Recovery Plan for: Chipola slabshell (*Elliptio chipolaensis*)

https://ecos.fws.gov/docs/recovery_plan/030930.pdf

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DRAFT AMENDMENT 1

We have identified the best available information that indicates the need to amend recovery criteria for Chipola slabshell (*Elliptio chipolaensis*) since the recovery plan was completed in 2003. 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, and propose the need for additional mussel surveys in the upper reaches of the Chipola River to better quantify the Chipola slabshell population. The proposed modification is shown as an addendum that supplements the recovery plan, superseding only Part II pages 75 - 95 of the recovery plan. Recovery plans are a non-regulatory document that provide guidance on how best to help recover species.

For
U.S. Fish and Wildlife Service
Southeast Region
Panama City, Florida

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METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

The amendment was accomplished by using information obtained from the Recovery Plan (USFWS 2003), 5-Year Review (2007), and unpublished field survey results by Service, State, and other experienced biologists. Ultimately, biologists and managers in the Panama City Ecological Services Field Office developed the amended recovery criteria for the Chipola slabshell using the best available information.

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 in 7 Mussel Recovery Plan 2003 Part II pages 75 – 95 (https://ecos.fws.gov/docs/recovery_plan/030930.pdf).

Synthesis

Background
The Chipola slabshell is a narrow ranging freshwater mussel species that is endemic to the Chipola River system (Alabama and Florida). There is also one historic record from Howards Mill Creek, AL, in the Chattahoochee River system. Van der Schalie (1940) reported that relative abundance of Chipola slabshell has likely always been low, 31 specimens of this species from 6 of 25 sites (24% occupancy rate and an average of 5.2 per site of occurrence). Clench and Turner (1956) considered it to be "rather rare, though it does occur throughout most of the length of the river proper and its smaller tributaries" (USFWS 2003). In 1989, the Chipola slabshell was among six additional freshwater mussels in the Apalachicola-Chattahoochee-Flint (ACF) Rivers considered as potential candidates for listing under ESA protections and was federally listed as a threatened species under the Endangered Species Act (ESA) of 1973, as amended, on March 16, 1998 (63 FR 12664). Critical Habitat for the species was designated November 15, 2007 (72 FR 64286). Currently, the Chipola slabshell "is extant through most of its historical range and is common at some localities" (Williams et al. 2014).

Distribution and Biology
In 1991, the US Geological Survey (USGS) conducted a comprehensive mussel survey in the ACF Basins which included the Chipola Basin using three broad sampling criteria: 1) obtain a thorough and even coverage of the basins; 2) to survey sites where, based on suitable habitat, there was a maximum chance of finding one or more of the target species; and 3) to resurvey as many of the historic sites as possible (USFWS 1998). In the Chipola basin, the USGS surveyed 33 sites in the historical range for the Chipola slabshell during 1991-1993, including 12 out of 16 historical sites. Occupancy rates were 15% (5/33) overall with a 6% (1/12) occupancy rate in historical sites. The number of Chipola slabshell mussels collected during the study averaged ~ 3.7 slabshells per site (USFWS 1998). Between 2005 – present, a series of mussel surveys have been conducted, using both qualitative and quantitative survey methods, in the range of the Chipola slabshell. Of the sites surveyed, 102 reported the presence of the Chipola slabshell with an average of ~ 13 Chipola slabshell mussels per site. In 2006, host fish trials were conducted by Priester (2006) where two potential fish hosts were identified: Bluegill (*Lepomis machrochirus*) and Redbreast Sunfish (*Lepomis auritus*). In this study, both Bluegill and Redbreast Sunfish had transformation rates above 30%, which is indicative of a potential fish host and may indicate that the Chipola slabshell may use both fish species as intermediate host (Priester 2006). These fish are considered widespread and common throughout the range of the Chipola slabshell (Robins et al. 2018).

Threats
The primary constituent elements (PCEs) of the critical habitat for the Chipola slabshell includes: a stream bed that is geomorphically stable, predominantly a sand mix substrate (% fine sand, sand, mud, clay), and permanently flowing water that meets or exceeds aquatic life criteria that protect identified fish hosts (USFWS 2003). In 2009, the Service conducted a basin threats

assessment for the Chipola River and analyzed unpaved road crossings, point sources, and fish passage barriers to identify and reduce sedimentation risks to aquatic life. The Service, along with its partners, have successfully restored more than 5 miles of stream in the Chipola Basin and continue to implement stream restoration projects (i.e. bank stabilization, solar wells, livestock exclusion fencing, riparian restoration, low-water crossings, and reshaping of spring-fed tributaries) to reduce sediment inputs.

In 2013, the Environmental Protection Agency (EPA) released new ammonia criteria that included acute and chronic toxicity testing for 13 freshwater mussels, thus leading to an improved understanding of ammonia toxicity and lower ammonia criteria for freshwater mussels (EPA 2013). In 2016, the Florida Department of Environmental Protection adopted the chronic criteria for ammonia as both the acute and chronic values, therefore lowering the ammonia standard even further for the conservation of freshwater mussels statewide. In addition, the Chipola River is designated as an Outstanding Florida Water (OFW). This OFW designation has even more restrictions on nitrogen contamination and does not allow for deviations from the baseline period set in February 1978 - March 1979, therefore providing stricter ammonia-nitrogen values (USFWS 2017).

Conservation Actions

The principal listing criteria for the Chipola slabshell was identified as habitat modification (increased erosion and turbidity) and contaminants. Reducing threats to water quality and quantity for Chipola slabshell habitat must continue to be addressed and managed in order to maintain a resilient population. Partnerships and programs have had success in restoring and reducing sediment inputs in priority stream reaches that have been identified as highly erodible. The Southeast Aquatic Resource Partnership continues to use the Chipola Basin Threats Assessment to reduce sedimentation in the basin and identify potential barriers to fish passage.

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 Chipola slabshell 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*.

Recovery Criteria

We provide delisting criteria for the Chipola slabshell (*Elliptio chipolaensis*), which will supersede those included in the 7 Mussel Recovery Plan (USFWS 2003), as follows:

(1) The one (1) existing population of Chipola slabshell exhibits a stable or increasing trend, natural recruitment, and multiple age classes. (Factors - A, D, E)

(2) The population (as defined in Criterion 1) occupies each of the three (3) delineated units to protect against extinction from catastrophic events and maintain adaptive potential. (Factors - A, E)
   a. Unit 1 - from the confluence of the Apalachicola River to Dead Lakes and including the Chipola Cutoff.
   b. Unit 2 - the Chipola River mainstem above Dead Lakes upstream to Florida Caverns State Park, Marianna, FL.
   c. Unit 3 - in the Chipola River mainstem above Florida Caverns State Park, FL upstream to the headwater tributaries in Alabama (Big Creek and Cowarts Creek).

(3) Threats have been addressed and/or managed to the extent that the species will remain viable into the foreseeable future. (Factors - A, D, E)

Justification

Criteria 1 – The Recovery Plan (USFWS 2003) states that the Chipola slabshell needs "4 additional sub-populations to meet the recovery objective of 10 sub-populations for a large river", to the then held belief, that 6 sub-populations were established in the Chipola River. Chipola slabshell genetic information is lacking to determine the heterozygosity of the population and sub-population dynamics. The current theory being, the Chipola slabshell is such a narrow range endemic mussel, that there is only one population in existence, which inhabits the entire range of the species. Metrics of stable and/or increasing trends for the population are to be based on comparisons of relative abundance and occupancy rates from surveys taken prior to listing to the post-listing survey data. Natural recruitment and multiple age classes will be determined based on binning individual size measurements into a population age distribution

from post-listing survey data, the symmetry of the distribution curve will be used to examine the metrics of the population.

Criteria 2 - Mussel surveys from post-listing survey data indicate geographic breaks in the population. Based on current knowledge of the host fish preference, the natural breaks of "Dead Lake" and the "Chipola Sink" were used to delineate the Critical Habitat into 3 distinct units. Analysis of the survey data will provide direct comparisons of occupied habitat, relative abundance, increasing trends, and multiple age classes within each unit to determine the resiliency, redundancy, and representation of the overall population.

Criteria 3 – Threats identified include: water quality, water quantity, sedimentation, habitat degradation, and contaminants. Threat abatement through the implementation of numeric water quality criteria, nutrient reduction, stream bank restoration, and contaminant reduction will improve the primary habitat constituents identified increasing the viability of the species into the future.

Rationale for Amended Recovery Criteria

The proposed recovery criteria reflect the best available and most up-to date information on the biology and distribution of the Chipola slabshell. The Chipola slabshell seems to be extant throughout the range and is composed of only one population. The resiliency of the Chipola slabshell to withstand minor stochastic events and effects of environmental variations is affected by the number of representative units that are defined for the basin. We consider identifying three representative units of the Chipola slabshell, based on two natural "breaks" for the population. In general, the units must be long enough, such that stochastic events that affect individual mussel aggregations (or "beds") do not eliminate the entire population. Aggregations must be sufficiently dense and distributed over a contiguous length of stream reach, such that infested fish dispersal allows the population to recover from these events. The two natural breaks that delineate the three Units in the designated Critical Habitat of the Chipola slabshell are Dead Lake and the "natural sink" at Florida Caverns State Park. We delineated the population by examining the dispersal potential of host fishes and potential barriers to dispersal. The host fishes that have been identified are Redbreast sunfish and Bluegill, both are members of the centrachid family (Preister 2006). Although not yet verified in field or laboratory settings, other centrachids such as basses (Micropterus spp.) and warmouth (*Lepomis gulosus*), may also act as a host fish. The identified host fish are ubiquitous throughout the range of the Chipola slabshell and their home ranges are typically restricted (Robbins et. al. 2018). A study of two streams near Oak Ridge, Tennessee that tracked the movement of Bluegill and Redbreast sunfish showed very little movement, < 100 m (328 ft.) for two thirds of all tagged fish sampled quarterly over a three-year period (Gatz and Adams 1994).

With a restricted home range of the host fish, moving from downstream to upstream, the first natural break is Dead Lake. Dead Lake is the result of a low-head dam that was removed in 1987. Recent mussel surveys in Dead Lake by the Service (2014-2018) have documented very low or absent mussel fauna in Dead Lake and there is a distance of 4.8-6.4 km (3-4 miles) between suitable mussel survey sites that support mussel fauna (USFWS 2015). The lack of

mussel fauna can be attributed to the accumulation of organic debris and detritus that is unstable habitat for freshwater mussels, which is not conducive to "the primary habitat requirement of a stable environment" (Hagg 2012). Although there is not a fish passage barrier preventing host fish movement, the result of the unstable habitat in Dead Lake could prevent colonization of mussel fauna from recently transformed Chipola slabshells, that were shed from host fish dispersal in Dead Lake. Therefore, Dead Lake creates a natural break between Unit 1 and Unit 2.

Continuing upstream from Dead Lake, the second natural break is the sink of the Chipola River. Upstream from Marianna, FL is Florida Caverns State Park. There is a natural sink where the Chipola River disappears underground for 0.4 km (¼ mile) and re-appears to form the main stem Chipola River. During high flows the Chipola River can overwhelm the sink and inundate the floodplain, which may disperse host fish from upstream to downstream habitats. However, it is unlikely that host fish that have restricted home ranges would travel through underground caverns to disperse mussels. Therefore, the limited dispersal ability of the identified host fish from upstream of the sink delineates Unit 2 and Unit 3.

Due to the restricted home range of the identified host fish, one population for the Chipola slabshell is delineated into three Units to account for the two natural breaks (Dead Lake and Chipola "sink") in their distribution. In each of the three delineated units, metrics of: occupancy rates, relative abundance per site, distance between occupied reaches, as well as some combination of natural recruitment, and/or multiple age classes over time indicating a stable or increasing trend, shall represent resilient, redundant, and representation attributes. With these criteria, we expect the species to colonize and persist well into the foreseeable future in the face of stochastic events, thus increasing the species viability.

ADDITIONAL SITE SPECIFIC RECOVERY ACTIONS

1) Mussel surveys upstream of Florida Caverns State Park to the headwaters of the Chipola River (Unit 3) are needed to determine the overall size and distribution of the Chipola slabshell population. In 2007, Big Creek and Cowarts Creek, in Alabama, Garner et al. (2009), reported the Chipola slabshell from each creek, extending the upstream range 24 km (14.9 miles) from the lower most known location in Big Creek, AL. Since there are only limited surveys from these headwater tributaries (Unit 3), we recommend a more comprehensive assessment to better define the overall population. Surveys should be conducted during lower flow conditions allowing for greater visibility and working conditions.
2) Genetic information from individuals of Chipola slabshell from the three units are needed to determine the heterozygosity of the population, allowing for additional assurance of viability over time. Additionally, genetic information collected can be used to address genetic inter-variability among sympatric species, such as *Elliptio nigella.*

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