Interim Core Map Documentation for the Vermilion Darter

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Draft Interim core map developed by the Center for Biological Diversity (CBD)[1]
Documentation supplemented by the U.S. Environmental Protection Agency (EPA), Office of Pesticide Programs

Species Summary

The vermilion darter (*Etheostoma chermocki*; Entity ID #316) is an endangered teleost fish (Percidae). The current distribution of the vermilion darter is restricted to localized sites within the upper mainstem reach of Turkey Creek and four tributaries within its designated critical habitat located in Pinson, Jefferson County, Alabama. Habitat for the vermilion darter entails small to medium-sized clear streams, with gravel riffles and moderate currents. This darter requires clean, clear, flowing water, and clean rocks, logs, or sand and gravel substrate for the attachment of eggs during spawning in the spring. This species is sometimes associated with emergent aquatic vegetation. Additional information is provided in **Appendix 1**.

Description of Core Map

The core map for the vermilion darter is based on critical habitat. All known occurrences of this species fall within the critical habitat. **Figure 1** depicts the interim core map for the vermilion darter (green areas on map). The core map represents approximately 13.1 stream miles (106 acres).

The vermilion darter inhabits small to medium clear streams with gravel riffles and moderate currents within 11.03 miles of the upper reaches of Turkey Creek and two its tributaries in Jefferson County, Alabama, which is captured within the species' designated critical habitat. Landcover categories within the core map area are included in **Table 1**. Landcover within the core map is deciduous and mixed forest followed and developed land.

The core map developed for the vermilion darter is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the vermilion darter. This core map incorporates information developed by the U.S. Fish and Wildlife Service (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, and the critical habitat includes all known occurrences. However, EPA 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.

[1] 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

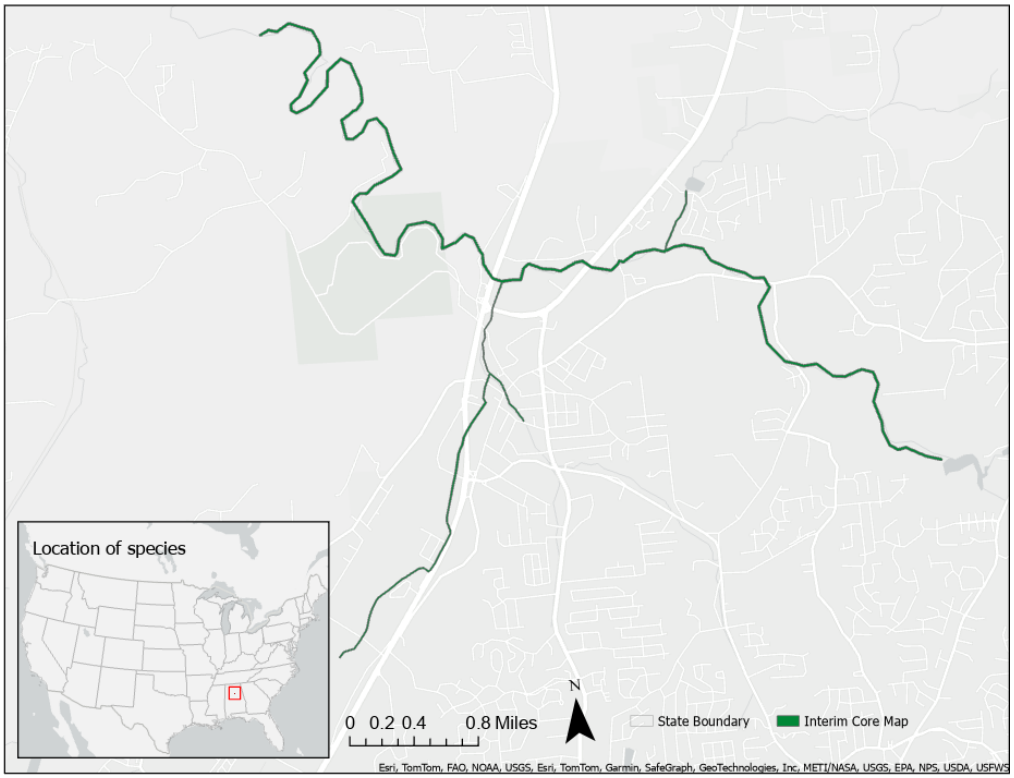

Figure 1. Interim core map for the vermilion darter. This map contains 13.1 river miles, and the total acreage of the core map is approximately 106 acres.

Table 1. Percentage of Interim Core Map Represented by NLCD[2] Land Covers and Associated Example Pesticide Use Sites/Types.

Example pesticide use sites/types	NLCD Class/Value	% Area	Total area for landcover type
Forestry	Deciduous Forest (41)	46%	62%
Forestry	Evergreen Forest (42)	1%	62%
Forestry	Mixed Forest (43)	15%	62%
Agriculture	Pasture/Hay (81)	9%	9%
Agriculture	Cultivated Crops (82)	0%	9%
Mosquito adulticide, residential	Open space, developed (21)	6%	22%
Mosquito adulticide, residential	Developed, Low intensity (22)	7%	22%
Mosquito adulticide, residential	Developed, Medium intensity (23)	8%	22%
Mosquito adulticide, residential	Developed, High intensity (24)	1%	22%
Invasive species control	Woody Wetlands (90)	4%	7%
Invasive species control	Emergent Herbaceous Wetlands (95)	0%	7%
Invasive species control	Open water (11)	1%	7%
Invasive species control	Grassland/herbaceous (71)	1%	7%
Invasive species control	Scrub/shrub (52)	1%	7%
Invasive species control	Barren land (rock/sand/clay; 31)	0%	7%
Total Acres	Interim Core Map Acres	106 acres	

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 the Global Biodiversity Information Facility (GBIF); and
- Occurrence locations in NatureServe.

EPA evaluated these four sets of data before selecting the type of and developing the core map. EPA is also making note of a location documented in the public comments on the Proposed Critical Habitat but not included in the final critical habitat. iNaturalist had 35 research grade observations, 21 of which are from 2019 or later. NatureServe lists one element occurrence. GBIF contained no additional Human

[2] Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, https://doi.org/10.5066/P9JZ7AO3

Observation data that were not already included in iNaturalist. The iNaturalist and NatureServe data had a coarse resolution, and EPA could not determine conclusively if these data fell within the critical habitat; however, they generally appear to be consistent with the locations of the range and critical habitat. **Appendix 1** includes more information on the available known location information.

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"[3] (referred to as "the process"). This core map was developed by EPA and was developed using the four 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 developers compiled available information for the vermilion darter from FWS as well as observational information available from various publicly available sources (discussed in previous section). The information compiled for the vermilion darter is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- Current existing populations occur in locations consistent with the critical habitat;
- The species' critical habitat is highly refined.

For step 2, the developers used the compiled information to identify the core map type, including the species range, critical habitat, and known location information. Known location data was compared to the range and critical habitat and found that the FWS known locations of currently existing (extant) populations are consistent with the location of the designated critical habitat. The species range follows geopolitical boundaries (i.e., counties) and is not likely limited to the areas containing habitat of the species. The range is equal to the areas where known locations occur. Based on this information, EPA used the designated critical habitat as the core map.

For step 3, the developers used the designated critical habitat provided by FWS for the vermilion darter. EPA 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 not discussed in the documentation were not considered in the development of this interim core map.

[3] Dated 2024, available online at: https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-areas

Appendix 1. Information Compiled for Species During Step 1

1. **Recent FWS Documents/Links**

- Vermilion Darter 5-Year Review (2019) https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2833.pdf Accessed 2/28/2025
- Designation of Critical Habitat for the Vermilion Darter: Final Rule https://www.govinfo.gov/link/fr/75/75913?link-type=pdf Accessed 2/28/2025
- Recovery Plan for the Vermilion Darter (*Etheostoma chermocki*) https://ecos.fws.gov/docs/recovery_plan/070802.pdf Accessed 2/28/2025

2. **Background information**

- Status: Federally listed as endangered in 2001
- Resiliency, redundancy, and representation (the 3Rs)
  - No mention in FWS documentation, but this is a narrowly endemic species with one Element Occurrence.

- ***Habitat, Life History, and Ecology (Source: 2021 Recovery Plan)***
  - **Habitat**: the vermilion darter is found only in the Turkey Creek drainage, a tributary of the Locust Fork of the Black Warrior River, Jefferson County, Alabama.
  - The vermilion darter prefers streams with pools of moderate current alternating with riffles of moderately swift current, and low water turbidity (2019 5-year review, 5).
  - **Reproduction**:
    - This darter requires clean, clear, flowing water, and clean rocks, logs, or sand and gravel substrate for the attachment of eggs during spawning in the spring
- **Taxonomy**
  - Boschung et al. (1992) formally described the vermilion darter (E*theostoma chermocki* (Teleostei: Percidae)) from the Black Warrior River drainage of Alabama.

- **Essential Physical Biological Features (PBFs) for Designated Critical Habitat:**
  - Habitat for the vermilion darter entails small to medium-sized clear streams, with gravel riffles and moderate currents. This darter requires clean, clear, flowing water, and clean rocks, logs, or sand and gravel substrate for the attachment of eggs during spawning in the spring. This species is sometimes associated with emergent aquatic vegetation.
  - Cool, clean water from consistent and steady groundwater sources.
  - The vermilion darter is primarily a benthic insectivore. Many of the benthos insect fauna species are pollution-sensitive.

- **Relevant Pesticide Use Sites in FWS Documents**
  - Pesticide threats to the species listed in FWS documents are as a component of stormwater runoff. Due to the small range located within the industrial and urbanized areas of the City of Pinson, the threat of declining water quality due to stormwater runoff is the greatest threat to this species.

- **Relevant Recovery Criteria and Actions (Source: 2017 5-year Review)**
    - De-listing criteria include: After downlisting criteria are met, then at least 13 occurrences exist, with a minimum of two occurrences from each of three different population units and they display stable or increasing trends of 10 consecutive years.
        1. Populations of vermilion darters and its habitat are shown to be protected from present and foreseeable threats to the point where listing is no longer required through the implementation of activities including stewardship, outreach, best management practices, securing conservation easements or acquisitions, and ensuring adequate regulatory enforcement.
        2. Stable or increasing population trends for at least 10 years throughout its known range are verified through monitoring and surveys.
        3. Suitable flows (water quantity) and water quality in Turkey Creek supporting the vermilion darter are determined through recovery tasks and assured, through State or local groundwater management plans, or water conservation plans.
        4. An average monthly reading of 10 NTU (Nephelometric Turbidity Units), a unit used to measure sediment discharge, or 15 mg/L TSS (Total Suspended Solid) or less discharge into the Turkey Creek watershed within and upstream of the vermilion darter's range is being attained and documented as occurring for a minimum of 10 consecutive years. Information will be compiled from sampling water quality monthly throughout the year during base, low and high flows.
        5. A captive vermilion darter population of 20 pairs (40 individuals) has been established and successfully propagated for augmentation.

3. Description of the species range

- The current range of the vermilion darter is restricted to localized sites within the upper mainstem reach of Turkey Creek and four tributaries in Pinson, Jefferson County, Alabama.
- **Figure A1-1** depicts the current FWS species range (last updated Sept. 18, 2019).
- The species range encompasses 90,288 acres.

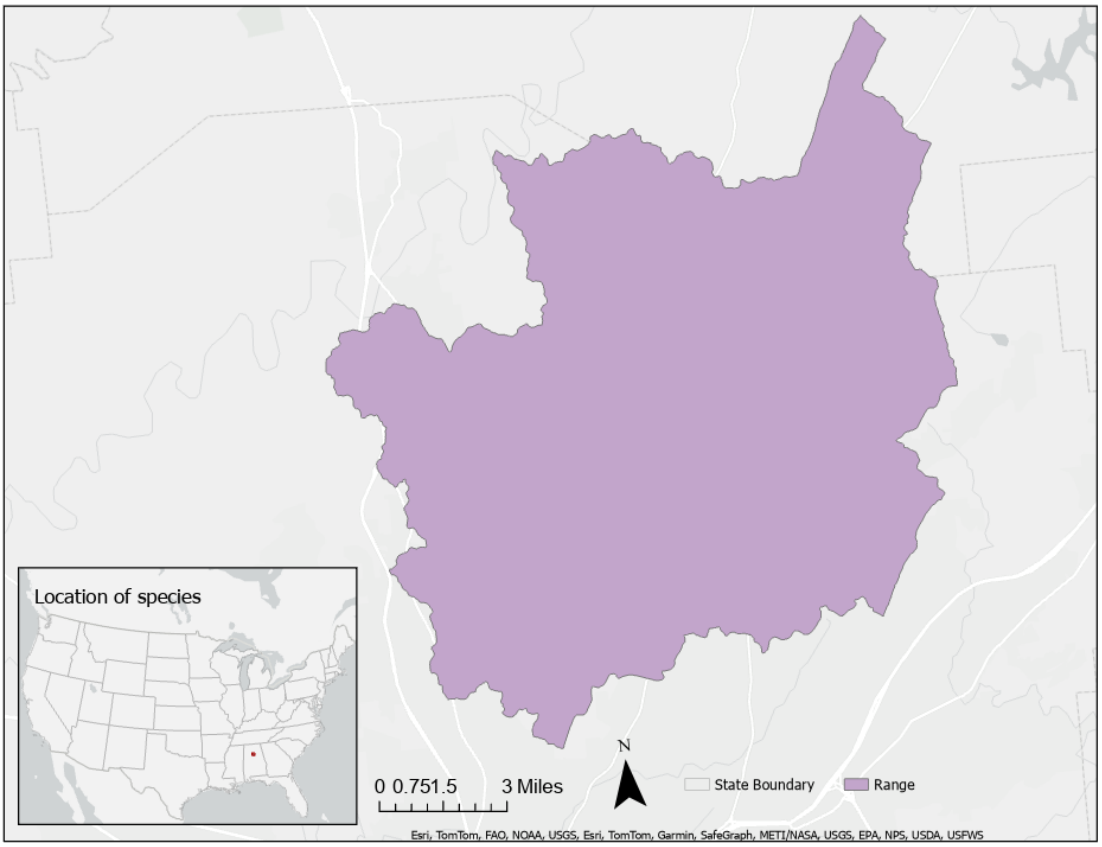

Figure A1-1. FWS Range of the vermilion darter (90,288 acres).

4. **Critical Habitat** (Source: 2010 Designation of Critical Habitat for the Vermilion Darter: Final Rule and 2019 Five Year Review)
    - Vermilion darter critical habitat designation of 13.1 river miles in 5 contiguous units within the upper mainstem reach of Turkey Creek and four tributaries in Pinson, Jefferson County, Alabama.
    - **Figures A1-2, A1-3,** and **A1-4** depict the current critical habitat.

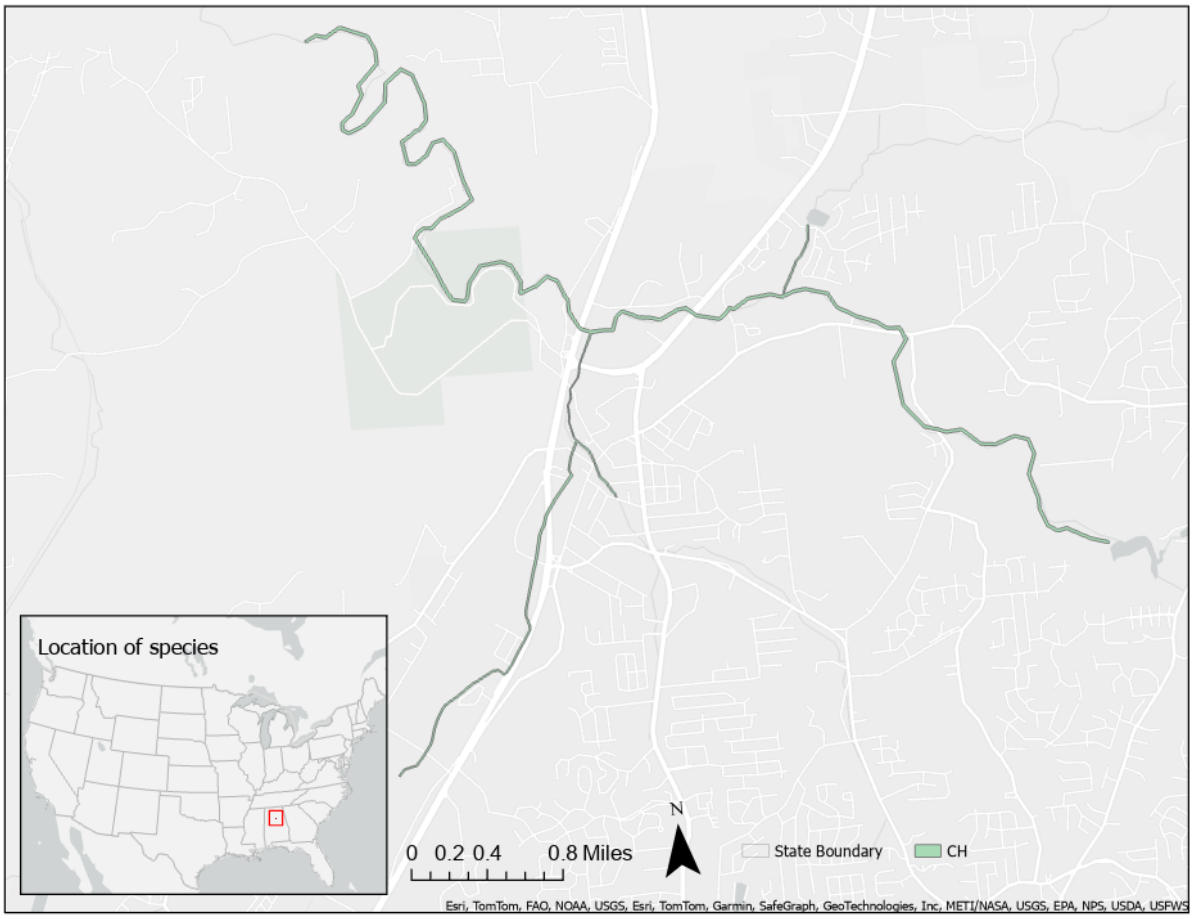

Figure A1-2. FWS critical habitat of the vermilion darter (106 acres).

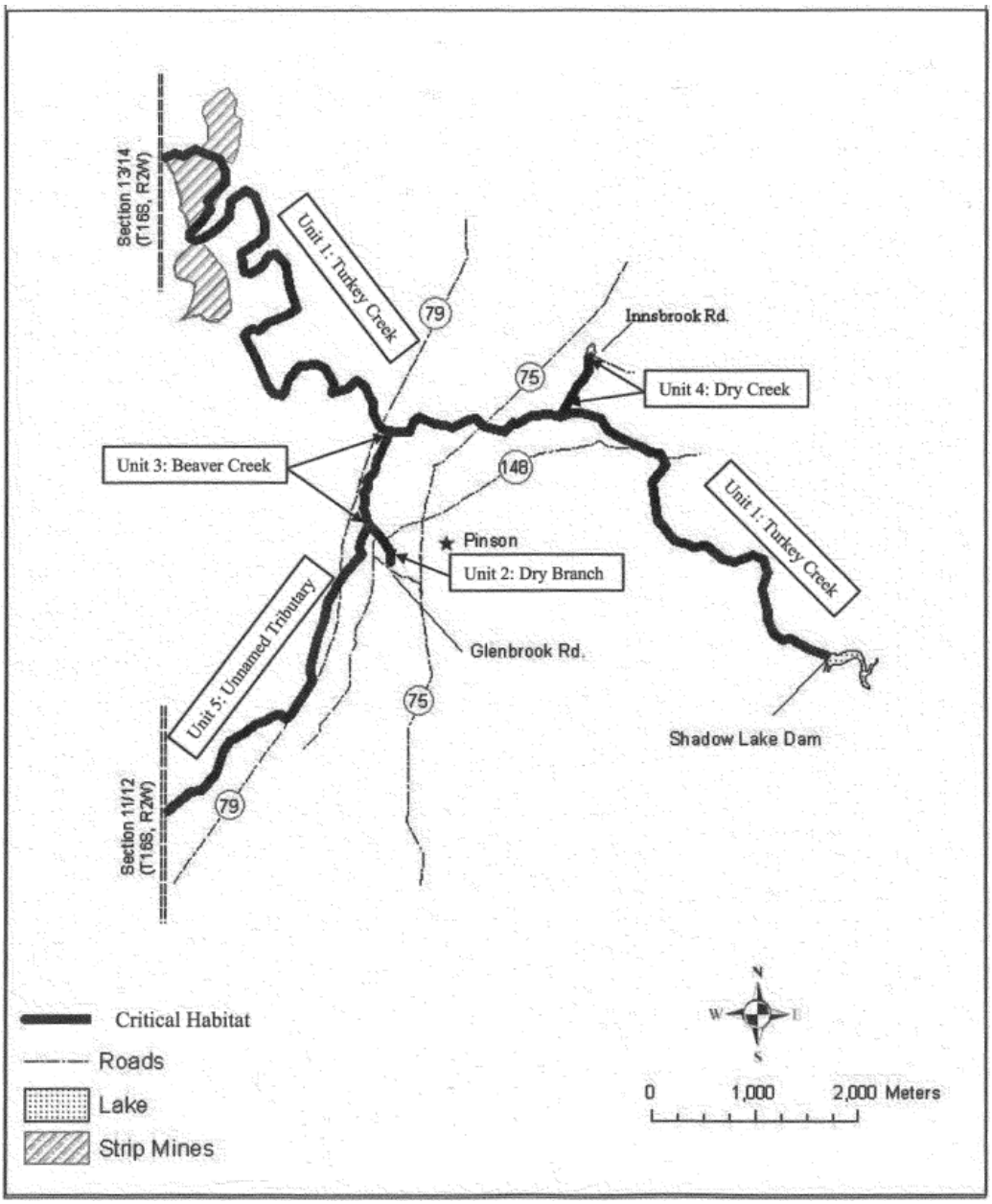

Figure A1-3. Closer view of FWS critical habitat of the vermilion darter.

5. Known Locations

- **Known Locations Described in FWS Recovery Documents**
  - All known occurrences of the vermilion darter occur in or adjacent to the critical habitat.
  - "The current range of the vermilion darter is restricted to localized sites within the upper mainstem reach of Turkey Creek and four tributaries in Pinson, Jefferson County, Alabama." (2019 5-year review, 7)
  - "Since the 2011 5-Year Review, collection efforts have indicated minor increases in relative abundance and slight range extensions within three tributaries, all within the designated critical habitat." (2019 5-year review, 21)

- **Occurrences in iNaturalist**
  - Searched on Feb. 27, 2025.
  - https://www.inaturalist.org/observations?nelat=37.290859730099946&nelng=-99.73438480565868&subview=map&swlat=27.087716942194135&swlng=-127.48584964940868&taxon_id=160614
  - There are 21 research grade observations available from 2019-2024.
  - **Figure A1-4** depicts the locations of these observations.
  - Due to the coarse resolution of these data, it is unclear if these observations are in the core map area or not.

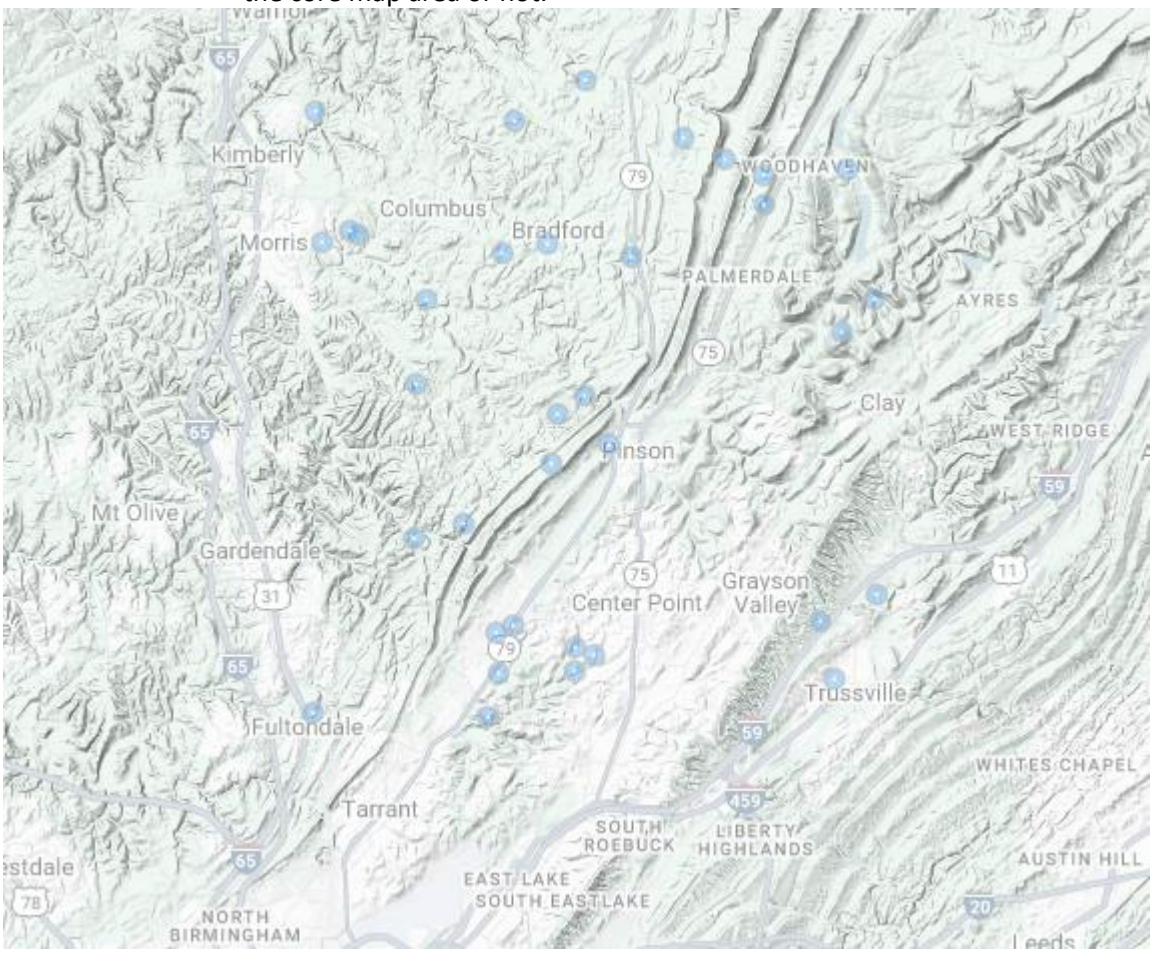

Figure A1-4. iNaturalist observations for the vermilion darter. Area depicted is on similar scale and location as species range depicted in Figure A1-2.

Occurrences in NatureServe

- NatureServe was searched on Feb. 27, 2025.
- https://explorer.natureserve.org/
- NatureServe has one documented Element Occurrence
- This location is generally consistent with the location of the critical habitat

Occurrences in GBIF

- GBIF was searched on Feb. 27, 2025.

- There were 131 records for vermilion darter of which all human observations are contained within the iNaturalist data set.
- https://www.gbif.org/occurrence/search?basis_of_record=HUMAN_OBSERVATION&taxon_key=2382207

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