

U.S. Fish and Wildlife Service

Revised Recovery Plan for the

Amber Darter (*Percina antesella*)



Photo from video by Todd Crail

Prepared by:

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For:
Department of the Interior
South Atlantic-Gulf Region

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DISCLAIMER

Recovery plans delineate reasonable actions that are believed necessary to recover and/or protect the species. Plans are prepared by the U.S. Fish and Wildlife Service (Service), sometimes with the assistance of recovery teams, contractors, State agencies, and others. Plans are reviewed by the public and subject to additional peer review before they are adopted by the Service. Objectives will only be attained and funds expended contingent upon appropriations, priorities, and other budgetary constraints. Recovery plans do not obligate other parties to undertake specific tasks. Recovery plans represent the official position of the Service only after they have been signed by the Regional Director; they do not necessarily represent the views or the official positions or approval of other individuals or agencies involved in the plan formulation. Approved recovery plans are subject to modification as dictated by new findings, changes in species' status, and completion of recovery tasks. Copies of all documents reviewed in development of the plan are available in the administrative record, located at the Service's Georgia Ecological Services Field Office, Athens, Georgia.

Approved: _____


Regional Director, DOI South Atlantic-Gulf Region, U.S. Fish and Wildlife Service

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Recovery Plan for Amber Darter (*Percina antesella*)

This recovery plan describes criteria for determining when the amber darter should be considered for removal from the *List of Endangered and Threatened Wildlife* (50 CFR 17.11). It lists specific actions necessary to meet those criteria and estimates the time and cost to implement recovery actions. Brief descriptions of the species' status, habitat requirements, and limiting factors are included. This recovery plan was informed by a Species Status Assessment (SSA) (available online at the US Fish and Wildlife Service Catalog, <https://ecos.fws.gov/ServCat/>). The amber darter recovery implementation schedule (RIS), which is the operational document that details on-the-ground activities for implementing the recovery plan actions, also is posted at ServeCat. The RIS and SSA will be updated on a routine basis. This trio of documents replaces the 1986 recovery plan for the species.

CURRENT SPECIES STATUS

The US Fish and Wildlife Service (Service) listed the amber darter as endangered and identified critical habitat in the Conasauga River on August 5, 1985 (50 FR 31597). The fish occurs in a 33.5-mile (53.9 km) reach of the Conasauga River, Georgia and Tennessee, and a 28-mile (45.1 km) reach of the Etowah River, Georgia; these two populations are isolated from each other by Lake Allatoona on the Etowah River. Multivariate autoregressive state-space analysis, which provides estimates of long-term growth rates, estimated that amber darters had declined approximately 12% annually in the Conasauga and 9% annually in the Etowah over the past two decades (Stowe et al. 2019). Viability models suggest that, at current rates of decline, amber darters would be effectively undetectable between 2021-2032 in the Conasauga and 2030-2047 in the Etowah, with extirpation likely shortly thereafter (Edward Sage Stowe, UGA, and Mary Freeman, USGS, pers. comm., November 2018). Shoal occupancy has declined in the Conasauga, and fish in both systems have been extirpated or greatly reduced in abundance in downstream reaches within the historic range (CCR Environmental, Inc. 2016, Freeman et al. 2017, Bumpers et al. 2018)

HABITAT REQUIREMENTS AND LIMITING FACTORS

Amber darters generally are found in the rivers' mainstems, preferring shoals with a moveable gravel/small cobble substrate and moderate to swift currents (Freeman and Freeman 1994). The presence of clean moveable gravel and high water quality in shoal habitat appears to be highly important in determining distribution. Amber darters forage primarily on snails, limpets, and aquatic insects (Etnier and Starnes 1993, Freeman and Freeman 1994).

The original amber darter recovery plan was published in June 1986 (USFWS 1986), when the Etowah River population was thought to be extremely small or extirpated. Primary threats identified in the 1986 plan included siltation, proposed Corps' reservoir construction on the river's mainstem, catastrophic events, increased silviculture, road and bridge construction, stream channel modification, and land use changes. Research over the past 30+ years has identified current stressors likely are (1) habitat/water quality degradation associated with agriculture and urbanization that increases levels of sediment, nutrients, estrogens, and herbicides in the river (Wenger and Freeman 2007, Baker et al. 2013, Freeman et al. 2015, Lasier et al. 2016), (2) loss of riparian buffers, (3) decline in *Podostemum*, (4) natural demographic, environmental, and genetic stochastic events that affect small populations with limited geographic range (Purvis et al. 2000), and (5) climate change.

RECOVERY STRATEGY

The primary strategies for recovery of the amber darter are to (1) increase population numbers and distribution across the species' historic ranges in the Etowah and Conasauga River systems, (2) reduce priority anthropogenic stressors on the two populations, (3) conserve genetic and morphological diversity of the species, and (4) emphasize voluntary stewardship practices by citizens in the Conasauga and Etowah watersheds. To achieve this, the Service and conservation partners [e.g., Georgia Department of Natural Resources, The Nature Conservancy, Natural Resource Conservation Service (NRCS), University of Georgia, US Geological Survey (USGS), Limestone Valley RC&D, Georgia-Alabama Land Trust, Conservation Fisheries, Inc., the Tennessee Aquarium, Conasauga River Alliance, U.S. Army Corps of Engineers (Corps), U.S. Forest Service, et al.] will continue to work with private landowners and Federal/state/local governments to implement measures to conserve the species. Available conservation programs include NRCS' Working Lands for Wildlife-Conasauga, the Corps' Clean Water Act 404 mitigation program, National Fish and Wildlife Foundation and Environmental Protection Agency Section 319 grants, the Service's Partners for Fish and Wildlife Program, NRCS' Farm Bill and Regional Conservation Partnership Programs, and other programs. Partners need to better coordinate with state agencies in both Tennessee and Georgia to ensure protective measures and best management practices to minimize sediment and nutrient transport, erosion, and stormwater runoff are implemented to protect water quality within the amber darter range. The Service must also work with conservation partners to inform local governments and the public about the amber darter, the value of its habitat to the community (e.g., recreation, drinking water, tourism), and conservation measures to conserve the species.

Management actions that improve stormwater management BMPs or reduce transport of agricultural nutrients and chemicals from farmland to stream systems, as well as other best management practices to reduce stressor impact, may need to be developed/adapted to improve water and habitat quality. Ongoing fish monitoring programs at established survey stations in both rivers should continue to track the species' status, and further research is needed to address information gaps related to amber darter demographics, life history, and threat sensitivity. Partners need to prioritize parcels to be targeted for conservation/restoration, determine management actions to best address stressors on priority parcels, and, with landowner approval, implement those actions and monitor results. Environmental outreach and education is needed to promote public awareness of rare species and their threats in these river basins. Captive propagation and release of offspring may be necessary if populations continue to decline before management actions are implemented at a scale that sufficiently restores habitat and water quality within the species range.

CRITERIA FOR DELISTING

All criteria address listing factors A, D, and E. As new information becomes available, criteria will be reevaluated.

1. Two stable, self-sustaining populations exist in both the Conasauga and Etowah Rivers, as evidenced by population trends over multiple spawning cycles.
2. Eighty percent of shoals within the species' historic range in each river system are consistently occupied by the species.
3. Key water quality standards are met such that the species will remain viable, based on Population Viability Analysis (PVA) or other scientifically-defensible evaluation methods, for the foreseeable future.
4. Amber darters are protected from habitat threats and/or managed such that the species will remain viable, based on PVA or other scientifically-defensible evaluation methods, for the foreseeable future.

JUSTIFICATION FOR RECOVERY CRITERIA

1. Criterion 1: A stable, self-sustaining population trend in both river systems, observed during biennial surveys over a 20-year time frame, would indicate that recruitment of young is equaling or outpacing adult mortality and the species is recovering.
2. Criterion 2: Recolonization of historically-occupied habitat in the Conasauga and Etowah (e.g., adults are collected at 80% of shoals in the species' historic range in at least 4 of 6 biennial surveys including the two most recent surveys) would increase the species' resilience to some stochastic and/or catastrophic events.
3. Criterion 3: Poor water quality, particularly sediment in the Etowah and nutrients in the Conasauga, is one of the main threats to this fish.
4. Criterion 4: Reduction of threats should increase survival and recruitment, thereby increasing resilience.

ACTIONS NEEDED

The recovery actions identified in the table below are those we believe are necessary to recover the amber darter, based on the best available science.

Recovery Action	Estimated Cost	Priority Number
1. Implement management actions and encourage best management practices to improve water quality in both the Conasauga and Etowah River mainstems. This action may include retrofitting existing stormwater networks, working with farmers to reshape agricultural ditches or create pocket wetlands to serve as stormwater treatment areas, and other measures to improve water quality in runoff before it is discharged into receiving waters.	\$25,000,000	1
2. Work with local/county/state governments to develop and implement ordinances regulating stormwater management and earth-moving activities, establishing stormwater utility fee programs, and other actions to address urban stressors on aquatic systems.	\$300,000	1
3. Protect (and restore, if needed) key parcels via land acquisition, conservation agreements, and conservation easements in both basins. Promote voluntary stewardship to reduce non-point pollution and habitat improvement.	\$100,000,000	1
4. Implement a biennial fish monitoring program at the 13 Conasauga shoals and 16 Etowah shoals where long-term monitoring has been conducted to determine population and habitat trends as management actions are implemented. Monitoring should continue until recovery criteria are met; monitoring methodology should allow future PVA or other scientifically-defensible evaluation methods. Additional monitoring post-recovery will also be needed.	\$500,000	1
5. Install sensors at USGS gages 02384500 and 02391860 in the Conasauga and Etowah Rivers and monitor real time water quality in each river, focusing on nitrite, phosphorus, turbidity, and water temperature.	\$200,000	1
6. Develop eDNA markers to help evaluate amber darter presence in Conasauga and Etowah tributaries and in the Coosawattee River. Conduct focused surveys at eDNA positive sites to assess abundance and habitat use.	\$150,000	2
7. Conduct research to determine the species' demographics and threat sensitivity to aid recovery efforts for the amber darter.	\$250,000	2

8. Develop, and implement as needed, a propagation plan for the species that provides for an ark population if numbers continue to decline. Reintroduce to former habitat when stressors are identified and eliminated/reduced.	\$100,000	2
9. Increase public awareness through outreach materials, festivals, planned snorkel and canoe/kayak trips, and other methods.	\$25,000	2
10. Modify State and local government policies and regulations to improve protection of the fish and its habitat and enhance enforcement of such policies and regulations.	Costs covered under existing State and Federal programs	2
11. Work with GEPD to develop water quality standards for nitrate and phosphorus in north Georgia free-flowing streams.		3
12. Coordinate all activities and conduct periodic review of recovery progress and strategy		3
Total Estimated Cost: \$126,525,000		

¹Recovery actions are assigned numerical priorities to highlight the relative contribution they may make toward species recovery (48 FR 43098):

Priority 1 - An action that must be taken to prevent extinction or to prevent the species from declining irreversibly.

Priority 2 - An action that must be taken to prevent a significant decline in species population/habitat quality or some other significant negative impact short of extinction.

Priority 3 - All other actions necessary to provide for full recovery of the species.

ESTIMATED COST TO DELIST:

The cost to recover and ultimately delist the amber darter is estimated to be \$126,525,000. Costs will be considerably less if landowners are amenable to easements and conservation agreements to conserve the fish, rather than land purchase and if NRCS Farm Bill and other funds can be applied to improve water quality of runoff from agricultural lands in the basins. Some costs are not determinable at this time. Twelve other fish and mussel species listed as endangered or threatened occur in these two basins, including five species that are either endemic to the basins or have been extirpated from all historic range except the basins. Recovery actions above will benefit these species.

DATE OF DELISTING

If all actions are fully funded and implemented, in a timely manner, as outlined, including full cooperation of all partners needed to achieve recovery, we anticipate that recovery criteria for delisting could be met by 2050. As we learn more about this species and its threats and recovery actions are implemented and funded with close cooperation of all partners, we will carefully monitor and assess progress toward recovery to ensure we are on track.

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