Recovery Plan for the Threatened Orange-nacre Mucket (*Hamiota perovalis*)
https://ecos.fws.gov/docs/recovery_plan/001117.pdf

Original Approved: November 17, 2000
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We have identified the best available information that indicates the need to amend the recovery criteria for the orange-nacre mucket. The existing criteria in the recovery plan, *Recovery Plan for Mobile River Basin Aquatic Ecosystem* (USFWS 2000), does not meet the requirements of Section 4(f)(1)(B)(ii) of the Endangered Species Act. In this proposed modification, we show amended recovery criteria and the rationale supporting the proposed recovery plan modification. The proposed modification would supplement the recovery plan, superseding the information under the "Recovery Objective and Criteria" heading on page 55. Recovery plans are a non-regulatory document that provide guidance on how best to help recover species.

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

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METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

The proposed amendments to the recovery criteria were developed using the most recent and best available information for the species. The lead biologist gathered the information and notified conservation partners of the Service's process to complete this amendment. Ultimately, biologists and managers in the Alabama Ecological Services Field Office developed the amended recovery criteria for the orange-nacre mucket.

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

The current recovery plan (https://ecos.fws.gov/docs/recovery_plan/001117.pdf) (USFWS 2000) does not provide recovery criteria, but it does outline recovery objectives, see page 55.

Synthesis

The Service listed the orange-nacre mucket (then considered *Lampsilis perovalis*) as threatened in 1993 due to habitat modification, sedimentation, eutrophication, and water quality degradation (58 FR 14339). The Service designated critical habitat for the orange-nacre mucket in 2004 (69 FR 40084). Currently, the species is threatened by habitat modification, sedimentation, degradation of water quality, impoundment by dams, operation of lock and dams, redirection of flow (Factor A); lack of adequate enforcement of existing Federal or State regulations prohibiting take (Factor D); and fragmentation of populations leading to genetic diversity loss (Factor E) (58 FR 14330).

The orange-nacre mucket was historically known from the Alabama, Tombigbee, Black Warrior, and Cahaba Rivers and their tributaries in Alabama and Mississippi. With the exception of the Cahaba River, the species has disappeared from these sub-basin mainstems but persists in their tributaries. For more specific location information refer to the most recent 5-year review (USFWS 2008) (https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=F01S).

The range of the orange-nacre mucket has been extended since listing. However, the newly discovered populations are small and the range remains highly fragmented and restricted with known populations isolated from each other. Trend data is generally lacking but is available from the Sipsey Fork (Black Warrior River system) drainage in the Bankhead National Forest, where the most robust population of the species occurs. The species was considered common in this tributary to the Black Warrior River prior to 2000 when it suffered declines due to severe drought. The population has increased since, and continues to be one of the most common mussels in the National Forest Service's monitoring (Moran 2010, 2011, 2012, 2013, 2015, 2016, 2017).

The Mobile River Basin Mollusk Restoration Committee, an inter-agency group, has established a framework for propagation and reintroduction of freshwater mollusks in the Mobile River Basin (MRBMRC 2010). In 2012, the Alabama Aquatic Biodiversity Center (AABC) successfully reintroduced orange-nacre mucket into Tallatchee Creek, a tributary to the Alabama River (Johnson 2012). Follow-up monitoring in 2013, 2014, and 2016 has found multiple tagged individuals (original release), including gravid females (Johnson 2018). In 2014 and 2015, AABC stocked orange-nacre mucket into multiple sites in the Locust Fork of the Black Warrior River. As such, we propose the following recovery criteria developed to ensure that orange-nacre mucket has adequate representation and redundancy so that stochastic losses of individual populations no longer threaten the species with extinction.

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 orange-nacre mucket 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 endangered to threatened. 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 tis 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*.

Herein, we provide delisting criteria for the Recovery Plan (USFWS 2000) as the plan did not include measurable delisting criteria at the time of publication.

Amended Recovery Criteria

We are providing recovery criteria for the orange-nacre mucket recovery plan (USFWS 2000). The below recovery criteria describes a recovered species, or a species that should be considered for removal from the Federal Lists of Endangered and Threatened Wildlife and Plants (50 CFR 17).

1. At least eight (8) populations exhibit a stable or increasing trend, evidenced by natural recruitment, and multiple age classes (Factors A and E).

2. At least one (1) population (as defined in Criteria 1) occupies each of the presently occupied sub-basins (Alabama, Cahaba, Black Warrior, and Tombigbee) (as defined in Criterion 1) (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 (Factors A, D, and E).

Justification for Amended Recovery Criteria

Criterion 1: Populations that exhibit a stable or increasing trend, natural recruitment, and multiple age classes demonstrate that the population is secure and will be resilient to habitat

destruction and stochastic events (Factors A and E). For the orange-nacre mucket, it is believed that eight populations exhibiting these traits are necessary to ensure the species will no longer require protection under the Act.

Criterion 2: To ensure that the species will not become threatened with extinction in the foreseeable future, a sufficient number of populations should be distributed throughout its historical range, therefore, we believe it is necessary for the species to occur in Alabama, Cahaba, Black Warrior, and Tombigbee sub-basins as described in Criterion 2. Expanding the species' range into historically occupied river reaches, and in a variety of stream sizes, will increase its resiliency, representation, and redundancy, and reduce threats due to habitat destruction and stochastic events (Factors A and E).

Criterion 3: Abatement of the threats to the orange-nacre mucket will allow populations to become stable and contribute to the viability of the species. The orange-nacre mucket is only known to persist in free-flowing streams. Current State and Federal regulations regarding pollutants are assumed to be protective of native aquatic species; however, some native species may have lower thresholds to some pollutants than the test organisms commonly used in developing the criteria. Eliminating significant sources of sedimentation, avoiding channelization and further dam construction, and adhering to good land management practices that minimize non-point source pollution in these sub-basins, will contribute to the conservation of the species into the foreseeable future (Factors A, D, and E).

Rationale for Amended Recovery Criteria

The Service adopted analysis of Resiliency, Redundancy, and Representation (3Rs) as a means to determine species viability in regards to listing and other regulatory decisions. The amended criteria follow a similar analysis process. All criteria must address and meet the species needs to accomplish the standards under the 3Rs.

Resiliency (as defined in Smith *et al*. 2018) is met through Criteria 1 listed above. The Service believes establishment of a robust population that demonstrates a stable or increasing trend in population numbers, and determining successful recruitment through multiple age classes, the orange-nacre mucket will withstand any stochastic disturbance that may occur into the future.

Redundancy (as defined in Smith *et al*. 2018) is addressed in Criteria 1 and 2. The requirement of eight resilient populations across four occupied sub-basins, as well as, in multiple stream orders will provide the distribution necessary to avoid extinction following any unforeseen catastrophic event. Each of the four sub-basins possess unique land characteristics, annual climate variations, and stream morphology. These variances will shield populations across multiple possible catastrophic events.

Representation (as defined in Smith *et al*. 2018) will be accomplished when all three criteria listed above are accomplished. The species will be distributed across two states, physiographic provinces, and stream orders. This should allow for preservation of genetic exchange into the future between two or more populations, distribution across multiple natural variances in habitat types, and allow for future adaptations to the changing environmental conditions.

Specifically, the stability of eight populations reduces the probability of extinction. Due to the large number of threats to each population that cannot be mitigated, the only way to ensure that the species will not become threatened with extinction in the foreseeable future is to create a sufficient number of populations distributed throughout its historical range, such that the loss of any one population due to unforeseen circumstances does not limit the continued existence of the species. For this reason, we believe that a robust and well developed propagation and reintroduction strategy is necessary for the delisting of this species. We suggest the maintenance and improvement of the existing populations is continued in an effort to establish resiliency. This, along with the establishment of additional populations, will demonstrate that the combination of threats acknowledged in the initial listing are reduced to a degree that is manageable, and that resilient populations can be sustained despite remaining threats.

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