, and animal operations are impacting aquatic ecosystems in this unit. More than 300 permitted point-source sites discharge wastewater into streams and rivers in the basin. Development is also impacting areas along the Upper Neuse River.

Special management considerations in this unit include using the highest available wastewater treatment technologies, retrofitting stormwater systems, eliminating direct stormwater discharges, increasing open space, maintaining connected riparian corridors, and treating invasive species (like hydrilla).

Unit 13: NR2—Middle Neuse River

This unit consists of 61 river miles (98.2 river km) in five subunits including Swift Creek, Middle Creek, Upper Little River, Middle Little River, and Contentnea Creek, all in North Carolina. The unit currently supports all breeding, feeding, and sheltering needs for the species.

The Middle Creek subunit is 19 river miles (30.6 river km), and the Swift Creek subunit is 25 river miles (40.2 river km), both in Wake and Johnston Counties. They are primarily bordered by private land with some easement parcels.

The Upper Little River subunit includes 4 miles (6.4 km) of the Upper Little River from the confluence with Perry Creek to Fowler Road in Wake County, North Carolina. The land along this subunit is primarily county-owned with some private parcels.

The Middle Little River subunit includes 11 river miles (17.7 river km) in Johnston County, North Carolina. This area is bordered predominantly by private land and some conservation parcels.

The Contentnea Creek subunit consists of 2 river miles (3.2 river km) near NC581 in Wilson County, North Carolina, bordered entirely by private land.

Special management considerations or protection may be required within this unit to address a variety of threats. Large quantities of nutrients (especially nitrogen) contributed by fertilizers and animal waste washed from lawns, urban developed areas, farm fields, and animal operations are impacting aquatic ecosystems in this unit. More than 300 permitted point-source sites discharge wastewater into streams and rivers in the basin. Development is also impacting areas along the Middle Neuse River.

There are 49 State-defined ''impaired'' stream reaches totaling approximately 447 miles (719.4 km) in this unit. There are many factors that cause an impairment label to be given by the State, including low benthic-macroinvertebrate assessment scores, low pH, poor fish community scores, low dissolved oxygen, polychlorinated biphenyls (PCBs), copper, and zinc. There are 349 non-major and 6 major (Apex Water Reclamation Facility, Central Johnston County Waste Water Treatment Plant, Cary Waste Water Treatment Plant, City of Raleigh Wastewater Treatment Plant, Dempsey Benton Water Treatment Plant, and Terrible Creek Waste Water Treatment Plant) permitted discharges in this MU. Special management related to developed areas, including using the best available wastewater treatment technologies, retrofitting stormwater systems, eliminating direct stormwater discharges, increasing open space in the watershed, and maintaining connected riparian corridors, will be important to maintain habitat in this unit.

Cape Fear Population

Unit 14: CF1—New Hope Creek

This unit consists of 6 mi (9.7 km) of habitat in the New Hope Creek in Orange County, North Carolina. The land bordering the creek includes private parcels and some easements. The unit currently supports all breeding, feeding, and sheltering needs for the species.

Special management considerations or protection may be required within this unit to address a variety of threats. Large quantities of nutrients (especially nitrogen) contributed by fertilizers and animal waste washed from lawns, urban developed areas, farm fields, and animal operations are impacting aquatic ecosystems in this unit. More than 200 permitted point-source sites discharge wastewater into streams and rivers in the basin. Development is also impacting areas along New Hope Creek.

Special management, including using the best available wastewater treatment technologies, retrofitting stormwater systems, eliminating direct stormwater discharges, increasing open space in the watershed, and maintaining connected riparian corridors, may be required to maintain habitat in this unit.

Unit 15: CF2—Deep River

The Deep River Subbasin unit consists of 10 river miles (16.1 river km) in Randolph County, North Carolina, including the mainstem as well as Richland Creek and Brush Creek. Land bordering the area is privately owned. The unit currently supports all breeding, feeding, and sheltering needs for the species.

The Deep River Subbasin is situated in a mostly rural part of the Cape Fear River Basin, and large-scale agriculture and livestock operations are present. Special management considerations or protection may be required within this unit to insure the use of agriculture BMPs, especially preventing cattle access to streams, as well as protecting forested riparian buffers to benefit habitat in this unit.

Yadkin-Pee Dee River Population

Unit 16: YR1—Little River

This unit consists of 40 miles (64.4 km) of Little River in Randolph and Montgomery Counties, North Carolina. Land along the river is predominantly privately owned with some parcels in conservation easements. The unit currently supports all breeding, feeding, and sheltering needs for the species.

Habitat fragmentation from dams and reservoirs is impacting the aquatic ecosystems in this unit. Sedimentation from intensive agriculture is the top pollution problem in the basin. Special management considerations or protection may include the use of agricultural BMPs, especially preventing cattle access to streams, as well as protecting forested riparian buffers to benefit habitat in this unit.

Exemptions

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

The Sikes Act Improvement Act of 1997 (Sikes Act) (16 U.S.C. 670a) required each military installation that includes land and water suitable for the

conservation and management of natural resources to complete an integrated natural resources management plan (INRMP) by November 17, 2001. An INRMP integrates implementation of the military mission of the installation with stewardship of the natural resources found on the base. Each INRMP includes:

(1) An assessment of the ecological needs on the installation, including the need to provide for the conservation of listed species;

(2) A statement of goals and priorities;

(3) A detailed description of management actions to be implemented to provide for these ecological needs; and

(4) A monitoring and adaptive management plan.

Among other things, each INRMP must, to the extent appropriate and applicable, provide for fish and wildlife management; fish and wildlife habitat enhancement or modification; wetland protection, enhancement, and restoration where necessary to support fish and wildlife; and enforcement of applicable natural resource laws.

The National Defense Authorization Act for Fiscal Year 2004 (Pub. L. 108–136) amended the Act to limit areas eligible for designation as critical habitat. Specifically, section 4(a)(3)(B)(i) of the Act (16 U.S.C. 1533(a)(3)(B)(i)) provides that: ''The Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 670a of this title [the Sikes Act; 16 U.S.C. 670a], if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation.''

We consult with the military on the development and implementation of INRMPs for installations with listed species. We analyze INRMPs developed by military installations located within the range of proposed critical habitat designations to determine if they meet the criteria for exemption from critical habitat under section 4(a)(3) of the Act.

We have identified one area within the proposed critical habitat designation that consists of Department of Defense lands with a completed, Service-approved INRMP. The Army National Guard—Maneuver Training Center Fort Pickett (Fort Pickett) is located in southeastern North Carolina on 41,000 acres in three counties: Nottoway, Brunswick, and Dinwiddie. Fort Pickett is federally owned land that is managed by the Virginia Army National Guard and is subject to all federal laws and regulations. The Fort Pickett INRMP covers fiscal years 2017–2021, and serves as the principal management plan governing all natural resource activities on the installation. Among the goals and objectives listed in the INRMP is habitat management for rare, threatened, and endangered species, and the Atlantic pigtoe is included in this plan. Management actions that benefit the Atlantic pigtoe include maintenance and improvement of habitat, monitoring mussel populations, and improving water quality. Additional elements of the management actions included in the INRMP that will benefit Atlantic pigtoe and its habitat are forest management, stream and wetland protection zones, and public outreach and education.

Fourteen miles (22.5 km) of Unit 4 (CR1—Nottoway River Subbasin) are located within the area covered by this INRMP. Based on the above considerations, and in accordance with section 4(a)(3)(B)(i) of the Act, we have determined that the identified streams are subject to the Fort Pickett National Guard Training Center INRMP and that conservation efforts identified in the INRMP will provide a benefit to the Atlantic pigtoe. Therefore, streams within this installation are exempt from critical habitat designation under section 4(a)(3) of the Act. We are not including approximately 14 river miles (22.5 river km) of habitat in this proposed critical habitat designation because of this exemption.

Consideration of Impacts Under Section 4(b)(2) of the Act

Section 4(b)(2) of the Act states that the Secretary shall designate and make revisions to critical habitat on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. The Secretary may exclude an area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific data available, that the failure to designate such area as critical habitat will result in the extinction of the species. In making that determination, the statute on its face, as well as the legislative history, are clear that the Secretary has broad discretion regarding which factor(s) to use and how much weight to give to any factor.

As discussed below, we are not proposing to exclude any areas from critical habitat. However, the final decision on whether to exclude any areas will be based on the best scientific data available at the time of the final designation, including information obtained during the comment period and information about the economic impact of designation.

Consideration of Economic Impacts

Section 4(b)(2) of the Act and its implementing regulations require that we consider the economic impact that may result from a designation of critical habitat. To assess the probable economic impacts of a designation, we must first evaluate specific land uses or activities and projects that may occur in the area of the critical habitat. We then must evaluate whether a specific critical habitat designation may restrict or modify specific land uses or activities for the benefit of the species and its habitat within the areas proposed. We then identify which conservation efforts may be the result of the species being listed under the Act versus those attributed solely to the designation of critical habitat. The probable economic impact of a proposed critical habitat designation is analyzed by comparing scenarios both ''with critical habitat'' and ''without critical habitat.'' The ''without critical habitat'' scenario represents the baseline for the analysis, which includes the existing regulatory and socioeconomic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat (*e.g.,* under the Federal listing as well as other Federal, State, and local regulations). The baseline, therefore, represents the costs of all efforts attributable to the listing of the species under the Act (*i.e.,* conservation of the species and its habitat incurred regardless of whether critical habitat is designated). The ''with critical habitat'' scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts would not be expected without the designation of critical habitat for the species. In other words, the incremental costs are those attributable solely to the designation of critical habitat, above and beyond the baseline costs. These are the costs we use when evaluating the benefits of inclusion and exclusion of particular areas from the final designation of critical habitat should we choose to conduct a discretionary 4(b)(2) exclusion analysis.

For this proposed designation, we developed an incremental effects memorandum (IEM) considering the probable incremental economic impacts

that may result from this proposed designation of critical habitat. The information contained in our IEM was then used to develop a screening analysis of the probable effects of the designation of critical habitat for the Atlantic pigtoe (IEc, 2018, entire). The purpose of the screening analysis is to filter out the geographic areas in which the critical habitat designation is unlikely to result in probable incremental economic impacts. In particular, the screening analysis considers baseline costs (*i.e.,* absent critical habitat designation) and includes probable economic impacts where land and water use may be subject to conservation plans, land management plans, best management practices, or regulations that protect the habitat area as a result of the Federal listing status of the species. The screening analysis filters out particular areas of critical habitat that are already subject to such protections and are, therefore, unlikely to incur incremental economic impacts. Ultimately, the screening analysis allows us to focus our analysis on evaluating the specific areas or sectors that may incur probable incremental economic impacts as a result of the designation. This screening analysis, combined with the information contained in our IEM, constitutes our draft economic analysis (DEA) of the proposed critical habitat designation for the Atlantic pigtoe, and is summarized in the narrative below.

Executive Orders (E.O.s) 12866 and 13563 direct Federal agencies to assess the costs and benefits of available regulatory alternatives in quantitative (to the extent feasible) and qualitative terms. Consistent with the E.O. regulatory analysis requirements, our effects analysis under the Act may take into consideration impacts to both directly and indirectly affected entities, where practicable and reasonable. If sufficient data are available, we assess to the extent practicable the probable impacts to both directly and indirectly affected entities. As part of our screening analysis, we considered the types of economic activities that are likely to occur within the areas likely affected by the proposed critical habitat designation. In our March 19, 2018, IEM describing probable incremental economic impacts that may result from the proposed designation, we first identified probable incremental economic impacts associated with each of the following categories of activities: (1) Federal lands management (National Park Service, U.S. Forest Service, Department of Defense); (2) agriculture; (3) forest management/silviculture/timber; (4) development; (5) recreation; (6) restoration activities; and (7) transportation. Additionally, we considered whether the activities have any Federal involvement. Critical habitat designation generally will not affect activities that do not have any Federal involvement; under the Act, designation of critical habitat only affects activities conducted, funded, permitted, or authorized by Federal agencies. If we list the species, as proposed in this document, in areas where the Atlantic pigtoe is present, under section 7 of the Act, Federal agencies would be required to consult with the Service on activities they fund, permit, or implement that may affect the species.

In our IEM, we attempted to clarify the distinction between the effects that would result from the species being listed and those attributable to the critical habitat designation (*i.e.,* difference between the jeopardy and adverse modification standards) for the Atlantic pigtoe. Because the designation of critical habitat is being proposed concurrently with the listing, it has been our experience that it is more difficult to discern which conservation efforts are attributable to the species being listed and those which would result solely from the designation of critical habitat. However, the following specific circumstances in this case help to inform our evaluation: (1) The essential physical or biological features identified for critical habitat are the same features essential for the life requisites of the species, and (2) any actions that would result in sufficient harm or harassment to constitute jeopardy to the Atlantic pigtoe would also likely adversely affect the essential physical or biological features of critical habitat. The IEM outlines our rationale concerning this limited distinction between baseline conservation efforts and incremental impacts of the designation of critical habitat for this species. This evaluation of the incremental effects has been used as the basis to evaluate the probable incremental economic impacts of this proposed designation of critical habitat.

The proposed critical habitat designation for the Atlantic pigtoe totals approximately 542 river miles (872 river km), all of which are currently occupied by the species. In these areas, any actions that may affect the species or its habitat would likely also affect proposed critical habitat, and it is unlikely that any additional conservation efforts would be required to address the adverse modification standard over and above those recommended as necessary to avoid jeopardizing the continued existence of the species. Therefore, the only additional costs that are expected in all of the proposed critical habitat designation are administrative costs, due to the fact that this additional analysis will require time and resources by both the Federal action agency and the Service. However, it is believed that, in most circumstances, these costs would not reach the threshold of ''significant'' under E.O. 12866. We anticipate a maximum of 109 section 7 consultations annually at a total incremental cost of less than $230,000 per year.

As we stated earlier, we are soliciting data and comments from the public on the DEA, as well as all aspects of the proposed rule and our required determinations. See **ADDRESSES**, above, for information on where to send comments. We may revise the proposed rule or supporting documents to incorporate or address information we receive during the public comment period. In particular, we may exclude an area from critical habitat if we determine that the benefits of excluding the area outweigh the benefits of including the area, provided the exclusion will not result in the extinction of this species.

Exclusions

Exclusions Based on Economic Impacts

Under section 4(b)(2) of the Act, we consider the economic impacts of specifying any particular area as critical habitat. As discussed above, we prepared an analysis of the probable economic impacts of the proposed critical habitat designation and related factors. The Secretary does not propose to exercise his discretion to exclude any areas from the final designation based on economic impacts. However, during the development of a final designation, we will consider any additional economic impact information we receive during the public comment period, which may result in areas being excluded from the final critical habitat designation under section 4(b)(2) of the Act and our implementing regulations at 50 CFR 424.19.

Exclusions Based on National Security Impacts or Homeland Security Impacts

Under section 4(b)(2) of the Act, we consider whether there are lands owned or managed by the Department of Defense where a national security impact might exist. In preparing this proposal, we have determined that, other than the land exempted under section 4(a)(3)(B)(i) of the Act based upon the existence of an approved INRMP, the lands within the proposed

designation of critical habitat for the Atlantic pigtoe are not owned or managed by the Department of Defense or Department of Homeland Security, and, therefore, we anticipate no impact on national security. Consequently, the Secretary does not propose to exercise his discretion to exclude any areas from the final designation based on impacts on national security.

Exclusions Based on Other Relevant Impacts

Under section 4(b)(2) of the Act, we consider any other relevant impacts, in addition to economic impacts and impacts on national security. We consider a number of factors including whether there are permitted conservation plans covering the species in the area such as HCPs, safe harbor agreements, or candidate conservation agreements with assurances, or whether there are non-permitted conservation agreements and partnerships that would be encouraged by designation of, or exclusion from, critical habitat. In addition, we look at the existence of tribal conservation plans and partnerships and consider the government-to-government relationship of the United States with tribal entities. We also consider any social impacts that might occur because of the designation.

In preparing this proposal, we have determined that there are currently no HCPs or other management plans for the Atlantic pigtoe, and the proposed designation does not include any tribal lands or trust resources. We anticipate no impact on tribal lands, partnerships, or HCPs from this proposed critical habitat designation. Accordingly, the Secretary does not propose to exercise his discretion to exclude any areas from the final designation based on other relevant impacts.

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as an endangered or threatened species and with respect to its critical habitat, if any is designated. Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. In addition, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under the Act or result in the destruction or adverse modification of proposed critical habitat.

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

If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Examples of actions that are subject to the section 7 consultation process are actions on State, tribal, local, or private lands that require a Federal permit or that involve some other Federal action. Federal agency actions within the species' habitat that may require conference or consultation or both include management and any other landscape-altering activities on Federal lands administered by the U.S. Fish and Wildlife Service, Army National Guard, U.S. Forest Service, and National Park Service; issuance of section 404 Clean Water Act (33 U.S.C. 1251 *et seq.*) permits by the U.S. Army Corps of Engineers; and construction and maintenance of roads or highways by the Federal Highway Administration. Federal actions not affecting listed species or critical habitat, and actions on State, tribal, local, or private lands that are not federally funded or authorized, do not require section 7 consultation.

As a result of section 7 consultation, we document compliance with the requirements of section 7(a)(2) through our issuance of:

(1) A concurrence letter for Federal actions that may affect, but are not likely to adversely affect, listed species or critical habitat; or

(2) A biological opinion for Federal actions that may affect, and are likely to adversely affect, listed species or critical habitat.

When we issue a biological opinion concluding that a project is likely to jeopardize the continued existence of a listed species and/or destroy or adversely modify critical habitat, we provide reasonable and prudent alternatives to the project, if any are identifiable, that would avoid the likelihood of jeopardy and/or destruction or adverse modification of critical habitat. We define ''reasonable and prudent alternatives'' (at 50 CFR 402.02) as alternative actions identified during consultation that:

(1) Can be implemented in a manner consistent with the intended purpose of the action,

(2) Can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction,

(3) Are economically and technologically feasible, and

(4) Would, in the Service Director's opinion, avoid the likelihood of jeopardizing the continued existence of the listed species and/or avoid the likelihood of destroying or adversely modifying critical habitat.

Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions in instances where we have listed a new species or subsequently designated critical habitat that may be affected and the Federal agency has retained discretionary involvement or control over the action (or the agency's discretionary involvement or control is authorized by law). Consequently, Federal agencies sometimes may need to request reinitiation of consultation with us on actions for which formal consultation has been completed, if those actions with discretionary involvement or control may affect subsequently listed species or designated critical habitat.

Application of the ''Adverse Modification'' Standard

The key factor related to the adverse modification determination is whether, with implementation of the proposed Federal action, the affected critical habitat would continue to serve its intended conservation role for the species. Activities that may destroy or adversely modify critical habitat are those that result in a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of the Atlantic pigtoe. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of the species or that preclude or significantly delay development of such features. As discussed above, the role of critical habitat is to support physical or biological features essential to the

conservation of a listed species and provide for the conservation of the species.

Section 4(b)(8) of the Act requires us to briefly evaluate and describe, in any proposed or final regulation that designates critical habitat, activities involving a Federal action that may destroy or adversely modify such habitat, or that may be affected by such designation. Activities that may affect critical habitat, when carried out, funded, or authorized by a Federal agency, should result in consultation for the Atlantic pigtoe. These activities include, but are not limited to:

(1) Actions that would alter the minimum flow or the existing flow regime. Such activities could include, but are not limited to, impoundment, channelization, water diversion, water withdrawal, and hydropower generation. These activities could eliminate or reduce the habitat necessary for the growth and reproduction of the Atlantic pigtoe and its fish host by decreasing or altering flows to levels that would adversely affect their ability to complete their life cycles.

(2) Actions that would significantly alter water chemistry or temperature. Such activities could include, but are not limited to, release of chemicals (including pharmaceuticals, metals, and salts), biological pollutants, or heated effluents into the surface water or connected groundwater at a point source or by dispersed release (non-point source). These activities could alter water conditions to levels that are beyond the tolerances of the mussel or its host fish and result in direct or cumulative adverse effects to these individuals and their life cycles.

(3) Actions that would significantly increase sediment deposition within the stream channel. Such activities could include, but are not limited to, excessive sedimentation from livestock grazing, road construction, channel alteration, timber harvest, off-road vehicle use, and other watershed and floodplain disturbances. These activities could eliminate or reduce the habitat necessary for the growth and reproduction of the mussel and its fish host by increasing the sediment deposition to levels that would adversely affect their ability to complete their life cycles.

(4) Actions that would significantly increase the filamentous algal community within the stream channel. Such activities could include, but are not limited to, release of nutrients into the surface water or connected groundwater at a point source or by dispersed release (non-point source). These activities can result in excessive filamentous algae filling streams and reducing habitat for the mussel and its fish hosts, degrading water quality during their decay, and decreasing oxygen levels at night from their respiration to levels below the tolerances of the mussel and/or its fish host. Algae can also directly compete with mussel offspring by covering the sediment that prevents the glochidia from settling into the sediment.

(5) Actions that would significantly alter channel morphology or geometry. Such activities could include, but are not limited to, channelization, impoundment, road and bridge construction, mining, dredging, and destruction of riparian vegetation. These activities may lead to changes in water flows and levels that would degrade or eliminate the mussel or its fish host and/or their habitats. These actions can also lead to increased sedimentation and degradation in water quality to levels that are beyond the tolerances of the mussel or its fish host.

(6) Actions that result in the introduction, spread, or augmentation of nonnative aquatic species in occupied stream segments, or in stream segments that are hydrologically connected to occupied stream segments, even if those segments are occasionally intermittent, or introduction of other species that compete with or prey on the Atlantic pigtoe. Possible actions could include, but are not limited to, stocking of nonnative fishes, stocking of sport fish, or other related actions. These activities can introduce parasites or disease for host fish, and can result in direct predation, or affect the growth, reproduction, and survival, of Atlantic pigtoes.

III. Proposed Rule Issued Under Section 4(d) of the Act

Background

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to threatened wildlife. Under section 4(d) of the Act, the Secretary has the discretion to issue such regulations as he deems necessary and advisable to provide for the conservation of threatened species. The Secretary also has the discretion to prohibit, by regulation with respect to any threatened species of fish or wildlife, any act prohibited under section 9(a)(1) of the Act. The same prohibitions of section 9(a)(1) of the Act, codified at 50 CFR 17.31, make it illegal for any person subject to the jurisdiction of the United States to take (which includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these) threatened wildlife within the United States or on the high seas. In addition, it is unlawful to import; export; deliver, receive, carry, transport, or ship in interstate or foreign commerce in the course of commercial activity; or sell or offer for sale in interstate or foreign commerce any listed species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. To the extent the section 9(a)(1) prohibitions apply only to endangered species, this proposed rule would apply those same prohibitions to the Atlantic pigtoe with some exceptions.

In accordance with section 4(d) of the Act, the regulations implementing the Act include a provision that generally applies to threatened wildlife the same prohibitions and exceptions that apply to endangered wildlife (50 CFR 17.31(a), 17.32). However, for any threatened species, the Service may instead develop a protective regulation that is specific to the conservation needs of that species. Such a regulation would contain all of the protections applicable to that species (50 CFR 17.31(c)); this may include some of the general prohibitions and exceptions under 50 CFR 17.31 and 17.32, but would also include species-specific protections that may be more or less restrictive than the general provisions at 50 CFR 17.31.

Proposed 4(d) Rule for Atlantic Pigtoe

Under this proposed 4(d) rule, except as noted below, all prohibitions and provisions of 50 CFR 17.31 and 17.32 would apply to the Atlantic pigtoe:

(1) Species restoration efforts by State wildlife agencies, including collection of broodstock, tissue collection for genetic analysis, captive propagation, and subsequent stocking into currently occupied and unoccupied areas within the historical range of the species.

(2) Channel restoration projects that create natural, physically stable, ecologically functioning streams (or stream and wetland systems) that are reconnected with their groundwater aquifers. These projects can be accomplished using a variety of methods, but the desired outcome is a natural channel with low shear stress (force of water moving against the channel); bank heights that enable reconnection to the floodplain; a reconnection of surface and groundwater systems, resulting in perennial flows in the channel; riffles and pools comprised of existing soil, rock, and wood instead of large imported materials; low compaction of soils within adjacent riparian areas; and

inclusion of riparian wetlands. Second- to third-order, headwater streams reconstructed in this way would offer suitable habitats for the Atlantic pigtoe and contain stable channel features, such as pools, glides, runs, and riffles, which could be used by the species and its host fish for spawning, rearing, growth, feeding, migration, and other normal behaviors.

(3) Bank stabilization projects that use bioengineering methods to replace pre-existing, bare, eroding stream banks with vegetated, stable stream banks, thereby reducing bank erosion and instream sedimentation and improving habitat conditions for the species. Following these bioengineering methods, stream banks may be stabilized using live stakes (live, vegetative cuttings inserted or tamped into the ground in a manner that allows the stake to take root and grow), live fascines (live branch cuttings, usually willows, bound together into long, cigar shaped bundles), or brush layering (cuttings or branches of easily rooted tree species layered between successive lifts of soil fill). These methods would not include the sole use of quarried rock (rip-rap) or the use of rock baskets or gabion structures.

(4) Silviculture practices and forest management activities that:

(a) Implement highest-standard best management practices, particularly for Streamside Management Zones, stream crossings, and forest roads; and

(b) Comply with forest practice guidelines related to water quality standards, or comply with Sustainable Forestry Initiative/Forest Stewardship Council/American Tree Farm System certification standards for both forest management and responsible fiber sourcing.

These BMPs are publicly available on websites for these organizations, and can currently be found below:

http://www.ncasi.org/Downloads/Download.ashx?id=10204
http://reports.oah.state.nc.us/
https://us.fsc.org/download.fsc-us-forest-management-standard-v1-0.95.htm
https://www.treefarmsystem.org/certification-american-tree-farm-standards

These actions and activities may have some minimal level of mortality, harm, or disturbance to the Atlantic pigtoe, but are not expected to adversely affect the species' conservation and recovery efforts. In fact, we expect they would have a net beneficial effect on the species. Across the species' range, instream habitats have been degraded physically by sedimentation and by direct channel disturbance. The activities proposed in this rule will correct some of these problems, creating more favorable habitat conditions for the species. These provisions are necessary because, absent protections, the species is likely to become in danger of extinction in the foreseeable future. Additionally, these provisions are advisable because the species needs active conservation to improve the quality of its habitat. By exempting some of the general prohibitions of 50 CFR 17.31 and 17.32, these provisions can encourage cooperation by landowners and other affected parties in implementing conservation measures. This will allow for use of the land while at the same time ensuring the preservation of suitable habitat and minimizing impact on the species.

We may issue permits to carry out otherwise prohibited activities involving threatened wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.32. With regard to threatened wildlife, a permit may be issued for the following purposes: For scientific purposes, to enhance propagation or survival, for economic hardship, for zoological exhibition, for educational purposes, for incidental taking, or for special purposes consistent with the purposes of the Act. There are also certain statutory exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

IV. Required Determinations

Clarity of the Rule

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

(1) Be logically organized;

(2) Use the active voice to address readers directly;

(3) Use clear language rather than jargon;

(4) Be divided into short sections and sentences; and

(5) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

Executive Order 13771

This proposed rule is not an Executive Order (E.O.) 13771 (''Reducing Regulation and Controlling Regulatory Costs'') (82 FR 9339, February 3, 2017) regulatory action because this rule is not significant under E.O. 12866.

Regulatory Planning and Review (Executive Orders 12866 and 13563)

Executive Order 12866 provides that the Office of Information and Regulatory Affairs (OIRA) will review all significant rules. The Office of Information and Regulatory Affairs has determined that this rule is not significant.

Executive Order 13563 reaffirms the principles of E.O. 12866 while calling for improvements in the nation's regulatory system to promote predictability, to reduce uncertainty, and to use the best, most innovative, and least burdensome tools for achieving regulatory ends. The executive order directs agencies to consider regulatory approaches that reduce burdens and maintain flexibility and freedom of choice for the public where these approaches are relevant, feasible, and consistent with regulatory objectives. E.O. 13563 emphasizes further that regulations must be based on the best available science and that the rulemaking process must allow for public participation and an open exchange of ideas. We have developed this rule in a manner consistent with these requirements.

Regulatory Flexibility Act (5 U.S.C. 601 et seq.)

Under the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 *et seq.*), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA; 5 U.S.C. 801 *et seq.*), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (*i.e.,* small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. The SBREFA amended the RFA to require Federal agencies to provide a certification statement of the factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities.

According to the Small Business Administration, small entities include

small organizations such as independent nonprofit organizations; small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents; and small businesses (13 CFR 121.201). Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than $5 million in annual sales, general and heavy construction businesses with less than $27.5 million in annual business, special trade contractors doing less than $11.5 million in annual business, and agricultural businesses with annual sales less than $750,000. To determine if potential economic impacts to these small entities are significant, we considered the types of activities that might trigger regulatory impacts under this designation as well as types of project modifications that may result. In general, the term ''significant economic impact'' is meant to apply to a typical small business firm's business operations.

The Service's current understanding of the requirements under the RFA, as amended, and following recent court decisions, is that Federal agencies are only required to evaluate the potential incremental impacts of rulemaking on those entities directly regulated by the rulemaking itself, and, therefore, are not required to evaluate the potential impacts to indirectly regulated entities. The regulatory mechanism through which critical habitat protections are realized is section 7 of the Act, which requires Federal agencies, in consultation with the Service, to ensure that any action authorized, funded, or carried out by the agency is not likely to destroy or adversely modify critical habitat. Therefore, under section 7, only Federal action agencies are directly subject to the specific regulatory requirement (avoiding destruction and adverse modification) imposed by critical habitat designation. Consequently, it is our position that only Federal action agencies would be directly regulated if we adopt the proposed critical habitat designation. There is no requirement under RFA to evaluate the potential impacts to entities not directly regulated. Moreover, Federal agencies are not small entities. Therefore, because no small entities would be directly regulated by this rulemaking, the Service certifies that, if promulgated, the proposed critical habitat designation will not have a significant economic impact on a substantial number of small entities.

In summary, we have considered whether the proposed designation would result in a significant economic impact on a substantial number of small entities. For the above reasons and based on currently available information, we certify that, if promulgated, the proposed critical habitat designation will not have a significant economic impact on a substantial number of small business entities. Therefore, an initial regulatory flexibility analysis is not required.

Energy Supply, Distribution, or Use—Executive Order 13211

Executive Order 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use) requires agencies to prepare Statements of Energy Effects when undertaking certain actions. In our economic analysis, we did not find that the designation of this proposed critical habitat will significantly affect energy supplies, distribution, or use. Therefore, this action is not a significant energy action, and no Statement of Energy Effects is required.

Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501 *et seq.*), we make the following findings:

(1) This proposed rule would not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, or tribal governments, or the private sector, and includes both ''Federal intergovernmental mandates'' and ''Federal private sector mandates.'' These terms are defined in 2 U.S.C. 658(5)–(7). ''Federal intergovernmental mandate'' includes a regulation that ''would impose an enforceable duty upon State, local, or tribal governments'' with two exceptions. It excludes ''a condition of Federal assistance.'' It also excludes ''a duty arising from participation in a voluntary Federal program,'' unless the regulation ''relates to a then-existing Federal program under which $500,000,000 or more is provided annually to State, local, and tribal governments under entitlement authority,'' if the provision would ''increase the stringency of conditions of assistance'' or ''place caps upon, or otherwise decrease, the Federal Government's responsibility to provide funding,'' and the State, local, or tribal governments ''lack authority'' to adjust accordingly. At the time of enactment, these entitlement programs were: Medicaid; Aid to Families with Dependent Children work programs; Child Nutrition; Food Stamps; Social Services Block Grants; Vocational Rehabilitation State Grants; Foster Care, Adoption Assistance, and Independent Living; Family Support Welfare Services; and Child Support Enforcement. ''Federal private sector mandate'' includes a regulation that ''would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance or (ii) a duty arising from participation in a voluntary Federal program.''

The designation of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency. Furthermore, to the extent that non-Federal entities are indirectly impacted because they receive Federal assistance or participate in a voluntary Federal aid program, the Unfunded Mandates Reform Act would not apply, nor would critical habitat shift the costs of the large entitlement programs listed above onto State governments.

(2) We do not believe that this proposed rule would significantly or uniquely affect small governments because the lands being proposed for critical habitat designation are owned by the States of Virginia and North Carolina. These government entities do not fit the definition of ''small governmental jurisdiction.'' Therefore, a Small Government Agency Plan is not required.

Takings—Executive Order 12630

In accordance with E.O. 12630 (Government Actions and Interference with Constitutionally Protected Private Property Rights), we have analyzed the potential takings implications of designating critical habitat for Atlantic pigtoe in a takings implications assessment. The Act does not authorize the Service to regulate private actions on private lands or confiscate private property as a result of critical habitat designation. Designation of critical habitat does not affect land ownership, or establish any closures, or restrictions on use of or access to the designated areas. Furthermore, the designation of

critical habitat does not affect landowner actions that do not require Federal funding or permits, nor does it preclude development of habitat conservation programs or issuance of incidental take permits to permit actions that do require Federal funding or permits to go forward. However, Federal agencies are prohibited from carrying out, funding, or authorizing actions that would destroy or adversely modify critical habitat. A takings implications assessment has been completed and concludes that, if adopted, this designation of critical habitat for Atlantic pigtoe does not pose significant takings implications for lands within or affected by the designation.

Federalism—Executive Order 13132

In accordance with E.O. 13132 (Federalism), this proposed rule does not have significant Federalism effects. A federalism summary impact statement is not required. In keeping with Department of the Interior and Department of Commerce policy, we requested information from, and coordinated development of this proposed critical habitat designation with, appropriate State resource agencies in Virginia, North Carolina, South Carolina, and Georgia. From a federalism perspective, the designation of critical habitat directly affects only the responsibilities of Federal agencies. The Act imposes no other duties with respect to critical habitat, either for States and local governments, or for anyone else. As a result, the proposed rule does not have substantial direct effects either on the States, or on the relationship between the national government and the States, or on the distribution of powers and responsibilities among the various levels of government. The proposed designation may have some benefit to these governments because the areas that contain the features essential to the conservation of the species are more clearly defined, and the physical or biological features of the habitat necessary to the conservation of the species are specifically identified. This information does not alter where and what federally sponsored activities may occur. However, it may assist these local governments in long-range planning (because these local governments no longer have to wait for case-by-case section 7 consultations to occur).

Where State and local governments require approval or authorization from a Federal agency for actions that may affect critical habitat, consultation under section 7(a)(2) would be required. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency.

Civil Justice Reform—Executive Order 12988

In accordance with Executive Order 12988 (Civil Justice Reform), the Office of the Solicitor has determined that the rule does not unduly burden the judicial system and that it meets the requirements of sections 3(a) and 3(b)(2) of the Order. We have proposed designating critical habitat in accordance with the provisions of the Act. To assist the public in understanding the habitat needs of the species, this proposed rule identifies the elements of physical or biological features essential to the conservation of the species. The proposed areas of designated critical habitat are presented on maps, and the proposed rule provides several options for the interested public to obtain more detailed location information, if desired.

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This rule does not contain information collection requirements, and a submission to the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*) is not required. We may not conduct or sponsor and you are not required to respond to a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act (NEPA), need not be prepared in connection with listing a species as an endangered or threatened species under the Endangered Species Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

It is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses pursuant to NEPA in connection with designating critical habitat under the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This position was upheld by the U.S. Court of Appeals for the Ninth Circuit (*Douglas County* v. *Babbitt,* 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with tribes in developing programs for healthy ecosystems, to acknowledge that tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to tribes. There are no tribal lands in the proposed critical habitat designation.

Authors

The primary authors of this proposed rule are the staff members of the U.S. Fish and Wildlife Service Species Assessment Team and Raleigh Ecological Services Field Office.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

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

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

■ 2. Amend § 17.11 paragraph (h) by adding an entry for ''Pigtoe, Atlantic'' to the ''List of Endangered and Threatened Wildlife'' in alphabetical order under CLAMS to read as set forth below:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
*	*	*	*	* * *
CLAMS				
*	*	*	*	* * *
Pigtoe, Atlantic	*Fusconaia masoni* ...	Wherever found	T	[**Federal Register** citation when published as a final rule]; 50 CFR 17.45(a)[4d]; 50 CFR 17.95(f)[CH].
*	*	*	*	* * *

■ 3. Amend § 17.45 to read as set forth below:

§ 17.45 Special rules—snails and clams.

(a) Atlantic pigtoe (*Fusconaia masoni*).

(1) *Prohibitions.* Except as noted in paragraph (a)(2) of this section, all prohibitions and provisions of §§ 17.31 and 17.32 apply to the Atlantic pigtoe.

(2) *Exceptions from prohibitions.* Incidental take of the Atlantic pigtoe will not be considered a violation of the Act if the take results from any of the following activities:

(i) Species restoration efforts by State wildlife agencies, including collection of broodstock, tissue collection for genetic analysis, captive propagation, and subsequent stocking into currently occupied and unoccupied areas within the historical range of the species.

(ii) Channel restoration projects that create natural, physically stable, ecologically functioning streams (or stream and wetland systems) that are reconnected with their groundwater aquifers. These projects can be accomplished using a variety of methods, but the desired outcome is a natural channel with low shear stress (force of water moving against the channel); bank heights that enable reconnection to the floodplain; a reconnection of surface and groundwater systems, resulting in perennial flows in the channel; riffles and pools comprised of existing soil, rock, and wood instead of large imported materials; low compaction of soils within adjacent riparian areas; and inclusion of riparian wetlands. Second- to third-order, headwater streams reconstructed in this way would offer suitable habitats for the Atlantic pigtoe and contain stable channel features, such as pools, glides, runs, and riffles, which could be used by the species and its host fish for spawning, rearing, growth, feeding, migration, and other normal behaviors.

(iii) Bank stabilization projects that use bioengineering methods to replace pre-existing, bare, eroding stream banks with vegetated, stable stream banks, thereby reducing bank erosion and instream sedimentation and improving habitat conditions for the species. Following these bioengineering methods, stream banks may be stabilized using live stakes (live, vegetative cuttings inserted or tamped into the ground in a manner that allows the stake to take root and grow), live fascines (live branch cuttings, usually willows, bound together into long, cigar shaped bundles), or brush layering (cuttings or branches of easily rooted tree species layered between successive lifts of soil fill). These methods would not include the sole use of quarried rock (rip-rap) or the use of rock baskets or gabion structures.

(iv) Silviculture practices and forest management activities that:

(A) Implement highest-standard best management practices, particularly for Streamside Management Zones, stream crossings, and forest roads; and

(B) Comply with forest practice guidelines related to water quality standards, or comply with Sustainable Forestry Initiative/Forest Stewardship Council/American Tree Farm System certification standards for both forest management and responsible fiber sourcing.

(b) [Reserved]

■ 4. Amend § 17.95 paragraph (f) by adding, immediately following the entry for ''Rabbitsfoot (*Quadrilla cylindrica cylindrica*),'' an entry for ''Atlantic Pigtoe (*Fusconaia masoni*)'' to read as set forth below:

§ 17.95 Critical habitat—fish and wildlife.

* * * * *

(f) *Clams and Snails.*

* * * * *

Atlantic Pigtoe (*Fusconaia masoni*)

(1) Critical habitat units are depicted for Craig, Botecourt, Bath, Fluvanna, Buckingham, Nottoway, Lunenburg, Brunswick, Dinwiddie, Greensville, and Pittsylvania Counties, Virginia; and Rockingham, Granville, Mecklenburg, Halifax, Vance, Franklin, Nash, Warren, Leggett, Edgecombe, Person, Durham, Wake, Johnston, Orange, Randolph, and Montgomery Counties, North Carolina, on the maps below.

(2) Within these areas, the physical or biological features essential to the conservation of Atlantic pigtoe consist of the following components:

(i) Suitable substrates and connected instream habitats, characterized by geomorphically stable stream channels and banks (*i.e.,* channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation) with habitats that support a diversity of freshwater mussel and native fish (such as stable riffle-run-pool habitats that provide flow refuges consisting of silt-free gravel and coarse sand substrates).

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

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

(iv) The presence and abundance of fish hosts necessary for recruitment of the Atlantic pigtoe.

(3) Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they

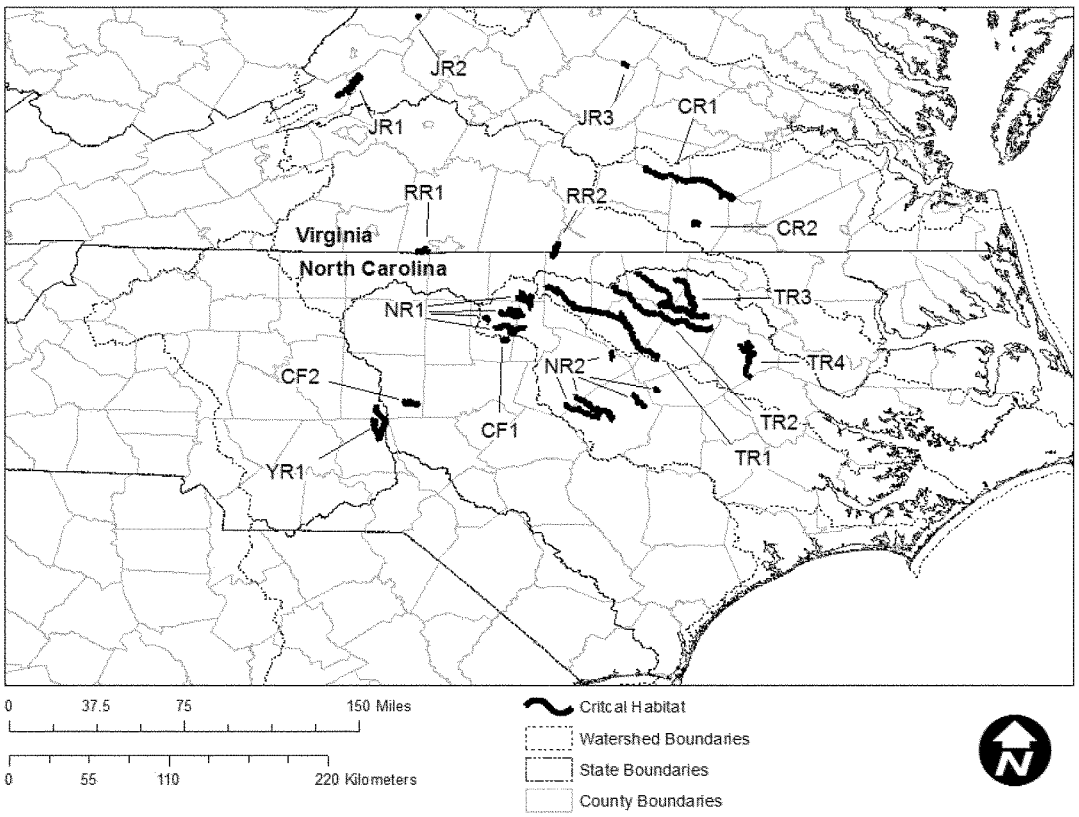
are located existing within the legal boundaries on the effective date of this rule.

(4) *Critical habitat map units.* Data layers defining map units were created by overlaying Natural Heritage Element Occurrence data and U.S. Geological Survey (USGS) hydrologic data for stream reaches. The hydrologic data used in the critical habitat maps were extracted from the USGS 1:1M scale nationwide hydrologic layer (*https://nationalmap.gov/small_scale/mld/1nethyd.html*) with a projection of EPSG:4269—NAD83 Geographic. The North Carolina and Virginia Natural Heritage program species presence data were used to select specific stream segments for inclusion in the critical habitat layer. The maps in this entry, as modified by any accompanying regulatory text, establish the boundaries of the critical habitat designation. The coordinates or plot points or both on which each map is based are available to the public at *http://www.regulations.gov* under Docket No. FWS–R4–ES–2018–0046 and at the field office responsible for this designation. You may obtain field office location information by contacting one of the Service regional offices, the addresses of which are listed at 50 CFR 2.2.

(5) *Note:* Index map follows:

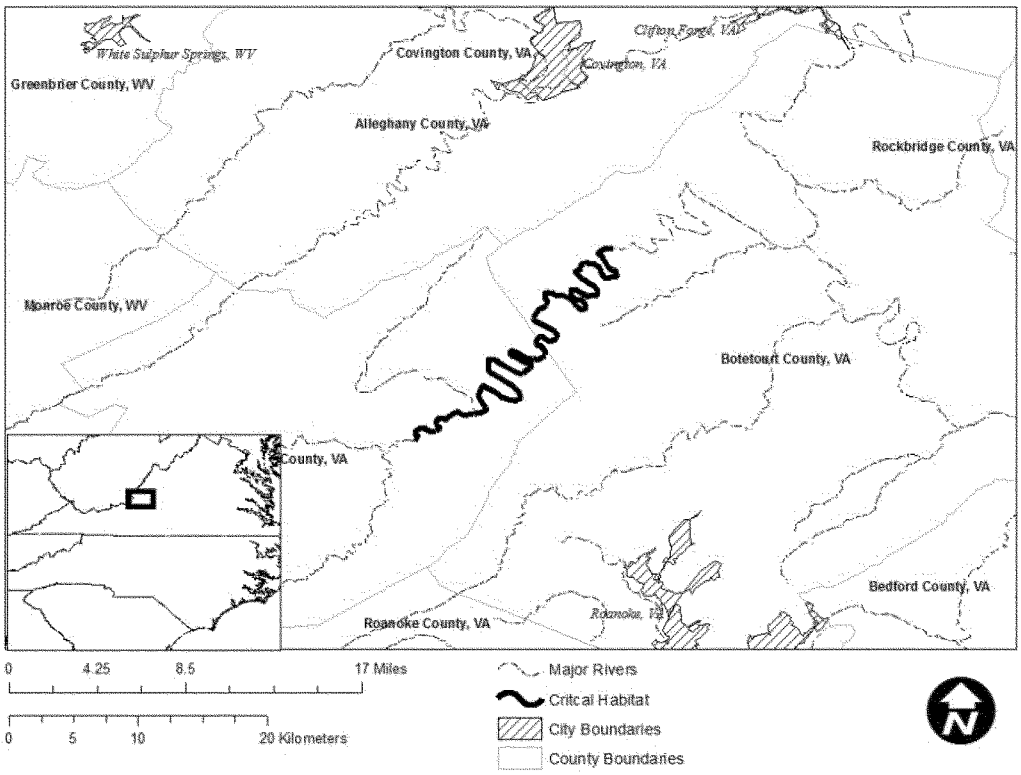
BILLING CODE 4333–15–P

Index Map of Critical Habitat Units for Atlantic Pigtoe



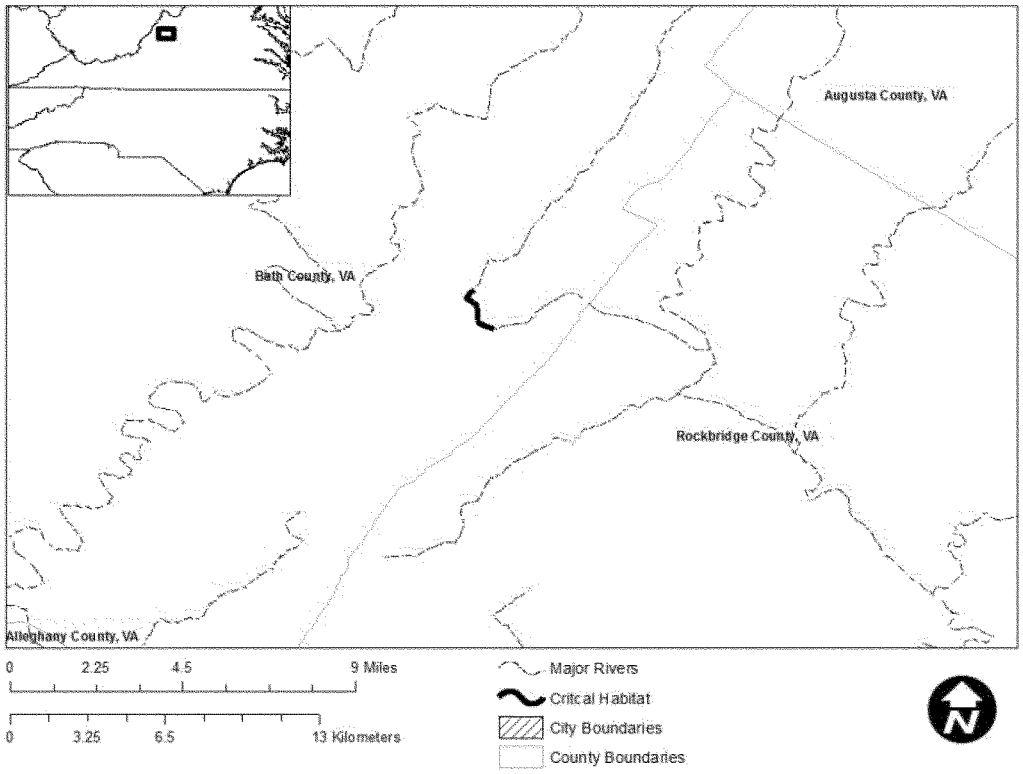
(6) Map of Unit JR1—Craig Creek follows:

Map of JR1 - Craig Creek Critical Habitat Unit for Atlantic Pigtoe

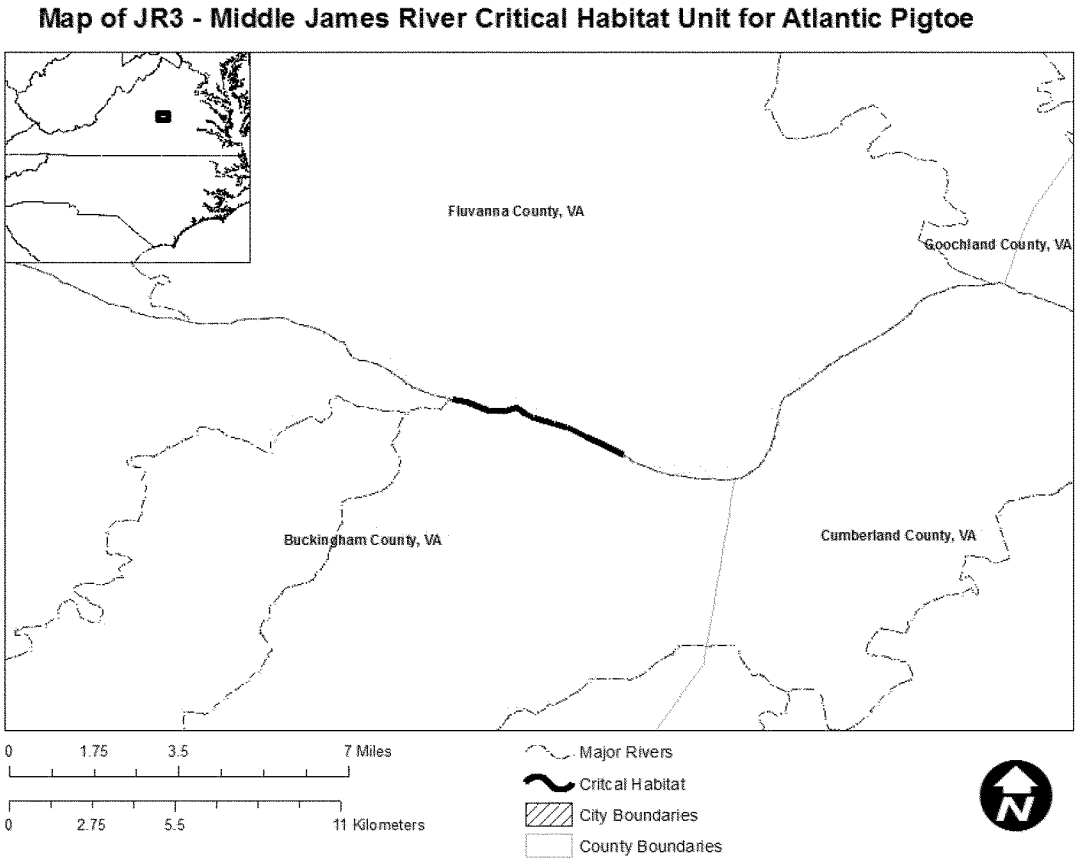


(7) Map of Unit JR2—Mill Creek follows:

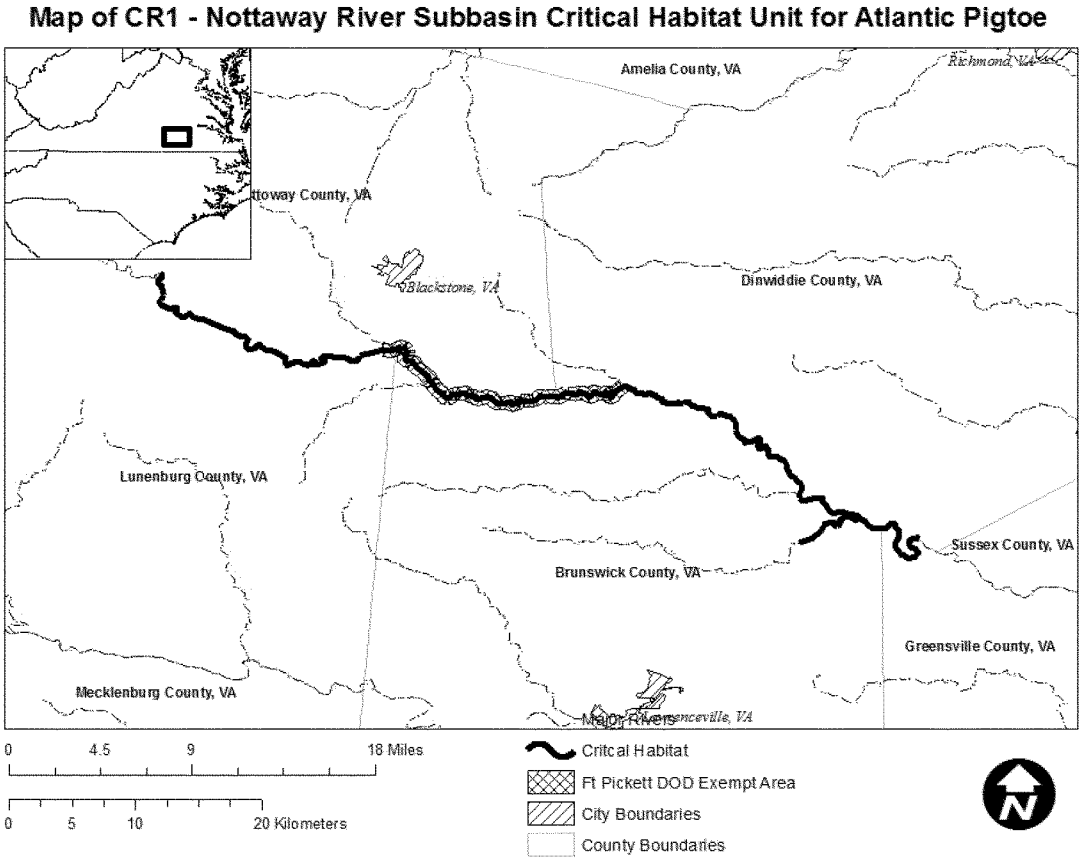
Map of JR2 - Mill Creek Critical Habitat Unit for Atlantic Pigtoe



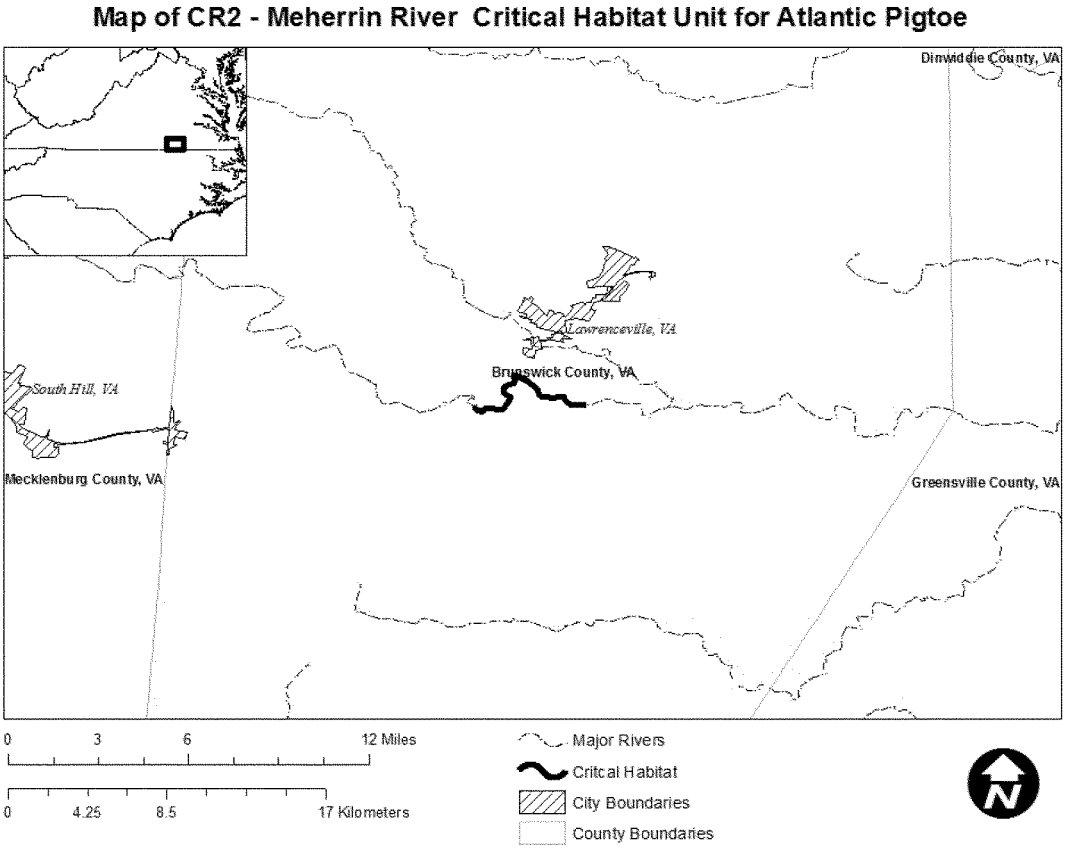
(8) Map of Unit JR3—Middle James River follows:



(9) Map of Unit CR1—Nottoway River Subbasin follows:

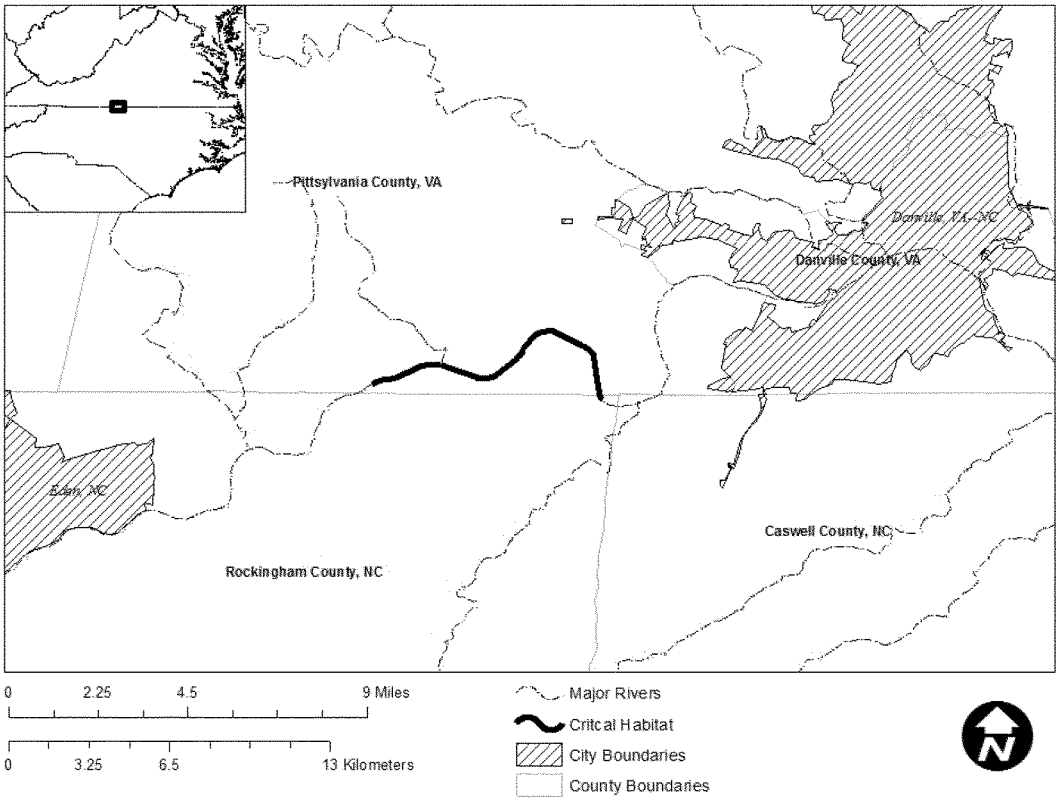


(10) Map of Unit CR2—Meherrin River follows:

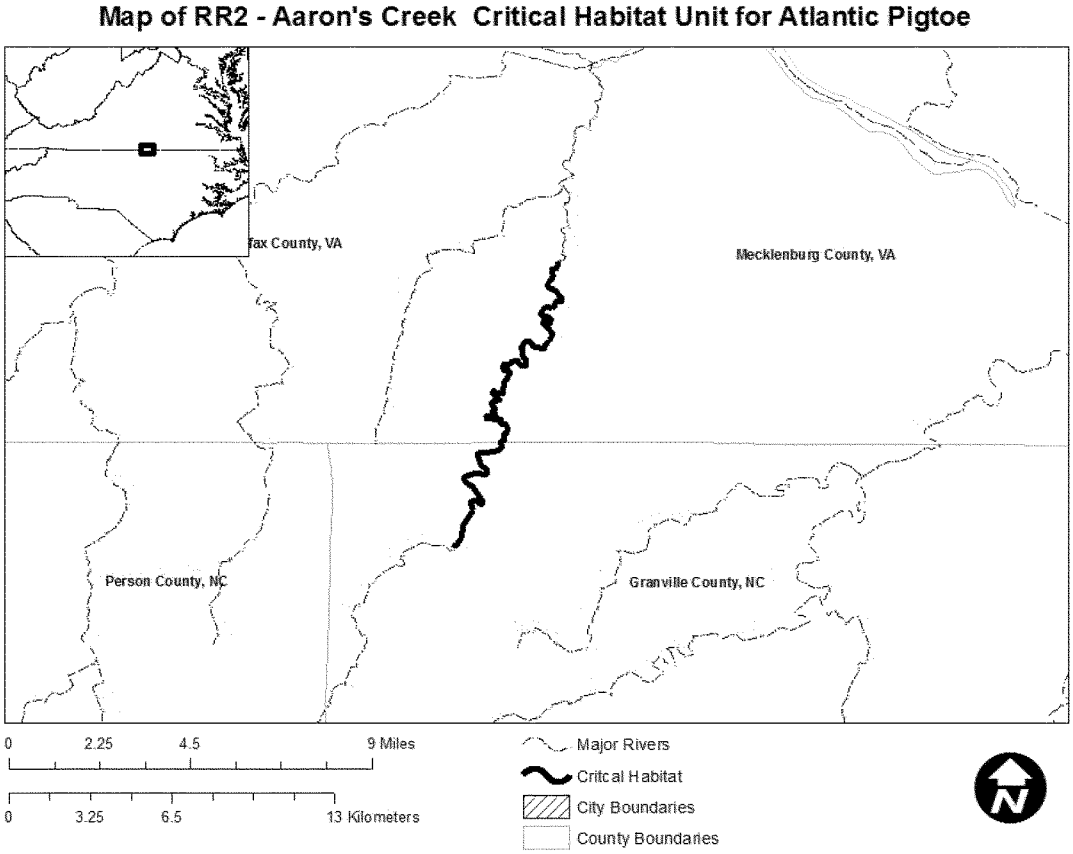


(11) Map of Unit RR1—Dan River follows:

Map of RR1 - Dan River Critical Habitat Unit for Atlantic Pigtoe

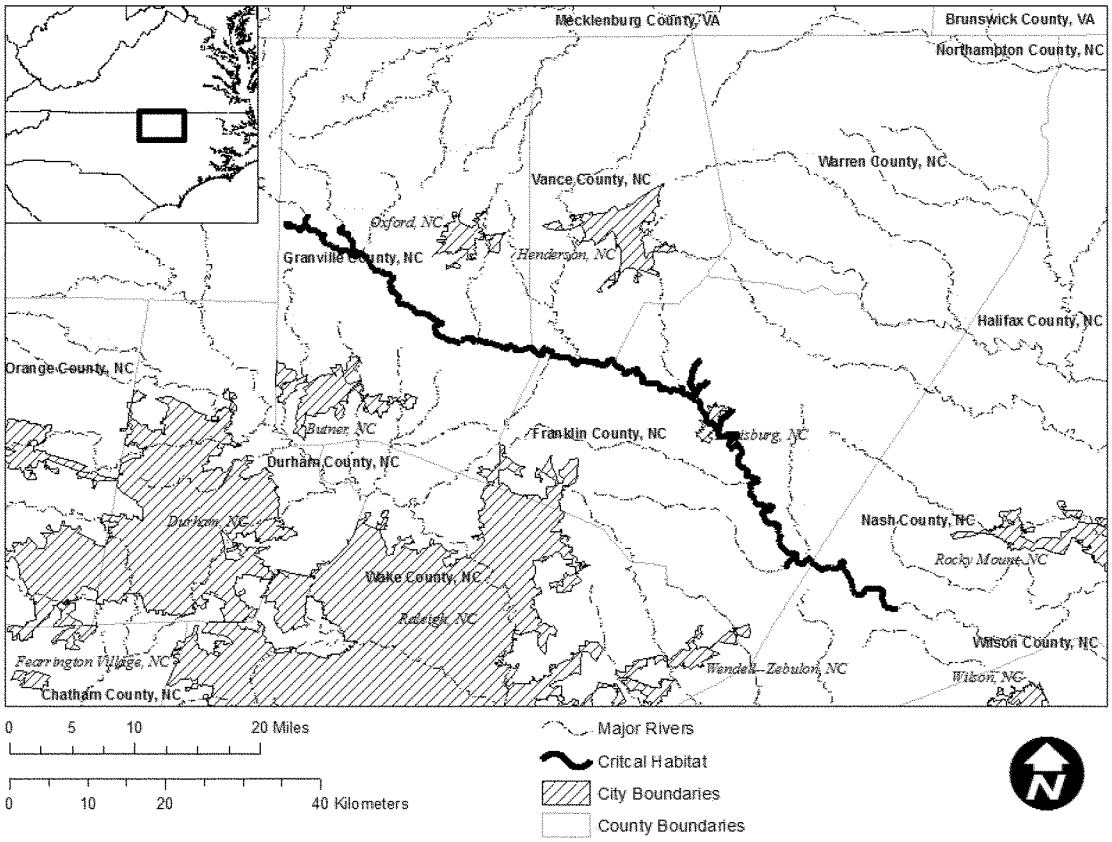


(12) Map of Unit RR2—Aarons Creek follows:



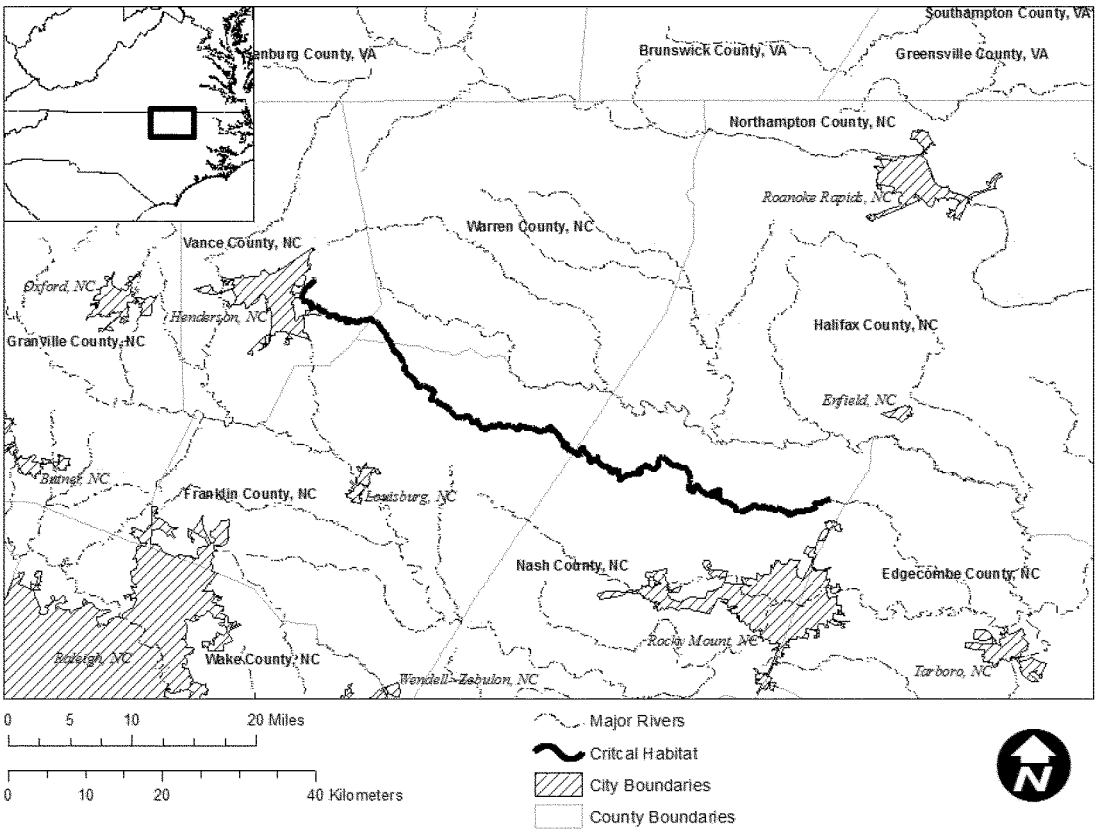
(13) Map of Unit TR1—Upper/Middle Tar River follows:

Map of TR1 - Upper/Middle Tar River Critical Habitat Unit for Atlantic Pigtoe

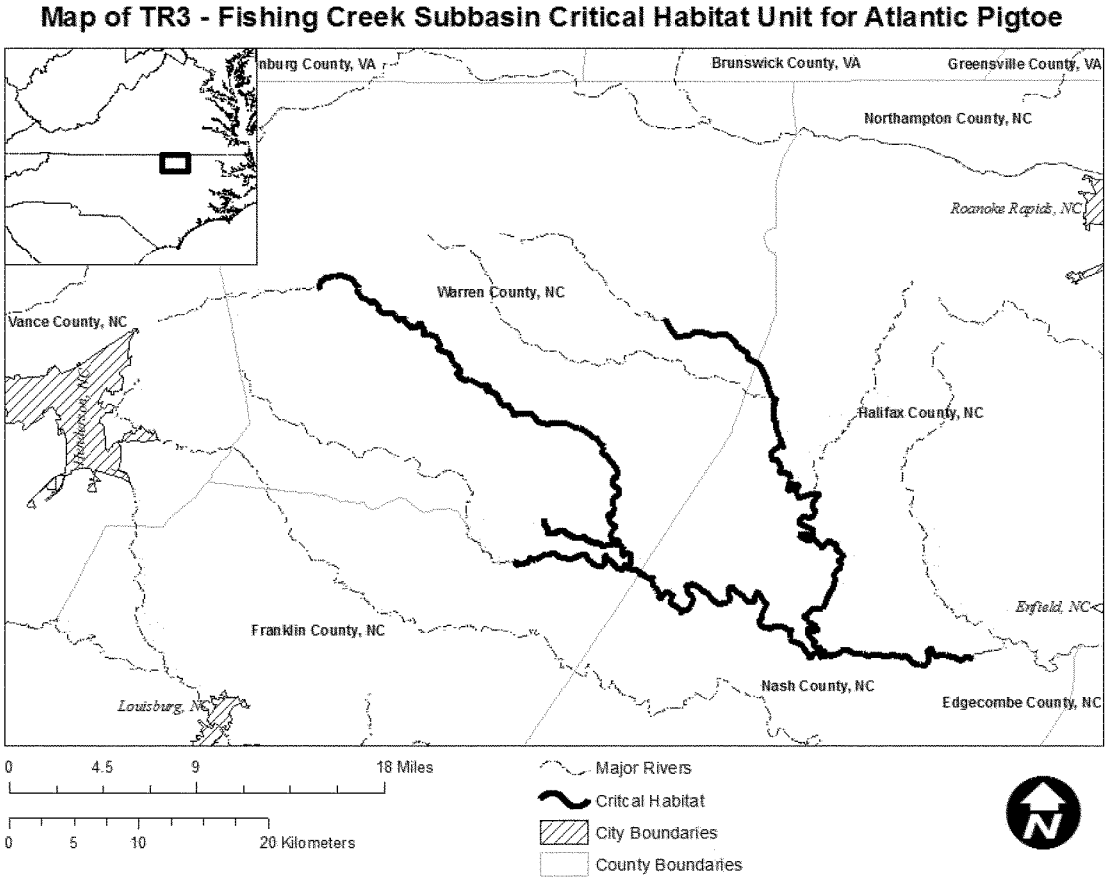


(14) Map of Unit TR2—Sandy/Swift Creek follows:

Map of TR2 - Sandy/Swift Creek Critical Habitat Unit for Atlantic Pigtoe

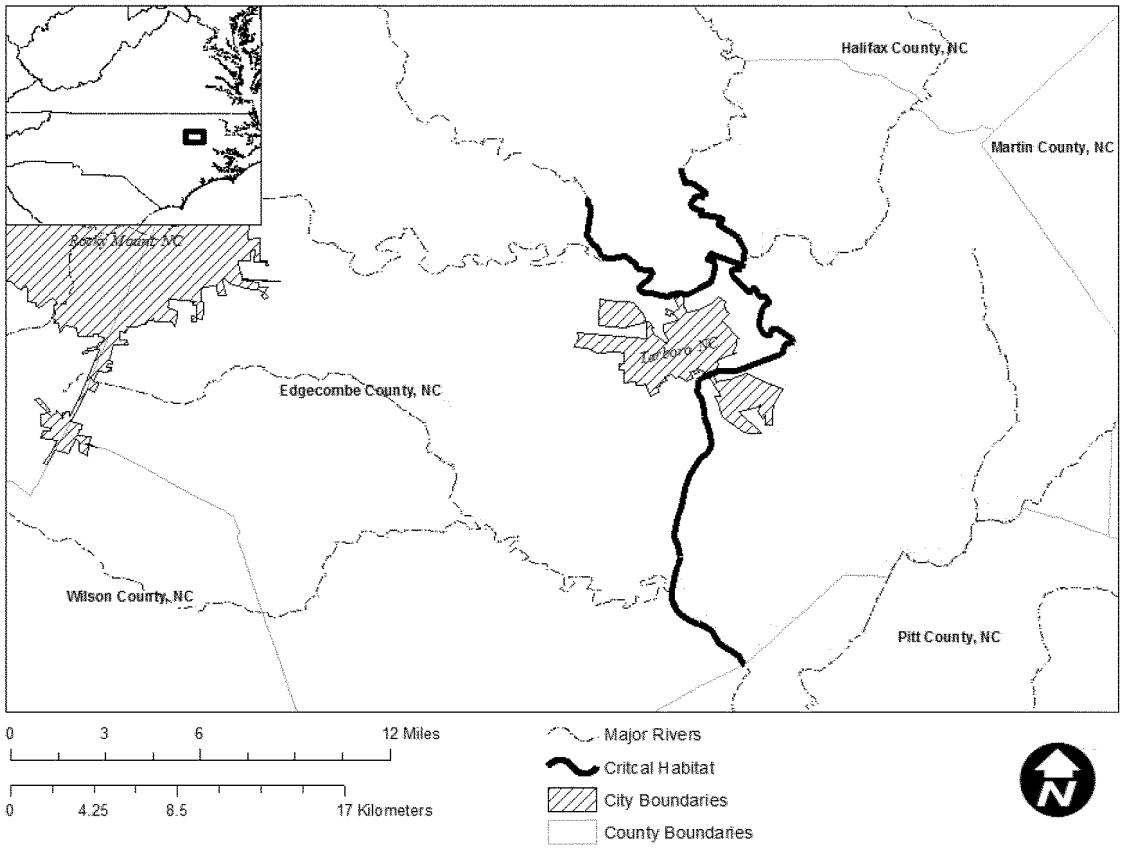


(15) Map of Unit TR3—Fishing Creek Subbasin follows:



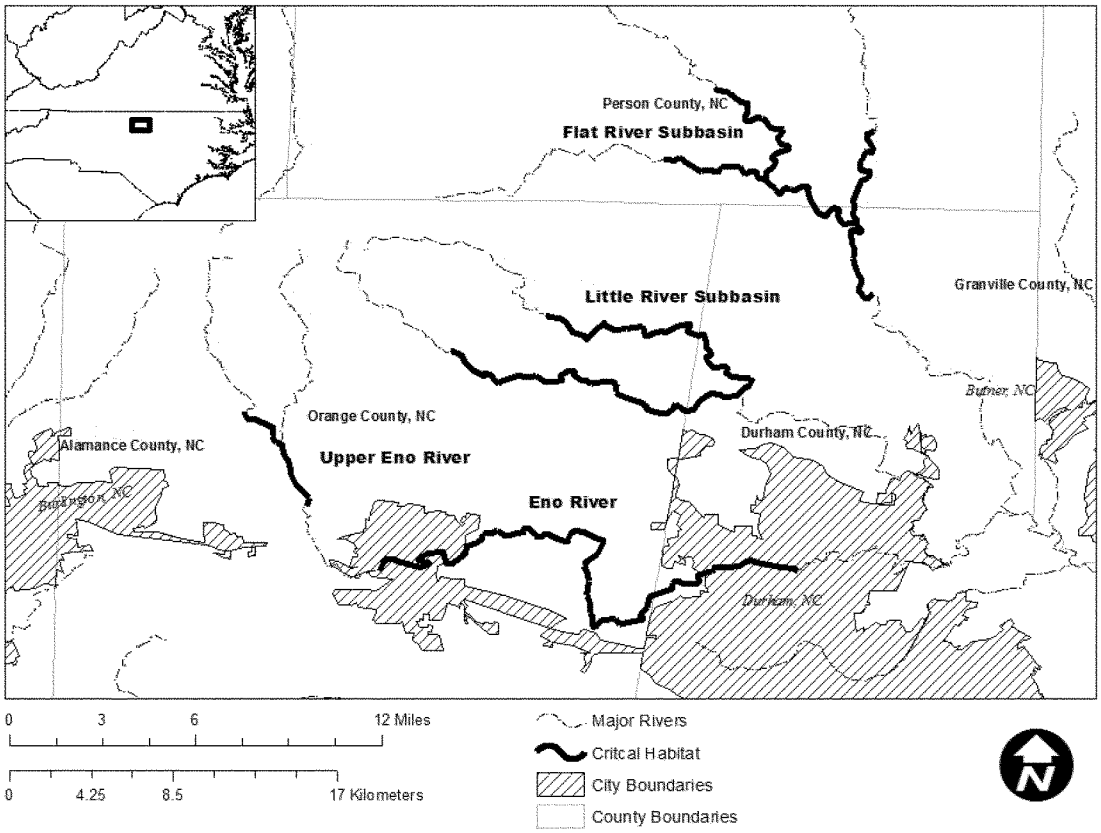
(16) Map of Unit TR4—Lower Tar River follows:

Map of TR4 - Lower Tar River Critical Habitat Unit for Atlantic Pigtoe

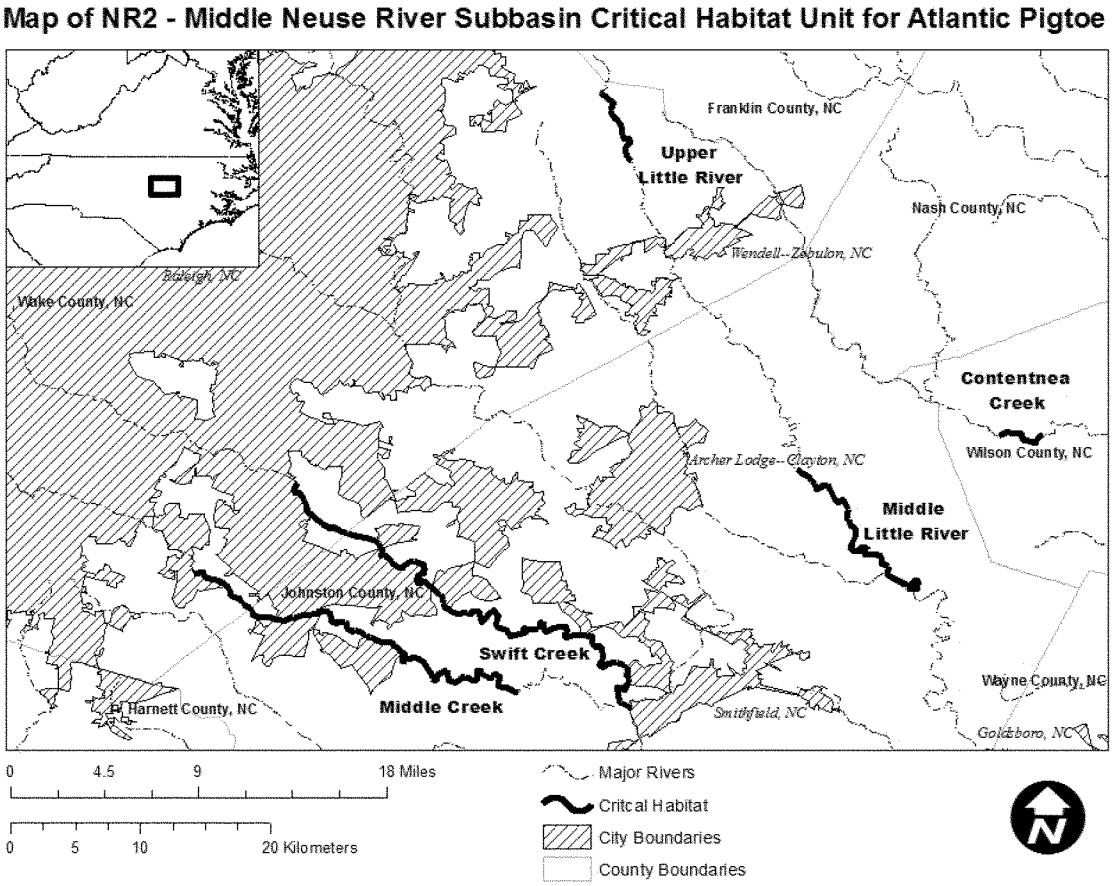


(17) Map of Unit NR1—Upper Neuse River Subbasin follows:

Map of NR1 - Upper Neuse River Subbasin Critical Habitat Unit for Atlantic Pigtoe

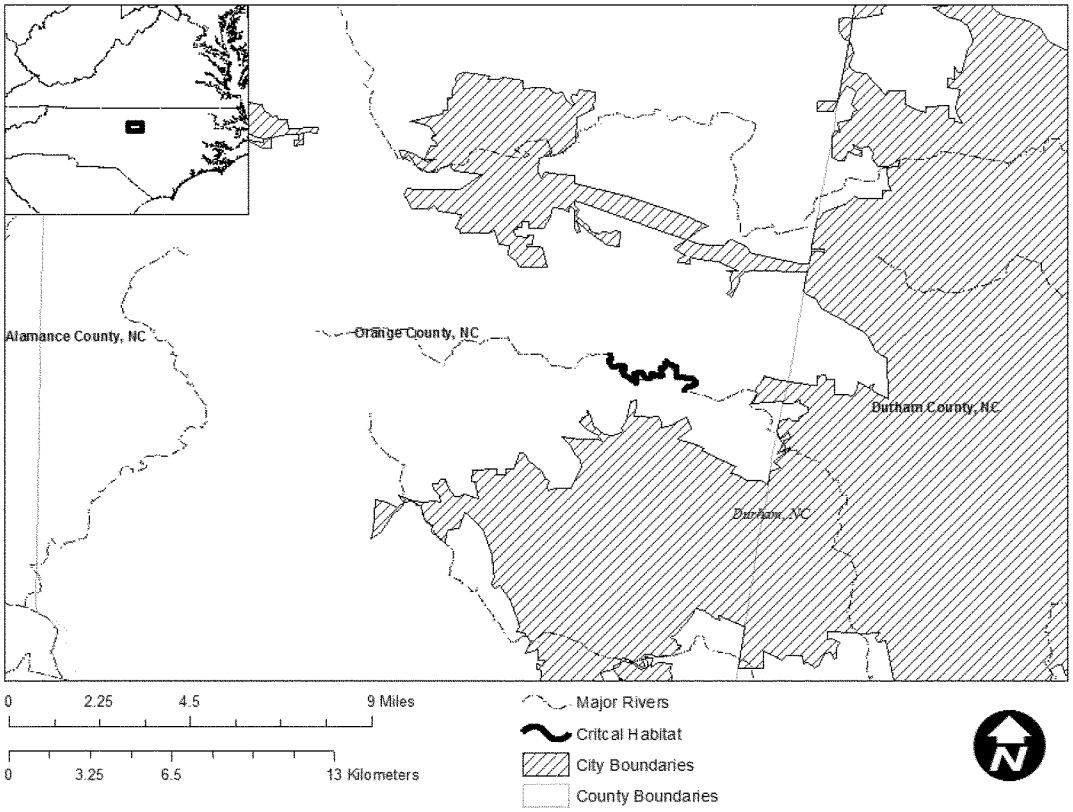


(18) Map of Unit NR2—Middle Neuse River follows:



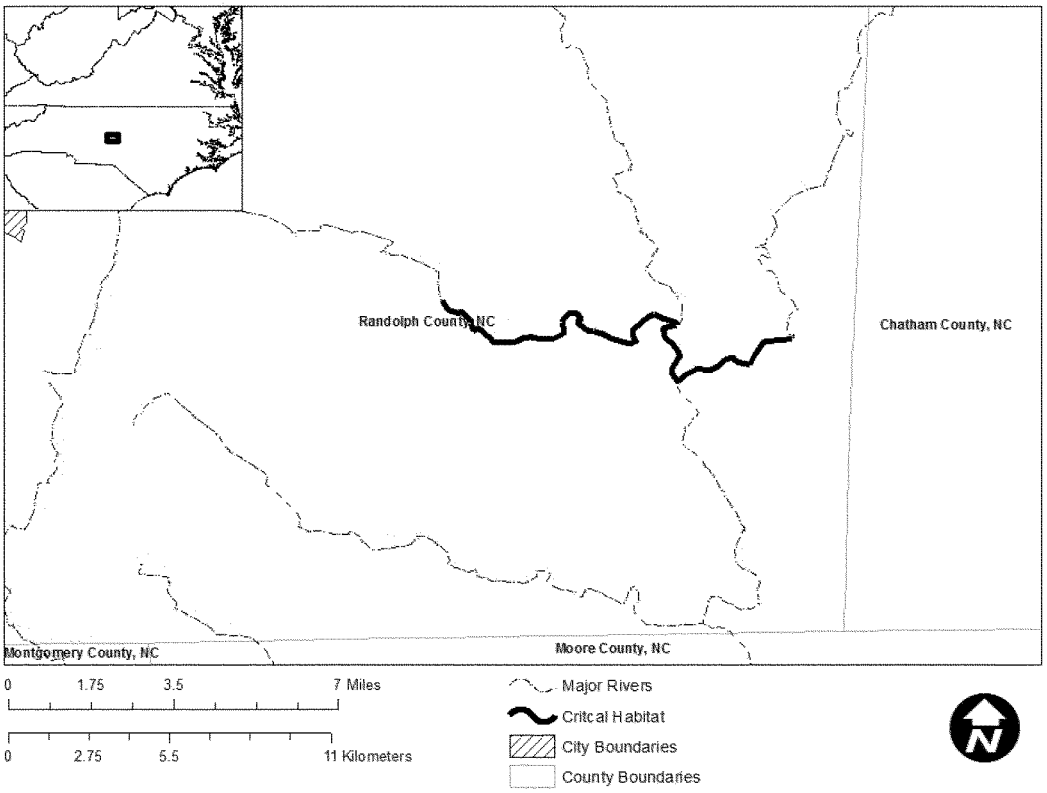
(19) Map of Unit CF1—New Hope Creek follows:

Map of CF1 - New Hope Creek Critical Habitat Unit for Atlantic Pigtoe



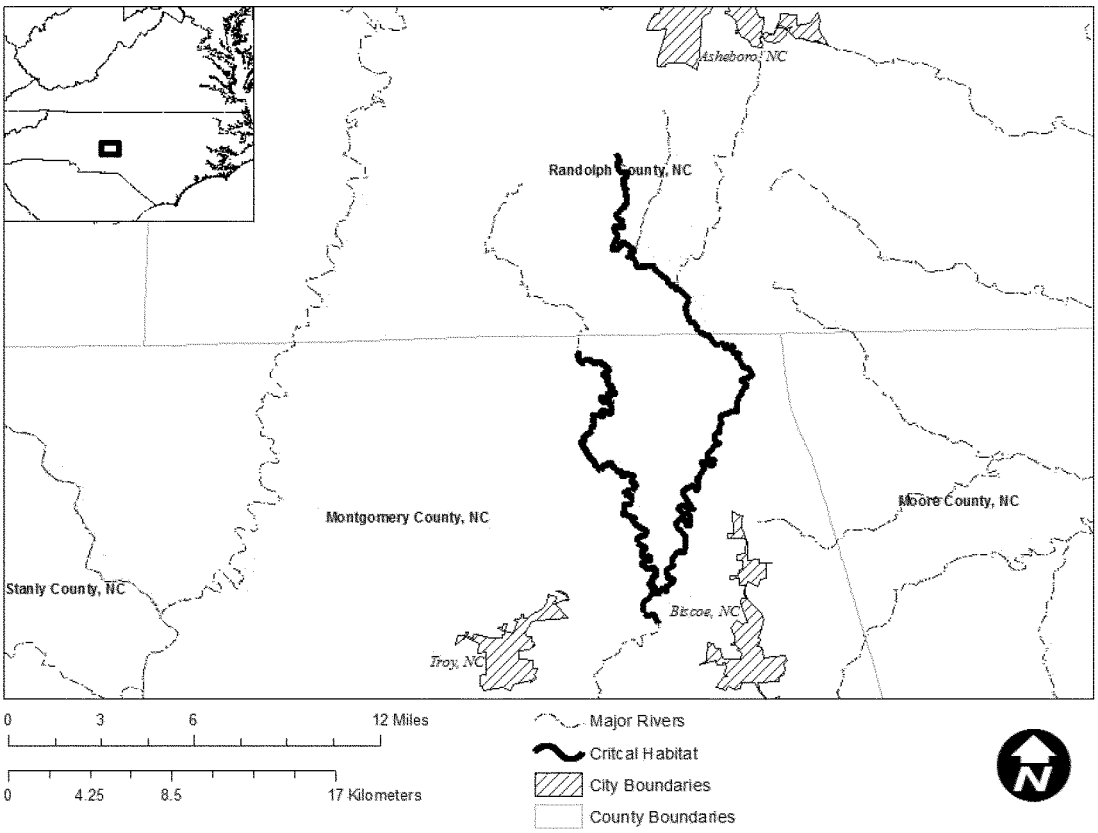
(20) Map of Unit CF2—Deep River follows:

Map of CF2 - Deep River Subbasin Critical Habitat Unit for Atlantic Pigtoe



(21) Map of Unit YR1— Little River follows:

Map of YR1 - Little River Subbasin Critical Habitat Unit for Atlantic Pigtoe



* * * * *

Dated: September 20, 2018.

James W. Kurth,

Deputy Director, U.S. Fish and Wildlife Service, Exercising the Authority of the Director, U.S. Fish and Wildlife Service.

[FR Doc. 2018–21798 Filed 10–10–18; 8:45 am]

BILLING CODE 4333–15–C