Etheostoma spectabile Agassiz — Orangethroat Darter

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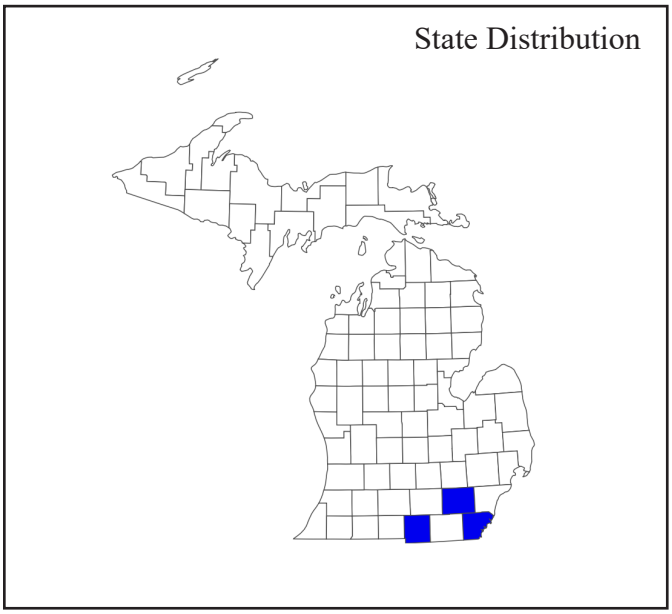

Best Survey Period

Status: State threatened

Global and State Rank: G5 (Secure) / S1 (Critically Imperiled)

Family: Percidae (perchers, darters, and allies)

Synonyms: *Poecilichthys spectabilis* (Agassiz)

Total Range: The orangethroat darter is found in the Lake Erie and Mississippi River basins, occurring north to Michigan, east to Ohio and Tennessee, south to Texas, and west to Wyoming (Hubbs and Lagler 1958, Latta 2005, NatureServe 2025). This species is considered Secure (S5) or Apparently Secure (S4) throughout much of its range, but is Vulnerable (S3) in Colorado, Imperiled (S2) in Iowa, and Critically Imperiled (S1) in Michigan and Wyoming. Its status has yet to be assessed in Missouri and Oklahoma (NatureServe 2025).

State Distribution: This species is only known to occur in the southeast corner of the state in the Lake Erie drainage (Latta 2005, MNFI 2025). It is currently known from relatively few sites, with only 22 element occurrences documented in Hillsdale, Monroe, and Washtenaw counties (MNFI 2025). Most of these occurrences are restricted to the Raisin watershed, with scattered occurrences present in the Huron, St. Joseph, and Ottawa-Stony watersheds (Smith et al. 1981, Latta 2005, MNFI 2025). Only four of these occurrences are considered extant, with extant populations restricted to the South Branch of Macon Creek, Ten Mile Creek, and two tributaries of the Saline River. Of these, only Macon Creek contains populations observed within the last 25 years (MNFI 2025).

Recognition: The orangethroat darter is a small, slender fish reaching a maximum length of approximately 8 cm (3 in) (Smith 1979, Trautman 1981, Page et al. 1996). It is yellow-olive to brown in color with 6-11 dark green dorsal saddles, dark blue vertical bars, and dark horizontal bars or streaks on the sides of the body (Pflieger 1975, Page et al. 1996). There are two dorsal fins, the first of which contains 10-11 spines (rarely 9 or 12), and a two-spined anal fin. In males, the first dorsal fin is red and blue, the second is mostly orange with blue at the base, and the anal fin is blue, green, or clear. In females, the fins are mostly clear and may possess light brown bands (Page et al. 1996). Breeding males are vibrantly colored with blue-green bars separated by orange to brick-red blotches, an orange throat, and a bright blue-green anal fin (Pflieger 1975, Smith 1979, Page et al. 1996). In Michigan, this species is most similar to the closely related rainbow darter (*Etheostoma caeruleum*). While the rainbow darter has 13-15 pectoral rays and a red color on the anal fin of breeding males, the orangethroat darter has 12 or fewer pectoral rays and lacks red on the anal fin of breeding males (Pflieger 1975, Smith

Michigan Natural Features Inventory
Phone: (517) 284-6200 Email: mnfi@msu.edu
Website: mnfi.anr.msu.edu

1979, Page et al. 1996).

Best Survey Time: Orangethroat darter have been detected in Michigan from late March to late October (MNFI 2025). Surveys in the shallow streams preferred by this species are best conducted during low-flow conditions in summer and fall, beginning in early July (Shipman 2001). Periods of high flow and high turbidity should be avoided, and sampling during the spawning season (March to early June) should be avoided to minimize impacts.

Habitat: Orangethroat darter are found in small creeks and streams, preferring sand and gravel riffles with slow to moderate currents (Hubbs and Lagler 1958, Pfleiger 1975, Trautman 1981, Latta 2005, MNFI 2025). This species demonstrates some tolerance to turbidity but is most abundant in clear streams (Pfleiger 1975). Individuals seem to avoid larger streams with deeper waters and faster currents and are often replaced by the closely related rainbow darter (*Etheostoma caeruleum*) in these habitats (Pfleiger 1975, Trautman 1981). Habitat use appears to vary seasonally, with deeper runs and pools supporting higher densities than riffles during the winter (Musselman and Brewer 2009).

Biology: Spawning occurs from March to early June in the Midwest and begins with males congregating on clear riffles with fine gravel substrates. When ready to spawn, a female enters the riffle and partially buries herself in the gravel. The male establishes a territory around the female, positions himself just above her, and fertilizes the eggs as they are laid (Smith 1979, Page et al. 1996). Eggs hatch in 9-10 days (Pfleiger 1975, Smith 1979, Page et al. 1996) and after hatching the young drift downstream into pools where they feed mainly on small insects and crustaceans (Page et al. 1996). Growth occurs quickly, with juveniles nearing adult size by the fall (Smith 1979) and reaching sexual maturity at one year (Page et al. 1996). As adults, orangethroat darter feed primarily on immature aquatic insects and fish eggs (Page et al. 1996). Males grow larger than females. The average lifespan is 2-3 years, with few individuals surviving to their fourth summer (Pfleiger 1975).

Conservation/Management: This species' reliance on clean, shallow riffles with slow to moderate currents makes them highly susceptible to surrounding land use changes and instream activities that alter water levels, alter water flow, increase siltation, and remove or eliminate riffle habitat. At a minimum, populations in Michigan are impacted by water degradation. Extant populations are largely restricted to the Raisin River drainage, where silt-tolerant species have increased at the expense of clean-water species, with changes in historical fish abundance and distribution attributed to siltation from agricultural runoff and pollution from municipalities (Smith et al. 1981). These populations likely face continued threats from siltation, as land use surrounding occupied stream reaches consists almost exclusively of cultivated crops (USGS 2024). Increased siltation resulted in decreased abundance of orangethroat darter populations in Ohio (Trautman 1981) and negatively impacts fish in multiple ways. Siltation can impact fish indirectly by altering prey availability and reducing substrate heterogeneity, and directly by reducing feeding rates and oxygen acquisition, lowering resistance to disease, causing physical damage to organs, disrupting development, and ultimately reducing survival (Smith et al. 1981, Kemp et al. 2011). Agricultural land cover is also associated with reduced flow stability of southeast Michigan streams (Dianna et al. 2006), which is likely to negatively impact this species given its need for slow to moderate currents. The maintenance, protection, and restoration of vegetated riparian buffers along occupied streams will help to reduce these threats and protect extant populations (Page et al. 1996, Wood and Armitage 1997, Anbumozhi et al. 2005).

This species is especially sensitive to instream activities such as dredging and channelization that reduce or eliminate riffle and pool habitat, increase water depth, and alter natural water flows. In Ohio, stream dredging eliminated pools and increased flow rates over riffles, resulting in decreased abundance of orangethroat darter and an increase in the number of rainbow darter (Trautman 1981). Protecting occupied reaches from instream activities that alter substrate composition and reduce natural habitat heterogeneity is critical to sustaining these populations, and instream habitat restoration should be considered for heavily modified streams that remain occupied.

Research Needs: Targeted surveys are needed throughout the current and historic range of this species in Michigan. Documented occurrences should be revisited to determine if populations persist, particularly those located in Ten Mile Creek and in tributaries of the Saline River. Due to a low level of targeted survey effort for this species there is potential for new occurrences to be found. Estimates of population size and periodic monitoring of occurrences would help to inform conservation strategies for this species, and additional surveys in suitable streams within southeast Michigan would be beneficial.

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