| Common name | Scientific name | Where listed | Status | Listing citations and applicable rules |
|---|---|---|---|---|
| * | * | * | * | * * * |
| Blindcat, toothless | *Trogloglanis pattersoni* | Wherever found | E | [**Federal Register** citation when published as a final rule]. |
| Blindcat, widemouth | *Satan eurystomus* | Wherever found | E | [**Federal Register** citation when published as a final rule]. |
| * | * | * | * | * * * |

**Wendi Weber,**

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

[FR Doc. 2023–17667 Filed 8–21–23; 8:45 am]

**BILLING CODE 4333–15–P**

## DEPARTMENT OF THE INTERIOR

### Fish and Wildlife Service

### 50 CFR Part 17

**[Docket No. FWS–R4–ES–2023–0112; FF09E21000 FXES1111090FEDR 234]**

**RIN 1018–BE94**

## Endangered and Threatened Wildlife and Plants; Endangered Species Status for Tennessee Clubshell, Tennessee Pigtoe, and Cumberland Moccasinshell

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTION:** Proposed rule.

**SUMMARY:** We, the U.S. Fish and Wildlife Service (Service), propose to list three Tennessee and Cumberland River basin mussel species, the Tennessee clubshell (*Pleurobema oviforme*), Tennessee pigtoe (*Pleuronaia barnesiana*), and Cumberland moccasinshell (*Medionidus conradicus*), as endangered species under the Endangered Species Act of 1973, as amended (Act). This determination also serves as our 12-month finding on a petition to list the three species. After a review of the best available scientific and commercial information, we find that listing the Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell as endangered species is warranted. If we finalize this rule as proposed, it would extend the Act's protections to these species.

**DATES:** We will accept comments received or postmarked on or before October 23, 2023. 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 a public hearing, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** by October 6, 2023.

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

(1) *Electronically:* Go to the Federal eRulemaking Portal: *https://www.regulations.gov.* In the Search box, enter FWS–R4–ES–2023–0112, which is the docket number for this rulemaking. Then, click on the Search button. On the resulting page, in the panel on the left side of the screen, under the Document Type heading, check the Proposed Rule box to locate this document. You may submit a comment by clicking on ''Comment.''

(2) *By hard copy:* Submit by U.S. mail to: Public Comments Processing, Attn: FWS–R4–ES–2023–0112, U.S. Fish and Wildlife Service, MS: PRB/3W, 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 *https://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:* Supporting materials, such as the species status assessment report, are available at *https://www.regulations.gov* at Docket No. FWS–R4–ES–2023–0112.

**FOR FURTHER INFORMATION CONTACT:** Janet Mizzi, Field Supervisor, U.S. Fish and Wildlife Service, Asheville Ecological Services Field Office, 160 Zillicoa St., Asheville, NC 28801; telephone 828–258–3939. Individuals in the United States who are deaf, deafblind, hard of hearing, or have a speech disability may dial 711 (TTY, TDD, or TeleBraille) to access telecommunications relay services. Individuals outside the United States should use the relay services offered within their country to make international calls to the point-of-contact in the United States.

**SUPPLEMENTARY INFORMATION:**

### Executive Summary

*Why we need to publish a rule.* Under the Act (16 U.S.C. 1531 *et seq.*), a species warrants listing if it meets the definition of an endangered species (in danger of extinction throughout all or a significant portion of its range) or a threatened species (likely to become endangered within the foreseeable future throughout all or a significant portion of its range). If we determine that a species warrants listing, we must list the species promptly and designate the species' critical habitat to the maximum extent prudent and determinable. We have determined that the Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell meet the Act's definition of an endangered species; therefore, we are proposing to list them as such. Listing a species as an endangered or threatened species can be completed only by issuing a rule through the Administrative Procedure Act rulemaking process (5 U.S.C. 551 *et seq.*).

*What this document does.* This document proposes to list the Tennessee clubshell (*Pleurobema oviforme*), Tennessee pigtoe (*Pleuronaia barnesiana*), and Cumberland moccasinshell (*Medionidus conradicus*) as endangered species.

*The basis for our action.* Under the Act, we may determine that a species is an endangered or threatened species because of 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 the primary threats to all three species are large impoundments, urban development, energy development, and agriculture, which have altered natural flow regimes and/or diminished water and substrate quality (Factor A).

### 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 governmental agencies, Native American Tribes, the

scientific community, industry, or any other interested parties concerning this proposed rule.

We particularly seek comments concerning:

(1) The species' biology, ranges, 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 ranges, including distribution patterns and the locations of any additional populations of these species;

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

(e) Past and ongoing conservation measures for these species, their habitats, or both.

(2) Threats and conservation actions affecting the species, including:

(a) Factors that may be affecting 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;

(b) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to these species; and

(c) Existing regulations or conservation actions that may be addressing threats to these species.

(3) Additional information concerning the historical and current status of these species, including whether any of the species may warrant listing as a threatened species or may not warrant listing.

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.

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

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**.

If you submit information via *https://www.regulations.gov,* your entire submission—including any personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy submissions on *https://www.regulations.gov.*

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on *https://www.regulations.gov.*

Because we will consider all comments and information we receive during the comment period, our final determinations may differ from this proposal. Based on the new information we receive (and any comments on that new information), we may conclude that any of these species are threatened instead of endangered, or we may conclude that any of these species do not warrant listing as either an endangered species or a threatened species.

*Public Hearing*

Section 4(b)(5) of the Act provides for a public hearing on this proposal, if requested. Requests must be received by the date specified in **DATES**. Such requests must be sent to the address shown in **FOR FURTHER INFORMATION CONTACT**. We will schedule a public hearing on this proposal, if requested, and announce the date, time, and place of the hearing, as well as how to obtain reasonable accommodations, in the **Federal Register** and local newspapers at least 15 days before the hearing. We may hold the public hearing in person or virtually via webinar. We will announce any public hearing on our website, in addition to the **Federal Register**. The use of virtual public hearings is consistent with our regulations at 50 CFR 424.16(c)(3).

## Previous Federal Actions

On April 20, 2010, we received a petition from the Center for Biological Diversity (CBD), Alabama Rivers Alliance, Clinch Coalition, Dogwood Alliance, Gulf Restoration Network, Tennessee Forests Council, and West Virginia Highlands Conservancy to list 404 aquatic, riparian, and wetland species, including the Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell, as endangered or threatened species under the Act. In response to the petition, we published a partial 90-day finding on September 27, 2011 (76 FR 59836), in which we announced our finding that the petition contained substantial information indicating that listing may be warranted for numerous species, including the Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell. This document serves as both our 12-month warranted petition finding and our proposed rule to list these species.

*Peer Review*

A species status assessment (SSA) team prepared an SSA report for the Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell. 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. After the SSA report was completed, the methodology used to evaluate the status of the three species was published in a peer-reviewed journal (Fitzgerald et al. 2021, entire).

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 solicited independent scientific review of the information contained in the SSA report. The Service sent the SSA report to three independent peer reviewers and received one response. Results of this structured peer review process can be found at *https://www.regulations.gov* and the Asheville Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**). In preparing this proposed rule, we incorporated the results of this review, as appropriate, into the SSA report, which is the foundation for this proposed rule.

## Summary of Peer Reviewer Comments

As discussed in Peer Review above, we received comments from one peer reviewer on the draft SSA report. We reviewed all comments we received from the peer reviewer for substantive issues and new information regarding the information contained in the SSA report. The peer reviewer agreed with our assessment of the status of the three mussel species. All substantive comments from the peer reviewer concerned the omission of coal mining as an important threat to the three species and included a recommendation to add references from peer-reviewed literature that illustrate the impact coal mining has had on freshwater mussels

in the species' ranges. To address the reviewer's comment, in this proposed rule, we clarify that our modeling approach focuses on rangewide drivers of population conditions and does not capture some site-specific threats with high consequences, such as coal mining. Coal mining drainage affects, very roughly, less than half the historical range of the three species. Because a little more than half of that range lacks coal mining impacts, mining does not explain rangewide patterns of population condition and was not included in the final model. Our SSA report explains that the negative effects of mining on mussels in this region have been well-documented, and the risk posed by this threat must be considered in addition to the model estimates presented, particularly for watersheds in the upper Tennessee and Cumberland River basins. As recommended by the peer reviewer, in this proposed rule, we include references from peer-reviewed literature that explain how coal mining has affected mussels in the range of the three mussel species.

## I. Proposed Listing Determination

### Background

*General Mussel Biology*

Freshwater mussels, including the three species that are the subjects of this proposed rule, have a complex reproduction process involving parasitic larvae, called glochidia, that are wholly dependent on host fish. Mussels release sperm into the water column, which is taken in by the female, wherein fertilization and development of glochidia occurs in a restricted portion of the gills, called the brood pouch or marsupium. When mature, the glochidia are released to the water column to attach on the gills, head, or fins of fishes. Glochidia die if they fail to attach to a host fish, attach to an incompatible fish species, or attach to the wrong location on a host fish (Neves 1991, p. 254; Bogan 1993, p. 599). Once attached to the host, glochidia draw nutrients from the fish's tissue as they develop (Arey 1932, pp. 214–215). Time to development, from attachment of glochidia to maturation, ranges from just over 1 week to 6 weeks or more (Parmalee and Bogan 1998, p. 8).

Depending on the species, mussels are either short-term or long-term brooders. In short-term brooders, fertilization occurs in the spring or summer and glochidia are released shortly after they are fully developed. In long-term brooders, fertilization occurs in late summer or fall, and developed glochidia are held over winter and released in the following spring or summer (Haag 2012, pp. 39–40). Mature glochidia drop off their hosts and, if they settle in suitable habitat on the stream bottom, continue the remainder of their existence as free-living mussels. Newly released glochidia are juveniles that are reproductively immature but otherwise resemble adults, with both halves (valves) of the shell developed and poised for growth.

Freshwater mussels are relatively sedentary and, under their own power, capable of moving only short horizontal distances, typically up to a few yards or less in a year (Haag 2012, pp. 34–35). Given mussels' limited mobility, host fish are their primary mode of dispersal, and the hosts are essential for maintaining population connectivity. Host specificity varies, with some mussel species being compatible with a few fish species while others can transform from glochidia to juveniles on several fish species.

*Tennessee Clubshell*

A thorough review of the taxonomy, life history, and ecology of the Tennessee clubshell is presented in the SSA report (Service 2020, pp. 3–7).

Attaining a maximum length of approximately 90 millimeters (mm) (4 inches (in)), the Tennessee clubshell is oval to triangular shaped and has a tawny to brown shell, usually with wide, broken green rays (Williams et al. 2008, p. 542). It occurs in the Tennessee and Cumberland River drainages in Alabama, Georgia, Kentucky, North Carolina, Tennessee, and Virginia (see figure 1, below). Favoring moderately swift currents, it is found in riffles and shoals of small streams to large rivers, in a mixture of sand, gravel, and cobble substrates.

The Tennessee clubshell has a lifespan of 30 years on average but may live to 50 years. Age at maturity ranges from 4 to 6 years. In total, 10 host fish species in the minnow and darter families have been documented by observations of either attachment or metamorphosis of glochidia (Service 2020, pp. 5–6). As a short-term brooder, the Tennessee clubshell spawns in the spring and releases glochidia mid-July through early August.

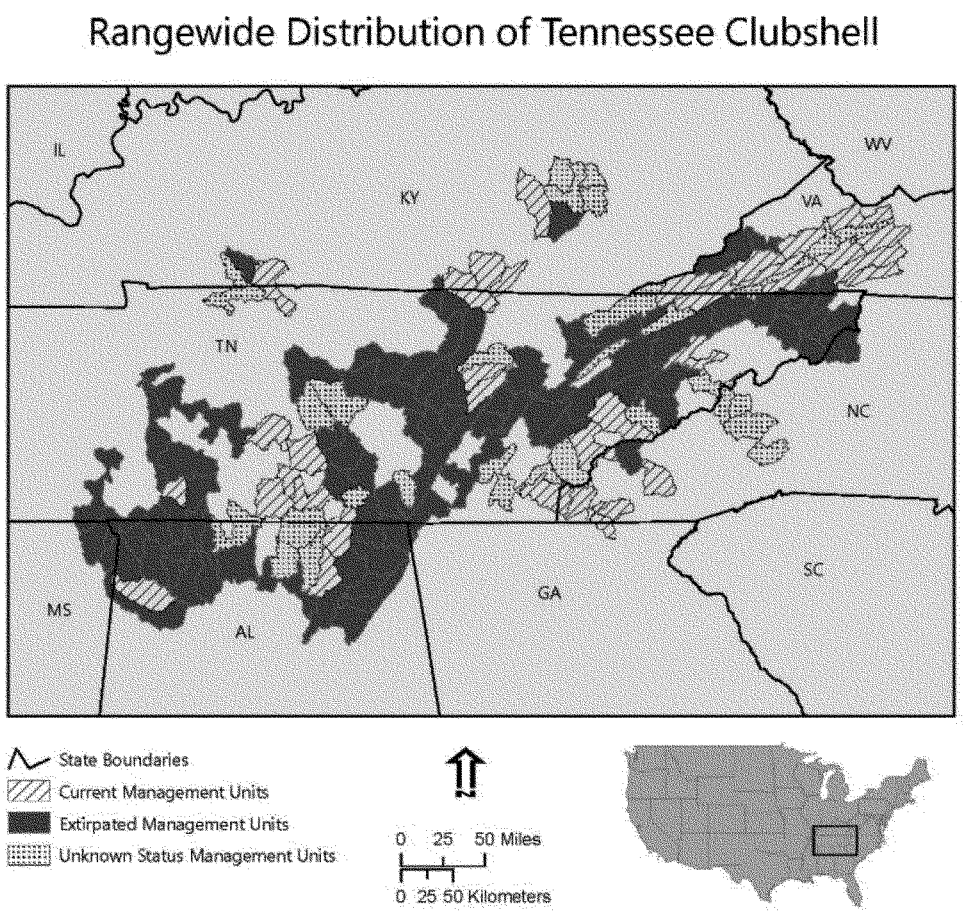


Figure 1. Tennessee clubshell range map. Management units are 10-digit hydrologic unit code (HUC) watersheds (HUC-10).

*Tennessee Pigtoe*

A thorough review of the taxonomy, life history, and ecology of the Tennessee pigtoe is presented in the SSA report (Service 2020, pp. 3–7).

Attaining a maximum length of 95 mm (3.7 in), the Tennessee pigtoe's shape varies from oval to subtriangular or subquadrate, and its shell is yellowish or brown, sometimes with dark green rays (Williams et al. 2008, p. 585). It occurs in the Tennessee River drainage, in Alabama, Georgia, North Carolina, Tennessee, and Virginia (see figure 2, below). It is presumed extirpated from Mississippi, where it was known to occur only in Bear Creek, in Tishomingo County. Unlike the Tennessee clubshell and Cumberland moccasinshell, the Tennessee pigtoe does not occur in the Cumberland River drainage. It is found in moderate current, and rarely in pools and slackwaters, in small streams to large rivers, in a mixture of sand, gravel, and cobble substrates.

The Tennessee pigtoe has a lifespan of 30 years on average but may live to 50 years. Age at maturity ranges from 4 to 6 years. As a short-term brooder, it spawns in the spring and releases glochidia mid-July through early August. The host fishes are unknown for this species but likely are the same as or similar to those of the Tennessee clubshell.

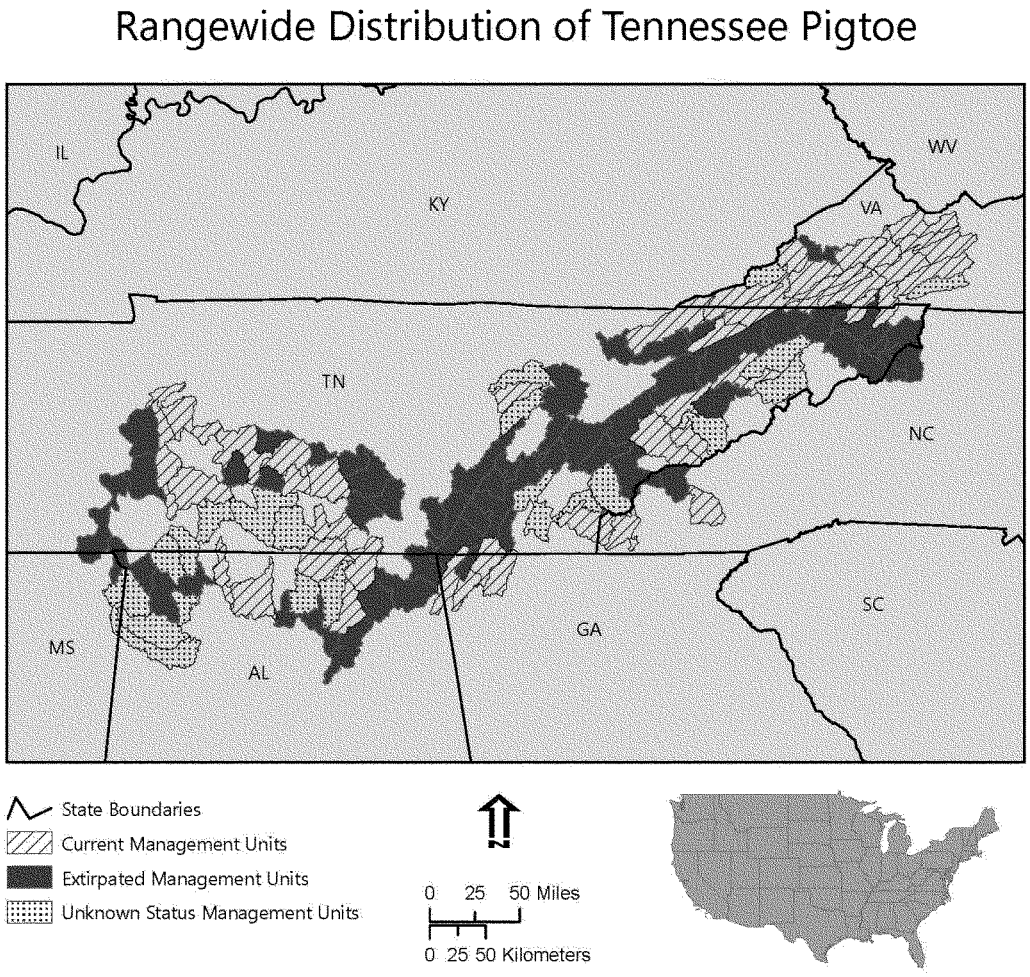


Figure 2. Tennessee pigtoe range map. Management units are 10-digit hydrologic unit code (HUC) watersheds (HUC-10).

*Cumberland Moccasinshell*

A thorough review of the taxonomy, life history, and ecology of the Cumberland moccasinshell is presented in the SSA report (Service 2020, pp. 3–7).

Attaining a maximum length of 60 mm (2.4 in), the Cumberland moccasinshell is elliptical shaped, slightly bowing or arching with age. Its shell is yellowish to tawny or brown and usually covered in green rays, and the posterior of the shell is usually marked with small ridges (Williams et al. 2008, p. 434). The Cumberland moccasinshell occurs in the Tennessee and Cumberland River drainages in Alabama, Georgia, Kentucky, Tennessee, and Virginia (see figure 3, below). It is presumed extirpated in North Carolina. Favoring strong currents, it is found in riffles and shoals of streams ranging from headwaters to medium-sized rivers amongst gravel, cobble, boulder, and occasionally sand and gravel substrates. It is sometimes found under large flat rocks or cracks in bedrock.

The Cumberland moccasinshell has a lifespan of approximately 10 years on average, with a maximum reported age of 24 years, based on shells from the Clinch River in Virginia and Tennessee (Scott 1994, pp. 16, 71). Age at maturity ranges from 1 to 3 years (Zale and Neves 1982, p. 19; T. Lane 2023, pers. comm.). Fish hosts include at least four (possibly six) species in the darter genus, *Etheostoma* (Service 2020, pp. 5–6). As a long-term brooder, the Cumberland moccasinshell spawns mid-July and releases glochidia sporadically September through November, with peak releases occurring January through May (Zale and Neves 1982, p. 25).

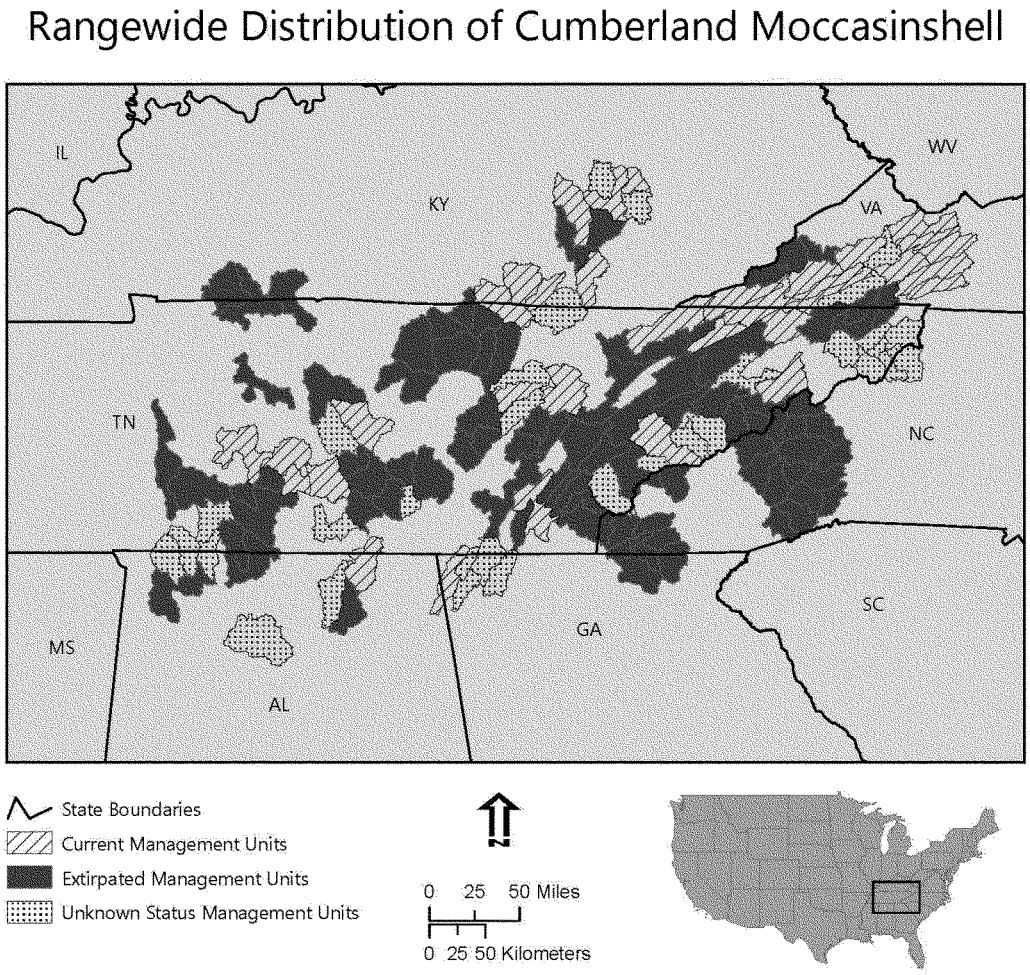


Figure 3. Cumberland moccasinshell range map. Management units are 10-digit hydrologic unit code (HUC) watersheds (HUC-10).

**Regulatory and Analytical Framework**

*Regulatory Framework*

Section 4 of the Act (16 U.S.C. 1533) and the implementing regulations in title 50 of the Code of Federal Regulations set forth the procedures for determining whether a species is an endangered species or a threatened species, issuing protective regulations for threatened species, and designating critical habitat for endangered and threatened species. In 2019, jointly with the National Marine Fisheries Service, the Service issued a final rule that revised the regulations in 50 CFR part 424 regarding how we add, remove, and reclassify endangered and threatened species and the criteria for designating listed species' critical habitat (84 FR 45020; August 27, 2019). On the same day, the Service also issued final regulations that, for species listed as threatened species after September 26, 2019, eliminated the Service's general protective regulations automatically applying to threatened species the prohibitions that section 9 of the Act applies to endangered species (84 FR 44753; August 27, 2019).

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 species' expected response 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.

The Act does not define the term ''foreseeable future,'' which appears in the statutory definition of ''threatened species.'' Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis. The term ''foreseeable future'' extends only so far into the future as we can reasonably determine that both the future threats and the species' responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. ''Reliable'' does not mean ''certain''; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

It is not always possible or necessary to define the foreseeable future as a particular number of years. Analysis of the foreseeable future uses the best scientific and commercial data available and should consider the timeframes applicable to the relevant threats and to the species' likely responses to those threats in view of its life-history characteristics. Data that are typically relevant to assessing the species' biological response include species-specific factors such as lifespan, reproductive rates or productivity, certain behaviors, and other demographic factors.

*Analytical Framework*

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data regarding the status of these species, including an assessment of the potential threats to the species. The SSA report does not represent our decision on whether these species should be proposed for listing as endangered or threatened species under the Act. However, it does provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies.

To assess the viability of the Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell, we used the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency is the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years, reduced birth rates), redundancy is the ability of the species to withstand catastrophic events (for example, droughts, large pollution events), and representation is the ability of the species to adapt to both near-term and long-term changes in its physical or biological environment (for example, climate conditions, pathogens). In general, species viability will increase with increases in resiliency, redundancy, and representation (Smith et al. 2018, p. 306). 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. For each of the three species, during the first stage, we evaluated the individual species' life-history needs. The next stage involved an assessment of the historical and current condition of the species' demographics and habitat characteristics, including an explanation of how the species arrived at its current condition. The final stage of the SSA involved making predictions about the species' responses to positive and negative environmental and anthropogenic influences. Throughout all of these stages, we used the best available information to characterize viability as the ability of a species to sustain populations in the wild over time. We use this information to inform our regulatory decision.

The following is a summary of the key results and conclusions from the SSA report; the full SSA report can be found at Docket No. FWS–R4–ES–2023–0112 on *https://www.regulations.gov* and at the Service's Environmental Conservation Online System species profile pages: *https://ecos.fws.gov/ecp/species/3254; https://ecos.fws.gov/ecp/species/9887;* and *https://ecos.fws.gov/ecp/species/9881.*

**Summary of Biological Status and Threats**

In this discussion, we review the biological condition of these species and their resources, and the threats that influence the species' current and future conditions, in order to assess the species' overall viability and the risks to that viability.

*Species Needs*

The Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell share similar habitat needs, preferring riffles, shoals, and high gradient streams with stable substrates composed predominantly of coarse sand, gravel, and cobble. Most often, the three species are found in habitat less than 3 feet (0.9 meter) deep, in small to medium-sized rivers. Larger, more inflated shell types of Tennessee clubshell and Tennessee pigtoe inhabited large rivers prior to impoundment (Ortmann 1918, pp. 534–538, 550–555), but representation of these shell types has been lost, as both species, in addition to the Cumberland moccasinshell, require free-flowing streams and are not viable (do not successfully reproduce) in large impoundments, such as those along the mainstem Tennessee and Cumberland rivers. Known and likely fish hosts needed by each mussel species for reproduction are noted above (see *General Mussel Biology*).

*Analysis Units*

For all three species, in our SSA, we used U.S. Geological Survey (USGS) 10-digit hydrologic unit codes (HUCs, or watersheds; see figures 1–3, above) as analysis units for threats, current conditions, and future conditions. These analysis units were selected because they reflect relative differences in hydrologic conditions (*e.g.,* separation by major impoundments), and they were at the finest spatial scale for which mussel survey data were available.

*Threats*

We provide information regarding present and future influences, including both positive and negative, on the three

mussels' current and future viability, including large impoundments, urban development, energy development, and agriculture, which have altered natural flow regimes and/or diminished water and substrate quality (Factor A). The existing regulatory mechanisms (Factor D) have not been adequate to arrest the decline of the species. Additional threats, including nonnative competitors and pathogens (which may be responsible for enigmatic declines in some streams), likely have had negative effects on the three mussel species, as described in the SSA report and in a peer-reviewed publication on the SSA methodology (Fitzgerald et al. 2021, entire). These additional threats may negatively affect individuals of the species, but, unlike the primary threats, these additional threats do not affect the species' overall viability. Further, our analysis did not indicate that climate change is a primary threat to the three species. While the rangewide effects of climate change are likely to worsen in the future as droughts and storms are projected to become more intense, the primary threats (large impoundments, urban development, energy development, and agriculture) are the main driver of the three species' status currently and into the future.

We used a regression model to identify the threats affecting the species. The model estimated the relative effects of a set of candidate predictor variables (threats) on the mussels' current conditions (see table 1, below). The threat variables retained for the regression analysis were those that best predicted mussel persistence at the rangewide scale. The analysis revealed the primary threats influencing current conditions of the three species are erosion and sedimentation from urban development and hydrologic alteration from large reservoirs and urban development. Mean runoff, another variable that reflects the impacts of erosion and sedimentation, was identified as a primary threat only to the Cumberland moccasinshell; its influence on the other two mussel species was not statistically significant.

Several threats (candidate variables in the model) were considered as potential influences on current condition but were excluded from the regression analysis because they decreased the model's ability to detect the primary threats acting on the three mussel species rangewide (see table 1, below). However, some of the excluded threats negatively affect the three mussel species at smaller scales. In some watersheds in the upper Tennessee Basin and Cumberland Basin, energy development, which includes coal mining, natural gas, and oil extraction, has been identified as key threats to mussels that have reduced habitat (see ''Energy Development—Coal, Natural Gas, and Oil,'' below).

TABLE 1—SUMMARY OF MAJOR THREATS IDENTIFIED FOR THREE FRESHWATER MUSSEL SPECIES, INCLUDING PROXY VARIABLES CONSIDERED AND VARIABLES RETAINED IN THE FINAL MODEL OF CURRENT CONDITIONS OF THE THREE MUSSEL SPECIES

[Service 2020, p. 11]

| Threats | Proxy variables considered | Variables in final model |
|---|---|---|
| Hydrologic alteration | Reservoir surface area | Included. |
| | Percentage developed land use | Included. |
| | Number and density of dams | Not included. |
| Erosion and sedimentation | Coefficient of variation mean monthly precipitation | Included. |
| | Percentage developed land use | Included. |
| | Mean runoff | Included. |
| | Density of agriculture (crops and pastureland) | Included. |
| | Soil erodibility index | Not included. |
| Climate change | Coefficient of variation mean monthly precipitation | Included. |
| | Mean monthly air temperature | Not included. |
| Nutrient and chemical pollution | Percentage developed land use | Included. |
| | Density of agriculture (crops and pastureland) | Included. |
| | Percentage of mining land use and number of mines | Not included. |
| | Stream km impaired (EPA 303(d) and TMDL lists [1]) | Not included. |
| Nonnative competitors | No suitable proxy for competitive effects identified | Not included. |

[1] Section 303(d) of the Clean Water Act (33 U.S.C. 1251 *et seq.*) authorizes the Environmental Protection Agency (EPA) to assist States, Territories, and authorized Tribes in listing impaired waters and developing total maximum daily loads (TMDLs) for these waterbodies. A TMDL establishes the maximum amount of a pollutant allowed in a waterbody and serves as the starting point or planning tool for restoring water quality.

Large Impoundments

Our analysis identified large impoundments (indicated by reservoir surface area) as a rangewide threat to the three mussel species. The Tennessee Valley Authority operates 31 large dams in the Tennessee River system and one large dam (Great Falls Dam) in the Cumberland system (TVA Recreation Map website, 2023) and the U.S. Army Corps of Engineers operates 10 large dams in the Cumberland system (USACE Nashville District website, 2023). The effects of dams on aquatic habitats and freshwater mussels are well-documented (Watters 2000, p. 261), and extinction and extirpations 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 (Haag 2009, p. 107).

Dams disrupt population connectivity and alter water quality. After a dam has been constructed, upstream the channel becomes deeper, flow decreases dramatically, and fine sediments accumulate on the channel bottom, which eliminates shoal and riffle habitats needed by the three mussel species, as well as many others, and their host fishes. Downstream of dams, natural flow regimes are disrupted by alternating low flow releases and pulses of scouring flows (Hardison and Layzer 2001, p. 79), reduced water temperatures, reduced dissolved oxygen, and changes in fish assemblages. Mussels may survive in cold tailwaters but may not be able to reproduce, as was shown for native washboard mussels (*Megalonaias nervosa*) in the mainstem Cumberland River (Heinricher and Layzer 1999, entire). In a Cumberland River tributary, Caney Fork, the extirpation of several mussel species, including Cumberland moccasinshell, was attributed mainly to cold tailwater temperatures from Center Hill Dam (completed in 1948) and

alteration of channel morphology from peaking flows, and no live mussels were found within 7.5 mi (12 km) of the dam outfall (Layzer et al. 1993, pp. 69–70).

Developed Land Use/Urbanization

For all three mussel species, development and urbanization contribute to habitat degradation and loss. Freshwater mussel populations may experience reduced abundance, species richness, reproduction, growth, and survival stemming from the impacts of urbanization on water and habitat quality (Diamond and Serveiss 2001, p. 4716; Gangloff et al. 2009, p. 198; Cao et al. 2013, pp. 1212–1214; Gillis et al. 2017, pp. 674–679). The threats analysis in our SSA found the estimated probability of extirpation for all three species approaches 100 percent when developed land area is between 9 and 15 percent of the total land area in a watershed (Service 2020, p. 61). The term ''development'' refers to urbanization of the landscape, including (but not limited to) land conversion for residential, commercial, and industrial uses and the accompanying infrastructure. Urbanization effects may include alterations to water quality, water quantity, and instream and streamside habitat (Ren et al. 2003, p. 649; Wilson 2015, p. 424). The effects on habitat also include variability in streamflow, typically increasing the extent and volume 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).

In urbanized environments, storm drains deliver large volumes of water to streams much faster than would naturally occur, often resulting in flooding and bank erosion that reshape the channel and cause substrate instability. Increased, high-velocity discharges can cause species living in streams (including mussels) to become stressed, displaced, or killed by fast-moving water and the debris and sediment carried in it. Once floodwaters recede, displaced individuals may be left stranded out of the water, and fine sediments transported to the stream settle on coarser substrates, which may damage or destroy areas of mussel habitat. During storm events, contaminants in urbanized environments (*e.g.,* gasoline, oil drips, fertilizers) accumulated on impervious surfaces may be washed directly into streams.

Energy Development—Coal, Natural Gas, and Oil

Extraction of coal, natural gas, and (to a lesser extent) oil is common in the Cumberland and Upper Tennessee River basins and has been associated with mussel declines in several watersheds (Layzer and Anderson 1992, entire; Warren and Haag 2005, entire; Johnson et al. 2014, p. 890; TDEC 2014, p. 62; Zipper et al. 2016, pp. 612–613; Ahlstedt et al. 2016, p. 13). Examples of energy development impacts in the range of the three mussels include high levels of copper, manganese, and zinc, metals that can be toxic to freshwater mussels, found in sediment samples from both the Clinch and Powell Rivers. Both rivers receive runoff from active, reclaimed, and abandoned coal mine sites. In Cumberland Basin streams, including Buck Creek, Horse Lick Creek, Little South Fork, and Rockcastle River, there was a clear correlation between surface mines, increased metal concentrations downstream, and the extirpation of some mussel species (Layzer and Anderson 1992, pp. 91–96). In the upper Powell River, Virginia, coal mining has almost eliminated the mussel fauna; sediment pore water from the riverbed contains levels of contaminants potentially toxic to mussels, particularly selenium and copper (Timpano et al. 2023, p. 13).

Natural gas and oil extraction is a threat to freshwater mussels in the Upper Tennessee Basin and Cumberland Basin. In addition to the general impacts of erosion and sedimentation from forest clearing for access roads and installing drill pads, spills from (brine) disposal ponds at gas wells or end-of-pipe discharges from brine treatment facilities can reduce freshwater mussel abundance and diversity, as well as increase mortality. These effects have been observed in the Allegheny River (Patnode et al. 2015, p. 55), a watershed outside the range of the three mussel species, but within the Ohio Basin, which contains the Tennessee River and Cumberland River.

Agriculture

Agricultural activities are common throughout the range of the three mussel species and have impacted watersheds in the species' historical and current ranges. The advent of intensive row crop agriculture is a potential factor in freshwater mussel decline and species extirpation in the eastern United States (Peacock et al. 2005, p. 550). Nutrient enrichment from fertilized crops and livestock is a threat commonly associated with negative effects on aquatic biota and can increase ammonia concentrations, to which freshwater mussels are particularly sensitive. In addition, agricultural pesticides, including herbicides, fungicides, insecticides, and their surfactants and adjuvants, are highly toxic to juvenile and adult freshwater mussels (Bringolf et al. 2007, p. 2,092). Concentrations of these contaminants from fields or pastures may be at levels that can affect an entire population, especially given the highly fragmented distributions of the three mussel species.

Agricultural land use has been associated with decreased freshwater mussel diversity, growth, and survival in North American streams. A temporal analysis of freshwater mussel populations in Iowa streams showed declines in mussel species richness, and local extirpations corresponded with agricultural intensity and forest clearing of the riparian zone (Poole and Downing 2004, pp. 121–124). In those Iowa streams, the segments with the highest substrate diversity exhibited the lowest declines in species richness, indicating homogenization of substrates from sedimentation is a freshwater mussel stressor. Further, species richness increased or was unchanged where agriculture was less than 25 percent of the land use. Another study, in Minnesota streams, revealed decreases in mussel abundance and richness corresponding with increases in agricultural land use (Hornbach et al. 2019, p. 1,833). In Kentucky, streams in proximity to row crop agriculture were associated with higher values of contaminants (pesticides and fertilizers), and growth of caged mussels in those streams was low in comparison with most other streams, where row crops were a minor land use (Haag et al. 2019, pp. 761–763). One of the streams in the study with high row crop land use was the Red River, in the historical range of the Cumberland moccasinshell and with one current low-condition population of the Tennessee clubshell. The abnormally low growth rates observed in the streams in proximity to high row crop land use usually presage early mortality observed in mussel hatchery settings (Haag et al. 2019, p. 765).

Agencies such as the U.S. Department of Agriculture's Natural Resources Conservation Service, along with State soil and water conservation districts, provide technical and financial assistance to farmers and private landowners. Additionally, county resource development councils and university agricultural extension services disseminate information on the importance of minimizing land use impacts, specifically the effects of agricultural practices, on aquatic resources. These programs help identify opportunities for conservation through projects such as exclusion fencing and alternate water supply sources, which

help decrease nutrient inputs and keep livestock off stream banks and shorelines, thus reducing erosion. However, the overall effectiveness of these programs over a large scale is unknown given the three mussel species' wide distribution and varying agricultural intensities.

Effects of the agricultural activities within the ranges of the three mussel species, including diminishment of water quality and habitat deterioration, are not often detected until after the sedimentation and/or pesticide and herbicide inputs occur. In summary, many effects of agricultural practices are pervasive across the ranges of the three mussel species and are a factor in their historical decline and localized extirpations.

Contaminants

Three of the land uses identified as threats to the three mussel species (urban development, energy development, and agriculture) contribute contaminants to stream habitats, which can degrade water and substrate quality and adversely impact individuals and populations. Although chemical spills and other point sources of contaminants may directly result in mussel mortality, widespread decreases in density and diversity may result in part from the subtle, pervasive effects of chronic, low-level contamination (Naimo 1995, p. 354).

The effects of contaminants such as metals, chlorine, and ammonia on juvenile mussels are profound (Augspurger et al. 2003, p. 2,571; Bartsch et al. 2003, p. 2,566). Among 69 aquatic organisms, the EPA reported freshwater mussels (from tests on juveniles and glochidia) were the taxonomic group most sensitive to ammonia (U.S. EPA 2013, pp. 24–27), which is a common contaminant in sewage plant discharges and agricultural runoff. Juvenile mussels may readily ingest contaminants adsorbed to sediment particles (Newton and Cope 2007, p. 276), and, unlike adults, they feed in sediment pore water rather than on surface water (Yeager et al. 1994, p. 221). Unionized ammonia in pore water was clearly associated with recruitment failure in populations of eastern elliptio (*Elliptio complanata*) mussels in the wild and was at concentrations far below those found to be toxic in laboratory experiments (Strayer and Malcom 2012, pp. 1,787–1,788).

Mussel glochidia are sensitive to some toxicants (Goudreau et al. 1993, p. 221; Jacobson et al. 1997, p. 2,386; Valenti et al. 2005, p. 1,243). Even at low levels, certain heavy metals may inhibit glochidial attachment to fish hosts. Contaminants have been shown to affect mussel glochidia on the Clinch River (Goudreau et al. 1993, p. 221; Jacobson et al. 1997, p. 2,386; Valenti et al. 2005, p. 1,243), which harbors some of the best condition populations of the three species, particularly the Cumberland moccasinshell.

Cadmium, chromium, copper, mercury, and zinc can negatively affect biological processes of all mussel life stages (Havlik and Marking 1987, pp. 4–9; Naimo 1995, p. 355; Jacobson et al. 1997, p. 2,389; Valenti et al. 2005, p. 1,243). Chronic mercury contamination from a chemical plant on the North Fork Holston River destroyed a diverse mussel fauna downstream of Saltville, Virginia (Brown et al. 2005, p. 1,459). Copper and zinc contamination originating from wastewater discharges at a coal-fired electric power plant is one of the sources of mussel declines in a reach of the Clinch River (Zipper et al. 2014, p. 9). Despite localized improvements since these rivers initially were contaminated, metals have remained in sediments, affecting recruitment and densities of the mussel fauna for decades thereafter (Price et al. 2014, p. 12; Zipper et al. 2014, p. 9).

Threats Summary

In summary, the primary threats have curtailed the habitat and range of the Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell, via flow alterations caused by large impoundments and diminishment of water and substrate quality caused by various land development activities. These threats, which result in both contamination and the physical disruption of surface waters and substrates, are the source of negative impacts to freshwater mussel fauna, including the Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell.

*Current Conditions*

The current resiliency of the Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell was analyzed using demographic and spatial distribution criteria (see table 2, below). Data for the criteria are from quantitative and qualitative mussel surveys reported in peer-reviewed literature, agency reports, and museum databases (Service 2020, p. 8). Resiliency was classified as low, medium, or high in the 10-digit HUC watersheds in each mussel species' historical range. Demographic criteria consisted of categories of abundance or density, and evidence of recent recruitment (inferred from the presence of individuals less than or equal to 30 mm in shell length). Distribution criteria were based on stream distance occupied within a watershed.

TABLE 2—CRITERIA FOR CLASSIFYING CURRENT CONDITIONS OF POPULATIONS WITHIN WATERSHEDS

[Service 2020, p. 10]

| Condition | Demographic criteria | | Distribution criteria | Probability of persistence [2] |
|---|---|---|---|---|
| | Abundance [1] | Reproduction | | |
| High | Abundant | Evidence of reproduction | Occurs in more than 50 river km | >0.75 |
| | Common | Increasing population trend or evidence of reproduction. | | |
| Medium | Abundant | Decreasing population trend or no evidence of reproduction. | Occurs in 10–50 river km | 0.25–0.75 |
| | Common | No information available. | | |
| | Rare | Evidence of recent reproduction. | | |
| Low | Common | Decreasing trend or no evidence of reproduction. | Occurs in less than 10 river km | <0.25 |
| | Rare | Decreasing trend or no evidence of reproduction. | | |
| | Presence-absence data only. | | | |

TABLE 2—CRITERIA FOR CLASSIFYING CURRENT CONDITIONS OF POPULATIONS WITHIN WATERSHEDS—Continued

[Service 2020, p. 10]

| Condition | Demographic criteria | | Distribution criteria | Probability of persistence [2] |
|---|---|---|---|---|
| | Abundance [1] | Reproduction | | |
| Unknown | Historical records of occurrence in watershed with no surveys in past 30 years. | | Subwatershed (HUC10) lacking site-specific surveys in watershed (HUC8) of known occurrence. | |
| Extirpated | No live or fresh dead individuals collected in surveys within the past 30 years. | | No areas known to be currently occupied within watershed. | |

[1] In this column, abundant is defined as more than 500 individuals reported or densities greater than 0.70 per square meter ($m^2$); common is defined as 100–500 individuals reported or densities between 0.10–0.70/$m^2$; and rare is defined as fewer than 100 individuals reported or densities fewer than 0.10/$m^2$.

[2] Probability of persistence represents expected risk of extirpation over 30 years (roughly 3 generations), with numeric estimates selected based on best professional judgment of freshwater mussel experts.

Mussel records were considered current if they included detection of live individuals or fresh dead shells (with soft tissue attached) since 1988. Watersheds containing only records before 1988 were considered extirpated if recent surveys had not encountered live individuals or no suitable habitat was available (*e.g.,* large impoundments), and unknown if no recent surveys (since 1988) were conducted. This approach represents an underestimate of decline, as only watersheds with confirmed records were considered historically occupied. Because early surveys did not always record exact localities and many watersheds faced hydrologic alterations prior to comprehensive sampling, actual historical ranges (still confined to the Cumberland and/or Tennessee Basin) were likely greater than those represented in figure 2 of the SSA report (Service 2020, p. 13). In addition, sampling has not occurred in a standardized manner, and many watersheds with unknown current conditions may reflect experts' opinions that these regions are unlikely to support viable populations (*i.e.,* sample selection bias). This suggests that upper values of estimated range reductions (74 percent, 76 percent, and 62 percent for the Cumberland moccasinshell, Tennessee clubshell, and Tennessee pigtoe, respectively) may better represent current conditions of these species (see table 3, below). Early surveys of freshwater mussels often recorded qualitative descriptions of abundance (*e.g.,* rare, common, widespread) that make direct comparison of current abundance estimates impossible; however, it is widely accepted in the literature that dramatic reductions from historical abundance have occurred throughout the ranges of these species.

In the absence of sufficient genetic data to confirm spatial population structure, we treated each watershed as a population for our analyses of species conditions. Watersheds were nested within two major units of representation, the Cumberland River basin and the Tennessee River basin. For each of the three species, redundancy was characterized by the number of populations, and, in our analysis, range loss incorporates redundancy as the portion of watersheds where the species is extirpated (see table 3, below). Although populations in low condition contribute to redundancy values, they have minimal influence on population resiliency and species representation. Low-condition populations are not, or are barely, recruiting individuals to found new generations and, therefore, are functionally extirpated.

TABLE 3—CURRENT RESILIENCY OF ALL WATERSHEDS (POPULATIONS), AND RANGE LOSS (PERCENT OF WATERSHEDS WHERE EXTIRPATED)

| Species | Current resiliency | | | | | Range loss (percent) |
|---|---|---|---|---|---|---|
| | Extirpated | Low | Medium | High | Unknown | |
| Tennessee clubshell | 83 | 28 | 4 | 3 | 29 | 58–76 |
| Tennessee pigtoe | 51 | 32 | 8 | 3 | 20 | 42–62 |
| Cumberland moccasinshell | 87 | 22 | 3 | 9 | 29 | 56–74 |

Tennessee Clubshell—Current Conditions

The Tennessee clubshell historically occurred throughout the Tennessee and Cumberland River basins. Currently, it occupies 35 to 64 watersheds, compared to 147 historically, reflecting a range reduction of 58 to 76 percent. Most extant populations of the species are classified as low condition (28), with only three populations classified as high condition and four populations classified as medium condition, indicating species condition is currently low (see table 3, above). Rangewide, there are three redundant populations with high resiliency, which are likely to withstand the effects of stochastic events, and five redundant populations with medium resiliency, which may withstand the effects of a stochastic event. The 28 low-condition (low resiliency) populations have little capacity to withstand the effects of a stochastic event and do not contribute to species redundancy or the species' capacity for withstanding catastrophic events. While the Tennessee clubshell persists in the Tennessee River basin, it is on the verge of extirpation from the entire Cumberland River basin, with only 5 low-condition populations (low resiliency) and 16 extirpated populations. Extirpation of the species from this basin would result in a 50 percent loss in representation, as the Tennessee clubshell would be lost from one of the two major ecological settings (representation units) in its range.

Representation has been further diminished by reductions in connectivity between mainstem and tributary streams, which contribute to reduced size and genetic isolation of Tennessee clubshell populations.

Tennessee Pigtoe—Current Conditions

The Tennessee pigtoe was once a common species throughout the Tennessee Basin. Currently, it occupies 43 to 63 watersheds, compared to 114 historically, reflecting a range reduction of 42 to 62 percent. Most extant populations of the species are classified as low condition (32), with only three populations classified as high condition and eight populations classified as medium condition, indicating species condition is currently low (see table 3, above). Rangewide, there are three redundant populations with high resiliency, which are likely to withstand the effects of stochastic events, and eight redundant populations with medium resiliency, which may withstand the effects of a stochastic event. The 32 low-condition (low resiliency) populations have little capacity to withstand the effects of a stochastic event and do not contribute to species redundancy or the species' capacity for withstanding catastrophic events. Representation of the Tennessee pigtoe has declined, as populations in the mainstem Tennessee River are extirpated and the connectivity between tributaries is disrupted by impoundments, which has diminished population interaction necessary for maintenance of genetic diversity.

Cumberland Moccasinshell—Current Conditions

The Cumberland moccasinshell historically occurred throughout the Tennessee and Cumberland River basins. Currently it occupies 34 to 63 watersheds, compared to 150 historically, reflecting a range reduction of 56 to 74 percent. Most extant populations of the species are classified as low condition (22), with nine populations classified as high condition and three populations classified as medium condition, indicating species condition is currently low (see table 3, above). With nine populations in high condition and two populations in medium condition in the Tennessee Basin, redundancy in the basin may buffer against stochastic events. However, these populations are concentrated in Upper Tennessee Basin tributaries, mainly the Clinch-Powell watershed, with seven high condition populations, and one high condition population in the Holston watershed. The Duck River watershed, in the lower Tennessee Basin, has one high-condition and two medium-condition populations. The low-condition populations in the rest of the Tennessee Basin lack resiliency and have little capacity to withstand effects of environmental stochasticity. Because there are no populations with high resiliency, and only one population with medium resiliency in the Cumberland basin ecological setting, and smaller-scale ecological settings outside the Upper Tennessee and Duck basins only contain populations with low resiliency, Cumberland moccasinshell representation, or its potential for adapting to environmental change, is diminished.

*Current Risk Profiles*

We used the model parameters estimated in the current conditions analysis (*i.e.,* the relative effects of each stressor) to model the probability that a watershed would be classified as extirpated, low, medium, or high based on historical land-use and climate patterns. These probabilities discussed in the ''Future Conditions'' section of our SSA report (Service 2020, pp. 16–20) represent the species' present (or baseline; *i.e.,* current) risk profile with no additional climate or land-use changes. The baseline modeling, based on threats alone, measures the present extirpation risk to all populations regardless of their current condition. For example, there may be populations that have a comparatively high demographic and distributional condition, but due to significant stressors that are already acting on the population, such as large impoundments and isolation, they also have a high probability of extirpation. Additionally, because low-condition populations contain few individuals or display little evidence of recruitment), they have an inherently high risk of extirpation within several generations. Importantly, these baseline estimates are not impacted by uncertainty in future climate or land-use scenarios because they derive from currently observed patterns across the landscape. These baseline probabilities are assumed valid over the next 10 years. Therefore, we used the current or baseline probability to assess the current risk of extirpation or low condition to each of the three mussel species (see table 4, below).

The current risk of being classified as extirpated or low condition for all three species was similar. For Tennessee clubshell, the average current risk of being classified as extirpated or low condition is 0.71 and 0.23, respectively. In addition, nearly all populations of Tennessee clubshell may be at high risk of being classified as extirpated or low condition due to current land use. For Tennessee pigtoe, the average current risk of being classified as extirpated or low condition is 0.54 and 0.34, respectively. In addition, all populations of Tennessee pigtoe were more likely than not to be classified as extirpated or low condition based on current patterns of land use within watersheds. For Cumberland moccasinshell, the average current risk of being classified as extirpated or low condition is 0.72 and 0.16, respectively. The current risk of being classified as extirpated or low condition was similarly high for Cumberland moccasinshell populations in the lower Tennessee and throughout the Cumberland Basin as described for Tennessee pigtoe; however, the upper Tennessee Basin currently contains eight populations classified as high condition that may have lower risk of becoming extirpated or low condition populations compared to other regions.

TABLE 4—AVERAGE CURRENT PROBABILITY (BASELINE OR CURRENT RISK PROFILE) OF SPECIES CONDITION ACROSS ALL WATERSHEDS GIVEN CURRENT THREATS

| Species | Extirpated | Low | Medium | High |
|---|---|---|---|---|
| Tennessee Clubshell | 0.71 | 0.23 | 0.04 | 0.03 |
| Tennessee Pigtoe | 0.54 | 0.34 | 0.06 | 0.05 |
| Cumberland Moccasinshell | 0.72 | 0.16 | 0.04 | 0.08 |

*Future Conditions*

Because we determined that the current condition of the Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell is consistent with an endangered species (see Determination of Status for the Three Mussel Species, below), we are not presenting the results of the future

scenarios in this proposed rule. However, above, we present the baseline or current risk profile results as these were used in the determination of the three species' status. Please refer to the SSA report (Service 2020, pp. 16–21) for the full analysis of future scenarios.

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have not only analyzed individual effects on the three species, but we have also analyzed their potential cumulative effects. We incorporate the cumulative effects into our SSA analysis when we characterize the current and future condition of the three species. To assess the current and future condition of the three species, we undertake an iterative analysis that encompasses and incorporates the threats individually and then accumulates and evaluates the effects of all the relevant factors that may be influencing the species, including threats and conservation efforts. For each of the three species, because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire species, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative effects analysis.

*Conservation Efforts and Regulatory Mechanisms*

Existing conservation measures directly benefiting the three mussel species are limited. Five percent or less of the currently occupied area for all three species is within protected areas managed for biodiversity conservation (Service 2020, pp. 27–29). While the percent of areas receiving some level of protection is slightly greater (15 percent or less), many of these areas are subject to mining and other extractive uses detrimental to freshwater mussels. Compared to currently extant populations of the three species, the percentage of protected area is similar for extirpated populations, suggesting the levels of protection observed are not adequate to prevent local extirpations.

Reintroductions have been attempted for at least three populations of Cumberland moccasinshell using individuals translocated from the Clinch River at Kyles Ford, Tennessee, to other rivers in the State. Between 2010 and 2015, 1,100 individuals were stocked in the Emory River, and 3,539 individuals were stocked in the Nolichucky River (Phipps et al. 2018, pp. 27–41). Populations of the Cumberland moccasinshell in both rivers are currently in low condition and do not appear to be reproducing based on 2016 surveys. An additional 800 individuals were stocked in the Hiwassee River in 2012 (Phipps et al. 2018, pp. 26–27), but reintroduction efforts were not successful, and this population is currently considered extirpated. It is possible that cold-water discharges from Apalachia Dam, which is operated as a peaking hydropower facility, have reduced the reintroduction potential of mussel species in the Hiwassee River. Unnatural thermal regimes continue to affect populations of Tennessee clubshell in the Hiwassee River and freshwater mussels below other hydropower dams in the Tennessee River basin (Layzer and Scott 2006, p. 488).

States vary in level of protection provided to freshwater mussels in general. The State of Virginia has statutory protection for freshwater mussels. State wildlife management agencies in Alabama, Tennessee, North Carolina, and Kentucky have protective regulatory measures prohibiting the take or possession of freshwater mussels without a scientific collector's permit. Freshwater mussel species are only protected in Georgia if they are listed under the Act. Accordingly, they currently may be taken with a fishing license or commercial fishing license. A variety of additional ''designations'' or status descriptions are assigned to the three species within States of occurrence; however, these do not indicate State statutory protections, nor are they associated with habitat or restoration priorities.

**Determination of Status for the Three Mussel Species**

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 meets the definition of an endangered species or a threatened species. The Act defines an ''endangered species'' as a species in danger of extinction throughout all or a significant portion of its range, and a ''threatened species'' as a species 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 a species meets the definition of 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.

*Status Throughout All of Its Range*

After evaluating threats to the species and assessing the cumulative effects of the threats under the Act's section 4(a)(1) factors, we found that the three mussel species have declined significantly in distribution and abundance. The primary broadscale threats, development (as urbanization) and large impoundments, and more localized threats, including energy development and agriculture, have reduced available habitat, curtailing the range of the three species (Factor A). All three species have experienced substantial reductions in their current distributions compared to historical ranges.

Our SSA modeled the current probability (*i.e.,* baseline or current risk profile) that the species' status within various watersheds would be extirpated, low, medium, or high (see table 4, above) based on historical land-use and climate patterns, which account for the rangewide primary threats as discussed above. Together, the model (baseline or current risk profile) and current population conditions analysis (which is based on observations in the wild and current threats) informed our determination as to whether each species is in danger of extinction throughout all or a significant portion of its range (*i.e.,* whether each species meets the definition of an endangered species under the Act). Our determinations for each species are discussed below.

*Tennessee Clubshell—Status Throughout All of Its Range*

The Tennessee clubshell historically occurred throughout the Tennessee and Cumberland River basins. Most extant populations of the Tennessee clubshell are in low condition (have low resiliency) and exhibit little to no reproduction. Recruitment of new generations to the low-condition populations is very unlikely, and, as such, they are functionally extirpated, with little resistance to stochastic events, and they are unlikely to recover under the chronic stresses of current and projected threats. The three high-condition populations are restricted to the upper Tennessee River basin, in the Clinch River (two watersheds) and Hiwassee River (one watershed). In the Cumberland Basin representation unit, 5 populations are in low condition, and 16 are extirpated. As discussed above, while the Tennessee clubshell persists in the Tennessee River basin, it is on the verge of extirpation from the entire

Cumberland River basin, with only 5 low-condition populations and 16 extirpated populations. Extirpation of the species from this basin would result in a 50 percent loss in representation. Representation has been further diminished by reductions in connectivity between mainstem and tributary streams, which contribute to reduced size and genetic isolation of Tennessee clubshell populations.

Because species viability is bolstered by having a broad spatial distribution across ecological settings (representation) and a sufficient number of resilient populations (redundancy), the restriction of few resilient populations to one region, in comparison to the broader distribution of populations historically, indicates species viability is currently low. In addition, the average current risk of extirpation (0.71) or low condition (0.23) across all watersheds for the Tennessee clubshell is high. Given the preponderance of low condition populations that are likely functionally extirpated throughout the species' range and the extent of urban development and large impoundments throughout the range, as well as more localized threats, including energy development and agriculture, the Tennessee clubshell is in danger of extinction throughout its range. Unlike a threatened species, which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, the Tennessee clubshell is in danger of extinction throughout its range now, owing to the low condition of most populations and their current high risk of extirpation resulting from current threats. Thus, after assessing the best available information, we determine that Tennessee clubshell is in danger of extinction throughout all of its range.

*Tennessee Clubshell—Status Throughout a Significant Portion of Its Range*

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so within the foreseeable future throughout all or a significant portion of its range. We have determined that the Tennessee clubshell is in danger of extinction throughout all of its range and accordingly did not undertake an analysis of any significant portion of its range. Because the Tennessee clubshell warrants listing as endangered throughout all of its range, our determination does not conflict with the decision in *Center for Biological Diversity* v. *Everson,* 435 F. Supp. 3d 69 (D.D.C. 2020) (*Everson*), which vacated the provision of the Final Policy on Interpretation of the Phrase ''Significant Portion of Its Range'' in the Endangered Species Act's Definitions of ''Endangered Species'' and ''Threatened Species'' (Final Policy; 79 FR 37578, July 1, 2014) providing that if the Service determines that a species is threatened throughout all of its range, the Service will not analyze whether the species is endangered in a significant portion of its range.

*Determination of Status for the Tennessee Clubshell*

Our review of the best available scientific and commercial information indicates that the Tennessee clubshell meets the Act's definition of an endangered species. Therefore, we propose to list the Tennessee clubshell as an endangered species in accordance with sections 3(6) and 4(a)(1) of the Act.

*Tennessee Pigtoe—Status Throughout All of Its Range*

Once a common species in the Tennessee Basin, most extant populations of the Tennessee pigtoe are in low condition (have low resiliency) and exhibit little to no reproduction. Recruitment of new generations to the low-condition populations is very unlikely, and, as such, they are functionally extirpated, with little resistance to stochastic events, and they are unlikely to recover under the chronic stresses of current and projected threats. Two of the three high-condition populations are in the upper part of the basin, in a Clinch River subwatershed and one of the river's tributaries, Copper Creek. The other high-condition population is in the lower Tennessee system, in the Duck River basin. Eight populations are in medium condition and distributed among lower, middle, and upper Tennessee Basin watersheds.

The Tennessee pigtoe may have sufficiently resilient populations (redundancy) spread over a large enough area to withstand a catastrophic event due to the occurrence in eight watersheds by either a high-condition or medium-condition population (three high-condition and eight medium-condition). However, populations in the mainstem Tennessee River, where the phenotype with a larger, more inflated shell only occurred, are extirpated. In addition, numerous large impoundments on the mainstem Tennessee and several of its tributaries prevent gene flow between populations, which is necessary for maintaining representation. The average current risk of extirpation across all watersheds for the Tennessee pigtoe is high (0.54) based on current patterns of land use within the watersheds. Therefore, the 11 populations in high and medium condition may be at high risk of becoming extirpated or low condition in the future given current land use and population trajectories. While the reduction in range (42 to 62 percent) appears slightly smaller for the Tennessee pigtoe when compared to the Cumberland moccasinshell and the Tennessee clubshell, this may reflect the Tennessee pigtoe's endemism to the Tennessee Basin and naturally smaller distribution rather than differences in the species' response to major stressors. Given the extent of urban development and large impoundments, and more localized but widespread threats of energy development and agriculture, most populations of the Tennessee pigtoe are in low condition such that they are at high risk of extirpation. Unlike a threatened species, which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, the Tennessee pigtoe is in danger of extinction throughout its range now, owing to the low condition of most populations and their current high risk of extirpation resulting from current threats. Thus, after assessing the best available information, we determine that the Tennessee pigtoe is in danger of extinction throughout all of its range.

*Tennessee Pigtoe—Status Throughout a Significant Portion of Its Range*

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so within the foreseeable future throughout all or a significant portion of its range. We have determined that the Tennessee pigtoe is in danger of extinction throughout all of its range and accordingly did not undertake an analysis of any significant portion of its range. Because the Tennessee pigtoe warrants listing as endangered throughout all of its range, our determination does not conflict with the decision in *Everson,* which vacated the provision of the Final Policy (79 FR 37578; July 1, 2014) providing that if the Service determines that a species is threatened throughout all of its range, the Service will not analyze whether the species is endangered in a significant portion of its range.

*Determination of Status for the Tennessee Pigtoe*

Our review of the best available scientific and commercial information indicates that the Tennessee pigtoe meets the Act's definition of an endangered species. Therefore, we propose to list the Tennessee pigtoe as

an endangered species in accordance with sections 3(6) and 4(a)(1) of the Act.

*Cumberland Moccasinshell—Status Throughout All of Its Range*

Historically occurring throughout the Tennessee and Cumberland Basins, most extant populations of the Cumberland moccasinshell are in low condition (have low resiliency) and exhibit little to no reproduction. Recruitment of new generations to the low-condition populations is very unlikely, and, as such, they are functionally extirpated, with little resistance to stochastic events, and they are unlikely to recover under the chronic stresses of current and projected threats. Nine populations are in high condition, with seven occupying the Clinch River drainage and one occupying a watershed in the North Fork Holston River drainage, both in the Upper Tennessee Basin. One high-condition population and two medium-condition populations are in the Duck River watershed. In the Cumberland Basin representation unit, 1 population is in medium condition, 7 are in low condition, and 20 are extirpated. The average current risk of extirpation across all watersheds for the Cumberland moccasinshell is high (0.72).

Containing eight of the nine high-condition populations rangewide, the Upper Tennessee Basin is a stronghold for the species. However, in the Upper Tennessee, there is uncertainty around population condition, for which mean risk of extirpation or low-condition population ranges from 0.5 to 0.8. The stronghold status of the Upper Tennessee Basin and the presence of one high-condition and two medium-condition populations in the Lower Tennessee Basin's Duck River, and another medium-condition population in the Cumberland Basin, indicate the species has some capacity to withstand a catastrophic event, although species redundancy is greatly reduced from historical levels.

Although currently nine populations are in high condition, they are isolated by large impoundments and the hundreds of river miles between the three river systems where they occur. This isolation prohibits genetic exchange between populations, which is essential to maintaining adaptive capacity (representation); therefore, the average risk of extirpation or low condition is high (greater than 0.5) for most of the high-condition populations. Additionally, the level of current rangewide threats to the species, which have contributed to documented extirpation from 87 of 150 watersheds, is projected to remain relatively constant, suggesting population trajectories are unlikely to change. Considering watersheds of unknown condition are likely extirpated and instead are classified as ''unknown'' due to being excluded from surveys because of poor habitat quality, the number of extirpations is likely closer to 106 of the 150 watersheds. The current level and extent of threats has resulted in a low-condition or extirpated state for most populations of the Cumberland moccasinshell, such that these populations are at a high risk of extirpation. Unlike a threatened species, which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, the Cumberland moccasinshell is in danger of extinction throughout its range now, owing to the low condition of most populations and their current high risk of extirpation resulting from current threats. Thus, after assessing the best available information, we determine that the Cumberland moccasinshell is in danger of extinction throughout all of its range.

*Cumberland Moccasinshell—Status Throughout a Significant Portion of Its Range*

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so within the foreseeable future throughout all or a significant portion of its range. We have determined that the Cumberland moccasinshell is in danger of extinction throughout all of its range and accordingly did not undertake an analysis of any significant portion of its range. Because the Cumberland moccasinshell warrants listing as endangered throughout all of its range, our determination does not conflict with the decision in *Everson,* which vacated the provision of the Final Policy (79 FR 37578; July 1, 2014) providing that if the Service determines that a species is threatened throughout all of its range, the Service will not analyze whether the species is endangered in a significant portion of its range.

*Determination of Status for the Cumberland Moccasinshell*

Our review of the best available scientific and commercial information indicates that the Cumberland moccasinshell meets the Act's definition of an endangered species. Therefore, we propose to list the Cumberland moccasinshell as an endangered species in accordance with sections 3(6) and 4(a)(1) of the Act.

**Available Conservation Measures**

Conservation measures provided to species listed as endangered or threatened species under the Act include recognition as a listed species, planning and implementation of 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, including the Service, 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. Section 4(f) of the Act calls for the Service to develop and implement recovery plans for the conservation of endangered and threatened species. 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.

The recovery planning process begins with development of a recovery outline made available to the public soon after a final listing determination. The recovery outline guides the immediate implementation of urgent recovery actions while a recovery plan is being developed. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) may be established to develop and implement recovery plans. The recovery planning process involves the identification of actions that are necessary to halt and reverse the species' decline by addressing the threats to its survival and recovery. The recovery plan identifies recovery criteria for review of when a species may be ready for reclassification from endangered to threatened (''downlisting'') or removal from protected status (''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. Revisions of the plan may be done to address continuing or new threats to the species, as new

substantive information becomes available. For each of the three species, the recovery outlines, draft recovery plans, final recovery plans, and any revisions will be available on our website (*https://ecos.fws.gov/ecp/species/3254; https://ecos.fws.gov/ecp/species/9887;* and *https://ecos.fws.gov/ecp/species/9881*) or from our Asheville Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**) as they are completed.

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 these species are listed, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost-share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the States of Alabama, Georgia, Kentucky, North Carolina, Tennessee, and Virginia would be eligible for Federal funds to implement management actions that promote the protection or recovery of the Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell. Information on our grant programs that are available to aid species recovery can be found at: *https://www.fws.gov/service/financial-assistance*.

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

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. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402.

Section 7(a)(2) states that each Federal action agency shall, in consultation with the Secretary, ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Each Federal agency shall review its action at the earliest possible time to determine whether it may affect listed species or critical habitat. If a determination is made that the action may affect listed species or critical habitat, formal consultation is required (50 CFR 402.14(a)), unless the Service concurs in writing that the action is not likely to adversely affect listed species or critical habitat. At the end of a formal consultation, the Service issues a biological opinion, containing its determination of whether the Federal action is likely to result in jeopardy or adverse modification.

In contrast, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any 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 critical habitat proposed to be designated for such species. Although the conference procedures are required only when an action is likely to result in jeopardy or adverse modification, action agencies may voluntarily confer with the Service on actions that may affect species proposed for listing or critical habitat proposed to be designated. In the event that the subject species is listed or the relevant critical habitat is designated, a conference opinion may be adopted as a biological opinion and serve as compliance with section 7(a)(2) of the Act.

Examples of discretionary actions for the Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell that may be subject to the section 7 processes are land management or other landscape-altering activities on Federal lands administered by the National Park Service, U.S. Fish and Wildlife Service, or U.S. Forest Service, as well as actions on State, Tribal, local, or private lands that require a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*) or a permit from the Service under section 10 of the Act) or that involve some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or Federal Emergency Management Agency). Federal actions not affecting listed species or critical habitat—and actions on State, Tribal, local, or private lands that are not federally funded, authorized, or carried out by a Federal agency—do not require section 7 consultation. Federal agencies should coordinate with the local Service Field Office (see **FOR FURTHER INFORMATION CONTACT**) with any specific questions.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to endangered wildlife. The prohibitions of section 9(a)(1) of the Act, codified at 50 CFR 17.21, make it illegal for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit or to cause to be committed any of the following: (1) import endangered wildlife into, or export from, the United States; (2) take (which includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) endangered wildlife within the United States or on the high seas; (3) possess, sell, deliver, carry, transport, or ship, by any means whatsoever, any such wildlife that has been taken illegally; (4) deliver, receive, carry, transport, or ship in interstate or foreign commerce in the course of commercial activity; or (5) sell or offer for sale in interstate or foreign commerce. Certain exceptions to these prohibitions apply to employees or agents of the Service, the National Marine Fisheries Service, other Federal land management agencies, and State conservation agencies.

We may issue permits to carry out otherwise prohibited activities involving endangered wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.22. With regard to endangered wildlife, a permit may be issued for the following purposes: for scientific purposes, to enhance the propagation or survival of the species, and for incidental take in connection with otherwise lawful activities. The statute also contains certain exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

It is the policy of the Service, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify, to the extent known at the time a species is listed, specific activities that would not be considered likely to result in violation of section 9 of the Act. To the extent possible, activities that would be considered likely to result in violation will also be identified in as specific a manner as possible. The intent of this policy is to increase public

awareness of the effect of a proposed listing on proposed and ongoing activities within the ranges of the species proposed for listing.

As discussed above, certain activities that are prohibited under section 9 may be permitted under section 10 of the Act. In addition, to the extent currently known, the following activities would not be considered likely to result in violation of section 9 of the Act if we list the Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell:

(1) Normal agricultural and silvicultural practices, which are carried out in accordance with any existing regulations and best management practices; and

(2) Normal residential landscape activities.

This list is intended to be illustrative and not exhaustive; additional activities that would not be considered likely to result in violation of section 9 of the Act may be identified during coordination with the local field office, and in some instances (*e.g.,* with new information), the Service may conclude that one or more activities identified here would be considered likely to result in violation of section 9.

To the extent currently known, the following is a list of examples of activities that would be considered likely to result in violation of section 9 of the Act, in addition to what is already clear from the descriptions of the prohibitions found at 50 CFR part 17, if we list the Tennessee clubshell, Tennessee pigtoe, and Cumberland moccasinshell:

(1) Unauthorized handling or collecting of the species;

(2) Modification of the channel or water flow of any stream in which the Tennessee clubshell, Tennessee pigtoe, or Cumberland moccasinshell is known to occur;

(3) Livestock grazing that results in direct or indirect destruction of stream habitat; and

(4) Discharge of chemicals or fill material into any waters in which the Tennessee clubshell, Tennessee pigtoe, or Cumberland moccasinshell is known to occur.

This list is intended to be illustrative and not exhaustive; additional activities that would be considered likely to result in violation of section 9 of the Act may be identified during coordination with the local field office, and in some instances (*e.g.,* with new or site-specific information), the Service may conclude that one or more activities identified here would not be considered likely to result in violation of section 9 of the Act. Questions regarding whether specific activities would constitute violation of section 9 of the Act should be directed to the Asheville Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

## II. Critical Habitat

### Background

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

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

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

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

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

We have found critical habitat to be prudent and determinable for all three mussel species and have drafted a proposed critical habitat rule for these species. However, the proposed critical habitat rule is proceeding on a different timeline from the proposed listing rule because we were informed on August 9, 2023, that the Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget (OMB) had determined that our proposed critical habitat rule is significant under Executive Order 12866 and will be initiating the interagency review process for that proposed rule. Because the Service is operating under a court-enforceable deadline requiring us to submit the 12-month finding to the **Federal Register** by August 15, 2023, and because E.O. 12866 does not apply to listing determinations, we are proceeding with publishing this finding and proposed rule without the proposed critical habitat designation. We will publish a proposed critical habitat rule for the three mussels following interagency review of the proposed critical habitat rule.

### Required Determinations

*Clarity of the Rule*

We are required by E.O.s 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.

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

Regulations adopted pursuant to section 4(a) of the Act are exempt from the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*) and do not require an environmental analysis under NEPA. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This includes listing, delisting, and reclassification rules, as well as critical habitat designations. In a line of cases starting with *Douglas County* v. *Babbitt,* 48 F.3d 1495 (9th Cir. 1995), the courts have upheld this position.

*Government-to-Government Relationship With Tribes*

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), E.O. 13175 (Consultation and Coordination with Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretary's 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.

### References Cited

A complete list of references cited in this rulemaking is available on the internet at *https://www.regulations.gov* and upon request from the Asheville Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

## Authors

The primary authors of this proposed rule are the staff members of the Fish and Wildlife Service's Species Assessment Team and the Asheville Ecological Services Field Office.

## List of Subjects in 50 CFR Part 17

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

## 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. In § 17.11, in paragraph (h), amend the List of Endangered and Threatened Wildlife by adding entries for ''Clubshell, Tennessee'', ''Moccasinshell, Cumberland'', and ''Pigtoe, Tennessee'' in alphabetical order under CLAMS to read as follows:

**§ 17.11 Endangered and threatened wildlife.**

* * * * *

(h) * * *

| Common name | Scientific name | Where listed | Status | Listing citations and applicable rules |
|---|---|---|---|---|
| * | * | * | * | * |
| **Clams** | | | | |
| * | * | * | * | * |
| Clubshell, Tennessee ..... | *Pleurobema oviforme* .... | Wherever found ..... | E | [**Federal Register** citation when published as a final rule] |
| * | * | * | * | * |
| Moccasinshell, Cumberland. | *Medionidus conradicus* | Wherever found ..... | E | [**Federal Register** citation when published as a final rule] |
| * | * | * | * | * |
| Pigtoe, Tennessee ..... | *Pleuronaia barnesiana* .. | Wherever found ..... | E | [**Federal Register** citation when published as a final rule] |
| * | * | * | * | * |

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**Martha Williams,**

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

[FR Doc. 2023–17844 Filed 8–21–23; 8:45 am]

**BILLING CODE 4333–15–P**