

Recovery Plan for Tar River Spiny mussel (*Parvaspina (Elliptio) steinstansana*)

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DRAFT AMENDMENT 1

We have identified best available information that indicates the need to amend recovery criteria for Tar River Spiny mussel (*Parvaspina (Elliptio) steinstansana*) since the revised recovery plan was completed in 1992. In this proposed modification, we synthesize the adequacy of the existing recovery criteria, show amended recovery criteria, and the rationale supporting the proposed recovery plan modification, primarily because delisting criteria were not provided in the revised plan (USFWS 1992). The proposed modification is shown as an addendum that supplements the revised recovery plan (USFWS 1992), superseding only Part II (pp. 9-10) of the recovery plan. The recovery plan is a non-regulatory document that provides guidance on how best to achieve recovery for the species.

**For
U.S. Fish and Wildlife Service
Region 4
Atlanta, Georgia**

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METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

The proposed amendments to the recovery criteria are based on information from our files and information from species experts provided in the 5-Year Review for the species (USFWS 2014) and in the NC Wildlife Resources Commission's (NCWRC) "Conservation Plan for Five Rare Aquatic Species Restricted to the Neuse and Tar-Pamlico River Basins: Dwarf Wedgemussel, Yellow Lance, Tar River Spiny mussel, Carolina Madtom, and Neuse River Waterdog" (NCWRC 2018). This information was utilized by the U.S. Fish and Wildlife Service (USFWS) biologists and managers in the Raleigh Ecological Services Field Office in order to develop the delisting criteria for the endangered Tar River Spiny mussel.

ADEQUACY OF RECOVERY CRITERIA

Section 4(f)(1)(B)(ii) of the Endangered Species Act (Act) requires that each recovery plan shall incorporate, to the maximum extent practicable, "objective, measurable criteria which, when met, would result in a determination...that the species be removed from the list." Legal challenges to recovery plans (see *Fund for Animals v. Babbitt*, 903 F. Supp. 96 (D.D.C. 1995)) and a Government Accountability Audit (GAO 2006) also have affirmed the need to frame recovery criteria in terms of threats assessed under the five listing factors.

Recovery Criteria

See previous version of criteria from Part II in [Tar River Spiny mussel Recovery Plan](#) on pages 9-10.

Synthesis

At the time of development of the revised recovery plan for the Tar River Spiny mussel (USFWS 1992), the Tar River Spiny mussel was known only from the mainstem of the Tar River and from one of its tributaries, Swift Creek; and, was believed to be endemic only to the Tar River system in North Carolina. However, current available information indicates the species is endemic to both the Tar River and Neuse River systems in North Carolina (USFWS 2014). In the Tar River system, the species has been documented from the mainstem of the Tar River and a few of its tributaries, Shocco Creek, Fishing Creek, Little Fishing Creek, Sandy-Swift Creek, and Chicod Creek, although it likely occurred throughout much of the Tar River basin prior to settlement of the area during the 1700s (USFWS 1992; NCWRC 2018). In the Neuse River system, the species has been documented from the mainstem of the Neuse River and one tributary, the Little River, although it is likely the species historically inhabited many waterways throughout the basin (NCWRC 2018).

Although there have been discoveries of additional occurrences of the Tar River Spiny mussel since the species was listed as endangered in 1985, the species continues to have a very fragmented, relict distribution and available trend information indicates that the species is rapidly declining throughout its range (USFWS 2014, NCWRC 2018). Based on available survey data, all extant sub-populations¹ are extremely small in numbers and the mainstem Tar River, Chicod Creek, and the mainstem Neuse River sub-population may possibly be extirpated, though additional surveys are needed to confirm status. Surveys in Sandy-Swift Creek have also shown dramatic declines in numbers, and intensive survey efforts are needed to determine whether the species continues to persist. Intensive surveys over the past 5 years (2013-2018) in the Little River (Neuse) have only observed two live individuals. Although a very low level of successful reproduction may be occurring in the Fishing Creek sub-population, all of the surviving sub-populations appear to be well below self-maintenance levels. Because of these extremely low population levels, the proximity of males and females may be limiting their reproductive success, especially as evidenced by the extremely low numbers of individuals found and their patchy distribution; all surviving sub-populations are isolated from one another and restricted to short stream reaches.

As suggested in the revised recovery plan (USFWS 1992), several recovery tasks from the narrative outline have been accomplished. Over the past 11 years (2007 to present), NCWRC and USFWS have partnered with North Carolina State University to conduct a series of experiments investigating the life history of Tar River Spiny mussel, including finding gravid females in the wild, collecting individuals for broodstock to begin arking a population at a NCWRC fish hatchery, identifying effective fish hosts, investigating life history characteristics and spawning periods, refining captive propagation and culture techniques, evaluating stream

¹ Populations refer to river basins (e.g., the Tar population and the Neuse population); sub-populations refer to large tributary systems (e.g., Fishing Creek subbasin, Sandy-Swift Creek tributary) or isolated stretches of mainstem rivers (e.g., upper Tar River above Louisburg, lower Tar River below Tarboro). NCWRC refers to “management units” in their Conservation Plan, which are equivalent to sub-populations referred to here (NCWRC 2018).

locations for future augmentation through *in situ* monitoring of caged juveniles, and identifying appropriate habitats for future augmentations (as referenced in NCWRC 2018). Over the past four years (2014-2018), NCWRC, in partnership with the USFWS and others, propagated and released over 30,000 individuals into several sites in Little Fishing Creek, Fishing Creek, and Swift Creek in the Tar River Basin. Live recapture rates have been between 20-35%, evidence of gravidity is between 26-47% at select sites (NCWRC 2018, and email from T.Fox (former NCWRC), June 2018), and mean growth of recaptured individuals since release was 1.04 mm (0.04 in) (SD=0.7 mm) (NCWRC 2018). Additional monitoring for several years of these initial augmentations is needed to determine success, but preliminary results suggest that stocking propagated individuals of Tar River Spiny mussel into the best available habitat has the potential to bolster dwindling populations and assist in the recovery of the species.

All surviving populations of Tar River Spiny mussel are under significant and increasing threat of extirpation from existing and likely future land use activities (USFWS 2014). Once extirpated, opportunities for populations to reestablish through natural recolonization do not appear to be possible. Attempts to propagate and augment/reintroduce the species to remaining suitable habitats within the historical range appear to be the best tool to improve population resiliency and increase redundancy for the species. Nevertheless, due to the threats from habitat destruction and modification, inadequacy of existing regulatory mechanisms, small population size, and effects of severe weather events (e.g., drought and flooding), the Tar River Spiny mussel continues to meet the definition of endangered under the ESA (USFWS 2014).

The revised recovery plan (USFWS 1992) did not incorporate delisting criteria however it did have measurable criteria to reclassify the species to a threatened status. We built upon the existing downlisting criteria to establish delisting criteria that focus on building redundancy, boosting resiliency, fostering adaptive potential, and managing threats to provide a new path to recovery for the Tar River Spiny mussel.

AMENDED RECOVERY CRITERIA

Recovery criteria serve as objective, measurable guidelines to assist in determining when an endangered species has recovered to the point that it may be downlisted to threatened, or that the protections afforded by the Act are no longer necessary and the Tar River Spiny mussel may be delisted. Delisting is the removal of a species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Downlisting is the reclassification of a species from an endangered species to a threatened species. The term “endangered species” means any species (species, sub-species, or DPS) which is in danger of extinction throughout all or a significant portion of its range. The term “threatened species” means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Revisions to the Lists, including delisting or downlisting a species, must reflect determinations made in accordance with sections 4(a)(1) and 4(b) of the Act. Section 4(a)(1) requires that the Secretary determine whether a species is an endangered species or threatened species (or not) because of threats to the species. Section 4(b) of the Act requires that the determination be made “solely on the basis of the best scientific and commercial data available.” Thus, while recovery

plans provide important guidance to the Service, States, and other partners on methods of minimizing threats to listed species and measurable objectives against which to measure progress towards recovery, they are guidance and not regulatory documents.

Recovery criteria should help indicate when we would anticipate that an analysis of the species' status under section 4(a)(1) would result in a determination that the species is no longer an endangered species or threatened species. A decision to revise the status of or remove a species from the Federal Lists of Endangered and Threatened Wildlife and Plants, however, is ultimately based on an analysis of the best scientific and commercial data then available, regardless of whether that information differs from the recovery plan, which triggers rulemaking. When changing the status of a species, we first propose the action in the *Federal Register* to seek public comment and peer review, followed by a final decision announced in the *Federal Register*.

We provide amended recovery criteria for the Tar River Spinemussel, which will supersede (replace) the existing downlisting criteria (refer to pages 9-10 of the Species Recovery Plan (USFWS 1992)). The recovery criteria below describe recovery of the Tar River Spinemussel, or conditions that, when met, enable the species to be considered for removal from the List of Endangered and Threatened Wildlife (50 CFR 17).

Delisting Recovery Criteria

The Tar River Spinemussel (*Parvaspina (Elliptio) steinstansana*) should be considered for delisting when:

- 1) At least seven (7) sub-populations exhibit a stable or increasing trend, as evidenced by natural recruitment, and multiple age classes. (addresses Factors A and E)
- 2) Spatial distribution of seven (7) sub-populations (as defined in Criterion 1) includes one (1) sub-population in each of the Tar and Neuse river basins, and sub-populations (as defined in Criterion 1) occupy both mainstem and tributary systems. (addresses Factors A and E)
- 3) Threats have been addressed and/or managed to the extent that the species will remain viable into the foreseeable future. (addresses Factors A, D, and E)

Justification

Criterion #1 addresses the number (i.e., redundancy) and resiliency of sub-populations needed in order to delist the species. Resiliency refers to wild, naturally reproducing, self-sustaining sub-populations that maintain sufficient genetic variation (i.e., representation) to evolve, and can respond to stochastic events without human intervention. Resilient sub-populations are expected to be large and genetically diverse, including multiple age classes with at least one cohort ≤ 2 years of age, and recruit at sufficient rates to maintain or increase population size. The number of sub-populations needed for delisting is seven (7), which increases the number mentioned in downlisting criteria in the revised Recovery Plan (i.e., five (5) "sub"populations) and is consistent with Conservation Objectives 1 and 3b in NCWRC's Conservation Plan (2018) for the species.

Criterion #2 addresses the spatial distribution of the seven (7) sub-populations, requiring one (1) sub-population in each known river basin within the species' range (i.e., representation) and allows flexibility in the location of the remaining sub-populations so as to not prescribe specific locations, but requires occupancy in both mainstem and tributary systems (i.e., resiliency and redundancy) within the species' range, thus enabling the Tar River Spiny mussel to withstand catastrophic events and adapt to changing environmental conditions.

Criterion #3 ensures that threats (specifically those related to habitat destruction, inadequacy of regulatory mechanisms, and other natural/manmade factors) are addressed or managed, thus enabling populations to become stable and to contribute to the viability of the species into the future.

Rationale for Amended Recovery Criteria

The largest threats to the Tar River Spiny mussel are water quality and habitat degradation from siltation, runoff, and agriculture/municipal/industrial discharges (USFWS 1992, 2014). To date, several partners, including local land trusts and the NCWRC, are identifying and protecting suitable habitats within both the Neuse and Tar river basins with the intent to support Tar River Spiny mussel into the future. The Upper Tar Collaboration has a mission "to provide expertise towards conserving healthy aquatic ecosystems/clean water so that information-sharing, planning, and prioritization of conservation strategies occur that will help partners to implement targeted and effective conservation actions to ultimately lead to the recovery of federally and state listed endangered species and prevent the listing of species in the future." The USFWS is working with partners in both the Tar and Neuse river basins to protect remaining suitable habitats and to improve and restore potentially suitable habitats to be inhabited by the Tar River Spiny mussel.

The revised Recovery Plan for the Tar River Spiny mussel states that "delisting may be possible if existing populations are secure, new populations are reestablished, and all populations are protected and exhibit long-term stability" (USFWS 1992). The proposed recovery criteria in this amendment reflect the best available and most up-to-date information on the Tar River Spiny mussel. Since the Neuse River population is on the verge of extirpation, and the existing sub-populations in the Tar River Basin are isolated and have very few individuals, the establishment of a minimum of seven (7) resilient sub-populations distributed in both the Neuse and Tar river basins is a crucial step towards the recovery of this species. By building on advances made in captive propagation techniques and capacity, continuing to identify suitable habitat for augmentations and reintroductions, and monitoring for success, we expect the species to reach a point where persistence into the foreseeable future will be possible. We will work together with NCWRC and other partners to strategically and efficiently implement the new criteria, with the ultimate goal of recovery for the Tar River Spiny mussel.

LITERATURE CITED

North Carolina Wildlife Resources Commission (NCWRC). 2018. North Carolina Conservation Plan for Five Rare Aquatic Species Restricted to the Neuse and Tar-Pamlico River

basins: Dwarf Wedgemussel (*Alasmidonta heterodon*), Yellow Lance (*Elliptio lanceolata*), Tar River Spinemussel (*Parvaspina steinstansana*), Carolina Madtom (*Noturus furiosus*), and Neuse River Waterdog (*Necturus lewisi*). Raleigh, North Carolina.

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