#### Interim Core Map Documentation for Maryland Darter

Posted on EPA's Geoplatform June 2025 Interim core map developed by the Center for Biological Diversity (CBD)<sup>1</sup> Documentation supplemented by EPA's Office of Pesticide Programs

### **Species Summary**

The Maryland Darter (*Etheostoma sellare*; Entity ID #212) is an endangered aquatic rayfinned fish species. This species is endemic to small streams that empty into the Chesapeake Bay near Aberdeen, Maryland. All known observations of the Maryland darter have been within Harford County, Maryland in Deer Creek, Gashey's Run, and Swan Creek. The species is believed to have been extirpated from Swan Creek (Designation of Critical Habitat, 1984). Therefore, the critical habitat consists of sections of Deerk Green and Gashey's Run which have sustained populations of Maryland Darter. There is a designated critical habitat for this species. Additional information is provided in **Appendix 1**.

## **Description of Core Map**

The core map for the Maryland Darter is based on critical habitat. The developer did not find evidence that any key areas for this species exist outside of the designated critical habitat. **Figure 1** depicts the interim core map for the Maryland Darter (green areas on map). The core map represents approximately 28 acres.

The Maryland Darter inhabits small creeks that are prone to shrinking drastically both seasonally and in times of drought, which is captured in the species' designated critical habitat. Landcover categories within the core map area are included in **Table 1**. Landcover within the core map is predominantly developed land and deciduous forest. While the species requires riffles in creeks to survive, only 3% of the core map is represented as open water because of the tiny and ephemeral nature of the creeks where it has been found. Agricultural areas are not located within the critical habitat.

The core map developed for the Maryland Darter is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the Maryland Darter. This core map incorporates information developed by FWS and made available to the public; however, the core map has not been formally reviewed by FWS. This interim core map may be revised in the future to incorporate expert feedback from FWS. This interim core map has a "none" best professional judgment classification because it consists of the species' critical habitat without additions or subtractions. However, the

<sup>&</sup>lt;sup>1</sup> CBD sent EPA the core map for this species before EPA released its mapping process document and example documentation. EPA supplemented the documentation and supporting analysis for consistency with EPA's most recent documentation examples made available after CBD developed this core map

developer did limit the core map only to designated critical habitat based on interpretation of FWS documentation. This core map does not replace or revise any range or designated critical habitat developed by FWS for this species.



Figure 1. Interim core map for the Maryland Darter. Total acreage of core map is approximately 28 acres.

Example pesticide use sites/types	NLCD Class/Value	% Area	Total area for landcover type
Forestry	Deciduous Forest (41)	29%	45%
	Evergreen Forest (42)	16%	
	Mixed Forest (43)	0%	
Agriculture	Pasture/Hay (81)	0%	0%
	Cultivated Crops (82)	0%	
Mosquito adulticide, residential	Open space, developed (21)	20%	49%
	Developed, Low intensity (22)	5%	
	Developed, Medium intensity (23)	1%	
	Developed, High intensity (24)	24%	
Invasive species control	Woody Wetlands (90)	0%	- 5%
	Emergent Herbaceous Wetlands (95)	0%	
	Open water (11)	3%	
	Grassland/herbaceous (71)	0%	
	Scrub/shrub (52)	0%	
	Barren land (rock/sand/clay; 31)	2%	
Total Acres	Interim Core Map Acres	~ 28	

 Table 1. Percentage of Interim Core Map Represented by NLCD<sup>2</sup> Land Covers and Associated

 Example Pesticide Use Sites/Types.

## **Evaluation of Known Location Information**

There are four datasets with known location information for this species:

- Descriptions of locations provided by FWS,
- Occurrence locations in iNaturalist;
- Occurrence locations in GBIF; and
- Occurrence locations in NatureServe.

The developer evaluated these four sets of data before selecting the type of and developing the core map. FWS' most recent 5-year review (2021) detailed known locations of this species. FWS described three creeks with documented sightings (Deer Creek, Gashey's Run, and Swan Creek) of the Maryland Darter, but there have not been any documented occurrences since 1988 and the species is believed to be extirpated from the Swan Creek site (Designation of Critical Habitat, 1984). iNaturalist had one research grade observation. Documented locations in NatureServe were included in FWS' documentation as well. Occurrence data in GBIF were also included in iNaturalist or NatureServe. **Appendix 1** includes more information on the available known location information.

<sup>&</sup>lt;sup>2</sup> Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, <u>https://doi.org/10.5066/P9JZ7AO3</u>

## Approach Used to Create Core Map

The core map was developed using the "Process EPA Uses to Develop Core Maps for Draft Pesticide Use Limitation Areas for Species Listed by the U.S. Fish & Wildlife Service (FWS) and their Designated Critical Habitats"<sup>3</sup> (referred to as "the process"). This core map was developed by EPA and was developed using the 4 steps described in the process document:

- 1. Compile available information for a species;
- 2. Identify core map type;
- 3. Develop the core map for the species; and
- 4. Document the core map.

For step 1, the developer compiled available information for the Maryland Darter from FWS as well as observational information available from various publicly available sources (discussed in previous section). The information compiled for the Maryland Darter is included in **Appendix 1**. Influential information that impacted the development of the core map included description of critical habitat and known populations that occurred relative to its critical habitat.

For step 2, the developer used the compiled information to identify the core map type, including the species range, critical habitat, and known location information. The developer compared known location data to the range and critical habitat and found that the last known occupied location of the Maryland Darter is consistent with the location of the designated critical habitat. The species range follows watershed boundaries and is not likely limited to the areas containing habitat of the species. The range is also much larger than the areas where known locations occur. Based on this information, the developer used the designated critical habitat as the core map.

For step 3, The developer used the designated critical habitat provided by FWS for Maryland Darter. The developer downloaded the critical habitat from FWS's ECOS (https://ecos.fws.gov/ecp/).

## Discussion of Approaches and Data that were Considered but not Included in Core Map

Alternative approaches and data were not considered in the development of this interim core map.

<sup>&</sup>lt;sup>3</sup> Dated 2024, available online at: <u>https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-areas</u>

# Appendix 1. Information Compiled for Species During Step 1

#### 1. Recent FWS Documents/Links

- FWS, "Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Endangered Maryland Darter," (1984), https://www.govinfo.gov/link/fr/49/34228?link-type=pdf.
- FWS, "Maryland Darter (*Etheostoma Sellare*) 5-Year Review: Summary and Evaluation," (2021), <u>https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\_docs/species\_nonpublish/3420.pdf</u>.
- FWS, "Maryland Darter Recovery Plan," (1985), https://ecos.fws.gov/docs/recovery\_plan/851017.pdf.

#### 2. Background information

- Status: Federally listed as endangered in 1967
- Resiliency, redundancy, and representation (the 3Rs)
  - Rediscovered in 1962 in Gashey's Run, a small tributary of Swan Creek, the Maryland darter was observed sporadically in the 1970s and 1980s, but there have been no observations of the Maryland darter since 1988. Therefore, the redundancy of this species is reduced, and, with it, the species' ability to survive a highly consequential event. The 2021 5-year Review also states, "...it is highly likely that the species is extinct" and recommends delisting due to extinction.

#### • Habitat, Life History, and Ecology (Source: 2021 5-year Review)

• **Habitat** endemic to small streams that empty into the Chesapeake Bay near Aberdeen, Maryland.

#### • Taxonomy

• This species is a ray-finned fish, and the full taxonomy is provided in **Figure A1-1**.

Taxonomic Hierarchy	
Kingdom	<u>Animalia</u> – Animal, animaux, animals
Subkingdom	Bilateria – triploblasts
Infrakingdom	Deuterostomia
Phylum	Chordata – cordés, cordado, chordates
Subphylum	Vertebrata – vertebrado, vertébrés, vertebrates
Infraphylum	Gnathostomata
Superclass	Actinopterygii – ray-finned fishes, spiny rayed fishes, poisson épineux, poissons à nageoires rayonnées
Class	Teleostei
Superorder	Acanthopterygii
Order	Perciformes – perch-like fishes
Suborder	Percoidei
Family	Percidae – true perches, perches, perches et dards, perches
Genus	Etheostoma Rafinesque, 1819 – smoothbelly darters
Species	Etheostoma sellare (Radcliffe and Welsh, 1913) – Maryland Darter

Figure A1-1. The full taxonomy of the Maryland Darter.

- Essential Physical Biological Features (PBFs) for Designated Critical Habitat (*Source: Recovery Plan 1985*):
  - Riffles only 1-3 meters in width, composed of gravel and silt.
  - Normal flow velocities are slight and the stream scarcely maintains a flow over the riffles during drought conditions.
  - Considerable seasonal fluctuation in riffle size can occur.
  - The designated critical habitat contains the only reaches with observations (1984 Designation of Critical Habitat).
- Relevant Pesticide Use Sites in FWS Documents
  - Pesticide threats to the species listed in FWS documents include agricultural and urban uses upstream of the occupied river section.

#### • Relevant Recovery Criteria and Actions

- From the 1985 Recovery Plan: "Map land use, land use trends, pollution sources and related features in the watersheds."
  - "Impacts to water quality resulting in sedimentation, high nutrient loads, and pollution, as well as water level fluxuations contributed to the species decline" (2021 5-year Review).
  - "The primary and most widespread source of nutrients in streams is runoff from agricultural fields. Runoff from agriculture can also contain organic matter, pesticides, sediment, and animal waste" (2021 5-year Review).

#### 3. Description of the species range

- The current geographic range encompasses the full HUC12 watershed boundaries surrounding where the Maryland Darter has been known to occur.
- According to the 2021 5-year Review, the range of the Maryland Darter was likely restricted in 1929 following the construction of the Conowingo Dam. The dam creates extreme changes in flow when it is producing power.
- Figure A1-1 depicts the current FWS species range (last updated 3/2/2022).
- The species range is approximately 42,000 acres.



Figure A1-2. FWS Range of the Maryland Darter.

#### 4. Critical Habitat

- Maryland Darter designated critical habitat contains the only reaches with extant observations, Deer Creek and Gashey's Run (Designation of Critical Habitat, 1984).
- Figure A1-2 depicts the current critical habitat.



Figure A1-3. FWS critical habitat of the Maryland Darter.

#### 5. Known Locations

- Known Locations Described in FWS Recovery Documents
  - All known locations of extant Maryland darter have been within Harford County, Maryland in Deer Creek and Gashey's Run.
  - **Figure A1-4** depicts the known location data in FWS' most recent 5-year review.
  - When considering the locations of populations (Figure A1-4), they are consistent with the location of the Critical habitat (Figure A1-3).



Figure 2. Deer Creek and Octoraro Creek at the USGS 10-digit HUC level and Swan Creek at the USGS 12-digit HUC level.

## Figure A1-4. Known locations of the Maryland Darter. Reproduced from FWS 5-year review (2021).

- Occurrence in iNaturalist
  - Searched on 2/28/25
  - o https://www.inaturalist.org/observations?subview=map&taxon id=100539
  - There is one research grade observations available from October 1985.
  - **Figure A1-5** depicts the location of this observation.



Figure A1-5. Screenshot from iNaturalist observations for Maryland Darter. Area depicted is consistent with the location of the species critical habitat depicted in Figure A1-2.

#### **Occurrences in NatureServe**

- NatureServe was searched on 2/28/25
- https://explorer.natureserve.org/pro/Welcome
- NatureServe is consistent with the range and iNaturalist.

#### **Occurrences in GBIF**

- GBIF was searched on 2/28/25
- <a href="https://www.gbif.org/occurrence/search?q=maryland%20darter">https://www.gbif.org/occurrence/search?q=maryland%20darter</a>
- GBIF is consistent with the critical habitat and iNaturalist.

Collectively, the occurrence data from iNaturalist, GBIF, and NatureServe do not support expanding the core map beyond the designated critical habitat.