Common Name: ETOWAH DARTER

Scientific Name: *Etheostoma etowahae*

Other Commonly Used Names: none

Previously Used Scientific Names: none

Family: Percidae

Rarity Ranks: G1/S1

State Legal Status: Endangered

Federal Legal Status: Endangered

Description: Reaching a maximum total length of approximately 70 mm (2.8 in), the Etowah darter has a compressed body with eight broad blotches marking the dorsum and up to 11 indistinct dark bars along the sides. Males have brilliant red bands in the dorsal and caudal fins, and bluish coloration on the lower sides of the head and on the pectoral, pelvic and anal fins.

Similar Species: Etowah darters are currently indistinguishable from the closely related greenbreast darter (*E. jordani*), barring genetic analysis. It was once thought the two species could be identified based on the presence of red spots along the body, but this character does not hold, as both greenbreast and Etowah darters may have red spots. A meristic analysis of the two species did not find consistent differences in scale counts (i.e., lateral line, transverse scale rows and caudal peduncle scale rows), though scale counts for Etowah darters tend to be lower than for greenbreast darters. At present, genetic analysis is the only means of distinguishing Etowah and greenbreast darters that co-occur in portions of the lower Etowah watershed where they likely hybridize. Etowah darters are also similar to the lipstick darter (*E. chuckwachatte*), but do not have orange color on their lips during the spawning season. These two species do not co-occur.

Habitat: The Etowah darter typically occurs in swift riffle habitat over cobble and gravel substrata.

Diet: Aquatic invertebrates.

Life History: Etowah darters spawn from May to mid-August within the upper Etowah River at water temperatures between 16-23^{o}C. Etowah darters spawn in moderate to swiftly flowing areas of coarse sand or fine gravel interspersed with or protected by larger gravel and cobble. Females appear to choose a suitable spawning site while a male may follow or chase her. There are numerous acts of aggression during the courtship towards other females or males that may attempt to cut in. If a second female comes along that is ready to spawn, she may be chased away by the first female, or the male may chose to leave the first female to couple with the second. In addition to the commonly observed male-on-male aggressive chasing behavior, male Etowah darters have been observed biting the tail of another rival male; at times two males may be locked together, each with the other's tail in his own mouth. When the female is ready to spawn she dives rostrum-first into the sand, partially burying herself. The male mounts the female, quivering as they push into sand stirring up the sediment. The female may remain in place partially buried for several minutes after the male leaves. The courtship and spawning behavior may continue, with multiple spawns occurring in the same general area.

Survey Recommendations: Etowah darters can be collected with a seine or observed while snorkeling.

Range: The Etowah darter occurs only in the Etowah River system in Georgia. Once thought to be restricted to the upper Etowah (upstream from Allatoona Reservoir), recent work has shown that Etowah darters also occur in the lower portion of the basin (downstream of Allatoona dam), where they co-occur with the closely related greenbreast darter. Etowah darters have been collected in the lower Etowah mainstem and in Raccoon Creek, a tributary to the lower Etowah River. In the upper Etowah, Etowah darters occur in the mainstem and some of its larger tributaries, including Long Swamp Creek, Amicalola Creek, and Shoal Creek (Dawson County). Etowah darters also occur in Stamp Creek, a tributary to Allatoona Reservoir. Check the Fishes of Georgia Webpage for a watershed-level distribution map.

Threats: The Etowah darter is particularly vulnerable to habitat loss because of its narrow distribution, which is restricted to a geographic area currently experiencing rapid urban and suburban development as the metro-Atlanta area expands. Land disturbance associated with commercial development, and home and road construction threatens to degrade river and stream habitat by accelerating the runoff of sediment and contaminants. Increased impervious surface cover results in flashy storm events that can scour stream channels, alter the water temperature regime, accelerate delivery of contaminants, and lower baseflows during non-runoff periods. Lowering of baseflow conditions may be a significant threat to the Etowah darter and other species that depend on swiftly-flowing, sediment-free riffles to complete their life cycle. Water-supply development threatens

Etowah darter habitat directly, but the operation of reservoirs may also pose a threat to the species if water flow and thermal regimes in main channel habitats are significantly altered.

Georgia Conservation Status: Etowah darters currently appear to have a relatively stable population in the upper Etowah River, where they are encountered during annual surveys. They may be locally abundant in some places they occur, despite their limited range within the Etowah system. Much less is known about their abundance and population status in the Raccoon Creek system and in the lower Etowah River, where they co-occur and hybridize with the greenbreast darter. The lower Etowah River has a dramatically altered flow and temperature regime, due the operation of the Allatoona Reservoir. The discovery of a population of Etowah darters in this reach is significant, as this population could potentially be enhanced if conditions improve there.

Conservation and Management Recommendations: Conserving the Etowah darter and other unique aquatic resources of the Etowah River depends on maintaining habitat quality upstream from Allatoona Reservoir, and ultimately on improving habitat and water quality in the lower portion of the river. Eliminating runoff of upland sediment from land-disturbing activities, such as roadway and housing construction, and runoff of contaminants, such as fertilizers, pesticides, heavy metals, and surfactants is critical to protecting aquatic resources. Forested buffers should be maintained along stream banks to aid in protecting water quality. Stream buffers are essential, but offer inadequate water quality protection where surface runoff is directed to bypass buffered areas, (e.g., where stormwater or other surface drains are in place to accelerate upland runoff to streams). Protecting riverine habitat quality will require the maintenance of natural patterns of stream flow by minimizing water withdrawals, new impoundments, and impervious cover. The Etowah darter and other fishes that similarly depend on riffle habitats are especially vulnerable to streamflow depletion because habitats with swift currents are diminished at low flows. Technical guidance on how to minimize the impacts of development on sensitive fishes is available through the Etowah HCP website.

Selected References:

Anderson, G. B. 2009. Confronting incomplete detection to address questions about distribution and reproductive season for four imperiled stream fishes. Master of Science thesis, University of Georgia, Athens. 94pp.

Lee, S. L., C. R. Gilbert, C. H. Hocutt, R. E. Jenkins, D. E. McAllister, and J. R.Stauffer. 1980. Atlas of North American fishes. North Carolina State Mus. Nat. Hist. 867pp.

Mettee, M. F., P. E. O'Neil and J. M. Pierson. 1996. Fishes of Alabama and the Mobile Basin. Oxmoor House, Birmingham. 820pp.

Page, L. M. and B. M. Burr. 1991. A field guide to freshwater fishes of North America north of Mexico. Houghton Mifflin, Boston. 432pp.

Ritchea, S. B. 2002. Genetic population structure of the federally endangered Etowah darter, *Etheostoma etowahae*. Master of Science thesis, Duquesne University, Pittsburgh. 139pp.

U.S. Fish and Wildlife Service. 1993. Endangered and threatened wildlife and plants: proposed threatened status for the Cherokee darter and proposed endangered status for the Etowah darter. 1993. Pages 53695-53702 in Federal Register. Vol. 58(199). 58(199).

Wood, R. M. and R. L. Mayden. 1993. Systematics of the *Etheostoma jordani* species group (Teleostei: Percidae), with descriptions of three new species. Bull. Alabama Mus. Nat. Hist. 16: 31-46.

Author of Account: Byron J. Freeman and Megan Hagler

Date Compiled or Updated:
B. Freeman, 1999: original account
K. Owers, Jan 2009: Added picture, updated status and ranks, added fish atlas link, converted to new format, minor edits to text
M. Hagler, July 2009: general update of entire account.
Z. Abouhamdan, April 2016: updated links