Interim Core Map Documentation for Trispot Darter

Date Posted to EPA's GeoPlatform: July 2025
Draft Interim Core Map Developer: Compliance Services International (CSI)

Species Summary

The Trispot darter (*Etheostoma trisella*; Entity ID 3069) is a freshwater fish found in New Mexico and Texas. The U.S. Fish and Wildlife Service (FWS) has assigned designated critical habitat for Trispot darter. This species inhabits different areas for breeding and non-breeding seasons. In breeding season, the species shifts its habitat preference and movement toward spawning areas—moving from main channels into tributaries and eventually reach adjacent seepage areas. In non-breeding season, the species consists of small to medium river margins and lower reaches of tributaries with slower velocities. Additional habitat information is provided in **Appendix 1**.

EPA Review Notes

The developers created this core map using the U.S. Environmental Protection Agency's (EPA) process available at: https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-areas. EPA reviewed the draft interim map and documentation and evaluated if: (1) the map and documentation are consistent with the agency's process; (2) areas included or excluded from the interim core map are consistent with the biology, habitat, and/or recovery needs of the species; (3) data sources are documented and appropriate; and (4) the GIS data and mapping process are consistent with the stated intention of the developer. EPA agrees that this map is a reasonable depiction of core areas for this species and was consistent with the agency's mapping process. This documentation was not prepared by EPA, but EPA may have edited this documentation for clarity or other purposes.

The core map developed for this species is considered interim and can be used to develop pesticide use limitation areas (PULAs). 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.

EPA graded the "best professional judgment classification" for this core map as "none" (1). The core map is developed from the designated critical habitat without any additions or subtractions. More information about this classification system and its definitions can be found in the core map process document (EPA 2024).

This core map does not replace or revise any range or designated critical habitat developed by FWS.

Description of Core Map

The core map for the Trispot darter is based on designated critical habitat . The most recent Species Status Assessment from FWS includes a textual description of habitats, and the critical habitat listing document provides details on the known location sites used to develop this core map (See **Appendix 1** for more information).

The core map spans 11,468 acres (Figure 1). A summary of acreage by National Landcover Database (NLCD) land use type is provided in Table 1.

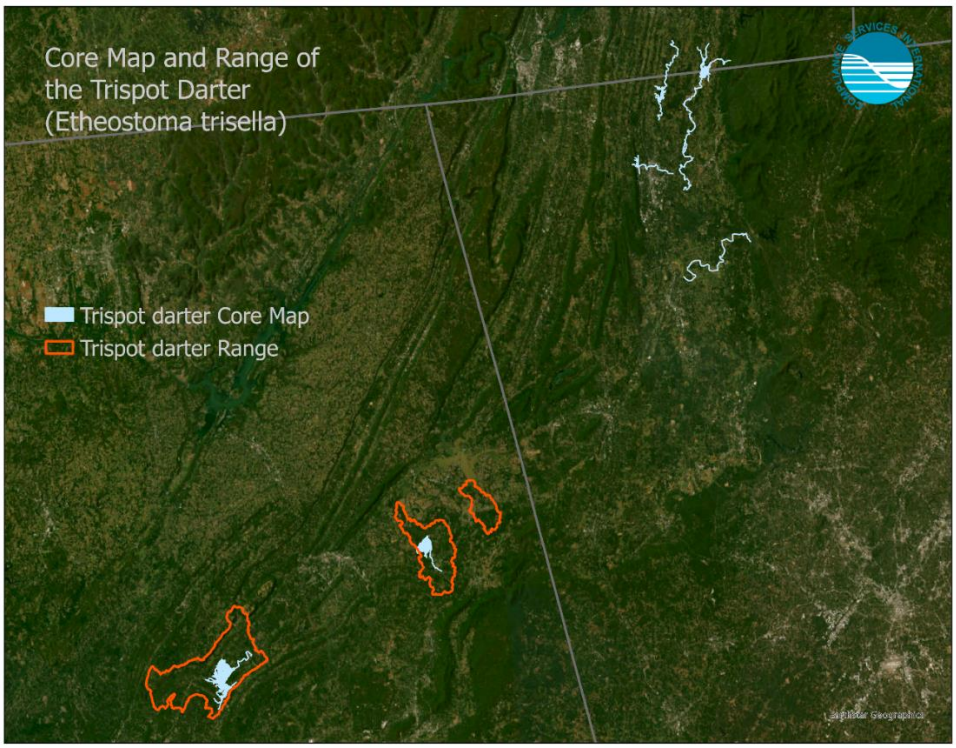

Figure 1. Interim core map for the Trispot Darter.

NLCD_Land_Cover_Class	Acres
Deciduous Forest	2,690
Woody Wetlands	2,026
Hay/Pasture	1,916
Evergreen Forest	1,882
Mixed Forest	1,002
Cultivated Crops	497
Shrub/Scrub	370
Developed, Open Space	357
Herbaceous	261
Emergent Herbaceous Wetlands	219
Developed, Low Intensity	120
Open Water	89
Developed, Medium Intensity	33
Developed, High Intensity	10
Barren Land	7

Table 1. Acres by National Land Cover Database (NLCD) class within the core map of the Trispot Darter. Total core map area (based on NLCD pixel count): 11,479 acres[1].

[1] This acreage is slightly different from the core map acreage (11,468) due to the pixelation of NLCD land cover. The core map is not developed from raster data.

Evaluation of Known Location Information

There were four evaluated datasets with known location information:

- Descriptions of locations provided by FWS;
- Occurrence locations in iNaturalist;
- Occurrence locations in the Global Biodiversity Information Facility (GBIF); and
- Occurrence locations in NatureServe.

Compliance Services International evaluated these four datasets before developing the core map. Overall, there were 24 research-grade observations found in iNaturalist[2]. The GBIF dataset comprised 35 usable observations. Neither dataset was used for core map development, however, both were useful for comparison with other datasets used.

The FWS location information includes textual descriptions of areas of relevant occupancy; these are confirmed not to extend beyond the critical habitat boundaries.

NatureServe public element occurrence (EO) data were also evaluated and are considered by CSI to of good quality for this species; however, these data were not considered for use in core map development because they do not represent more accurate location information than the designated critical habitat and known locations that were used.

Approach Used to Create Core Map

The core map was developed using EPA's process for developing core maps for species listed by the FWS and their critical habitat (referred to as "the process"). This core map was developed by CSI using the four steps described in the process document:

1. Compile available information for a species;
2. Identify core map type from among the following defined types: critical habitat, range, and biological information. From EPA, summaries of each core map type are provided below (EPA 2024).
3. Develop the core map for the species; and
4. Document the core map.

For step 1, CSI compiled available information for the Trispot darter from FWS, as well as observation information available from various publicly available sources including iNaturalist, GBIF, and NatureServe. The information compiled for the Trispot darter is included in **Appendix 1**. Influential information that impacted the development of the core map includes FWS' descriptions of areas of relevant occupancy; these are confirmed not to extend beyond the critical habitat boundaries.

[2] According to iNaturalist, an observation is designated as "research grade" if it 1) is verifiable with date, coordinates, photos/sounds, and not captive; 2) achieves community agreement defined as "more than 2/3 of identifiers needs to agree on the species level ID or lower;" and 3) "must pass a data quality assessment, which includes checks for accurate date and location, evidence of a wild organism, and clear evidence of the organism itself" (https://help.inaturalist.org/en/support/solutions/articles/151000169936-what-is-the-data-quality-assessment-and-how-do-observations-qualify-to-become-research-grade-).

For step 2, CSI used the compiled information including the species range, known locations, and habitat location information to determine the core map type. The known location data were compared to the range and critical habitat and found that known locations from larger databases (iNaturalist and GBIF) were too inclusive of non-extant populations compared to the critical habitat used for core map development.

Although the Trispot darter would not be expected to be found on agricultural land (*i.e.*, it is an "off-field" species), there is relatively little agriculture in the area and CSI was not convinced that critical habitat required cultivated areas removed; therefore, no refinement was necessary to exclude cultivated land. Therefore, based on the weight of evidence, CSI selected a critical habitat core map type.

For step 3, CSI used the best-available data sources to generate the core map. Data sources are discussed in the EPA's core map process document. For this interim core map, CSI followed EPA's decision framework to arrive at a core map type of critical habitat. Designated critical habitat was identified as a core map type because the Trispot darter has critical habitat that more accurately identifies critical areas for core map development than its more widespread range. **Appendix 2** provides more details on the GIS analysis and data used to generate the core map.

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

Known Observation Datasets
Datasets such as iNaturalist, GBIF, and NatureServe were considered but not used due to precision or accuracy relative to FWS' description of designated critical habitat.

NLCD, LANDFIRE, and other land cover datasets

Typically, it would be reasonable to refine a core map for a species with a large and/or unrefined range based on descriptions of its habitat, which can be mapped to land cover datasets such as NLCD, LANDFIRE, and others. For the Trispot darter, the core map extent was small enough and based on precise location information such that a refinement based on national land cover datasets was not necessary. Therefore, no attempt was made to refine the core map using land cover datasets.

Appendix 1. Information compiled for Trispot Darter

1. **Recent FWS documents**
   - Critical Habitat (2020): https://www.govinfo.gov/content/pkg/FR-2020-09-30/pdf/2020-19115.pdf#page=1
   - Draft Recovery Plan (2023): https://ecos.fws.gov/docs/recovery_plan/078282_20230125_draft_RP_Trisport Darter.pdf
   - Species Status Assessment (2017): https://iris.fws.gov/APPS/ServCat/DownloadFile/151853

2. **Background information**
   - Status: Federally listed as threatened in 2019.
   - Resiliency, redundancy, and representation (the 3Rs; FWS 2017)
     - Resiliency: "The Trispot darter currently has low resiliency in each of the four management units considered in our analysis."
     - Redundancy: "The Trispot darter currently does not exhibit high redundancy due to evidence indicating that this species was wider ranging in the Coosa River basin."
     - Representation: "The Trispot darter currently does not exhibit high representation due to evidence indicating that this species was wider ranging in the Coosa River basin. We estimate that the Trispot darter currently has low adaptive potential due to limited representation in the four MU's and 3 MU's have low resiliency and 1 MU has moderate resiliency."
   - Habitat, Life History, and Ecology
     - Non-breeding Season Habitat: "Approximately from April to October, the species inhabits its non-breeding habitat which consists of small to medium river margins and lower reaches of tributaries with slower velocities (estimated to be 0.7 - 1 foot/second, 0.2 – 0.3 m/second) and is associated with detritus, logs, and stands of water willow though vegetation and detritus have not been found to be essential. The substrate consists of small cobbles, pebbles, gravel, and often a fine layer of silt" (FWS 2017).
     - Breeding Season Habitat: "In late fall this migratory species shifts its habitat preference and movement toward spawning areas begins; this movement may be queued by temperature change, precipitation, and/or decreasing daylight hours (Ryon 1981, p. 13), with rainfall being the most likely trigger (Ryon 1981, p. 47). The fish move from the main channels into tributaries and eventually reach adjacent seepage areas where they will congregate and remain from approximately late November or early December to late April. Breeding habitat becomes available as precipitation increases and the water table rises" (FWS 2017).
     - Large River Habitat: "The species has also been documented in larger rivers such has the Coosa River. Within these areas, additional needs and requirements include detritus, woody debris, and stands of water willow (Justicia americana) over stream substrate consisting of small cobble, pebbles, gravel, and fine layers of silt" (FWS 2023).
     - "Based on the Species Status Assessment (SSA), the long-term viability of the Trispot darter is affected by habitat degradation and hydrologic alteration. Specifically, incompatible land-use practices and the associated impacts to habitat connectivity, water quantity, water quality, and linear distribution of occupied habitat influence the darter's viability" (FWS 2023).
   - Taxonomy
     - Fish: "This species was originally described as a member of the subgenus *Psychromaster* and was later moved to the subgenus *Ozarka* in 1980 (Williams and Robinson, p. 150). In 2011 the Trispot darter was moved into the Etheostoma subgenus where it exists today" (FWS 2017).

- Relevant Potential Pesticide Use Sites
    - Conasauga River MU: Under the Worst Case scenario, increased rates of pollutants, nutrients, herbicides and pesticides, and endocrine disruptors originating from agricultural practices being discharged into the river will be observed" (FWS 2017).

- Relevant Recovery Criteria and Actions SFWS 2023)
    - Draft Recovery Plan (2023) Select Recovery Objectives:
        - The ultimate recovery objective is to remove (delist) the Trispot darter from the Federal List of Endangered and Threatened Wildlife by ensuring the long-term viability of the species in the wild. We are defining reasonable recovery criteria for what constitutes a recovered species based on the best available information on this species. Criteria will be reevaluated as new information becomes available.
    - Draft Recovery Criteria (FWS 2023)
        - At least six (6) populations exhibit a stable or increasing trend, evidenced by natural recruitment, recruitment rates exceeding mortality rates, and multiple age classes.
        - Spatial distribution of the six (6) populations (as defined in Criterion 1) includes at least one population in four of the five historical river basins (HUC 8 level) (Middle Coosa- HUC8 CODE 03150106; Upper Coosa – HUC8 CODE 03150105; Oostanaula- HUC8 CODE 03150103; Conasauga- HUC8 CODE 03150101; Coosawattee- HUC8 CODE 03150102).
        - Threats have been addressed and/or managed to the extent that the species will remain viable based on scientifically defensible evaluation methods, for the foreseeable future.

3. Description of Species Range

- Historical Range: "Historically, this species occurred throughout the middle to upper Coosa River Basin with collections in the mainstem Coosa, Conasauga, and Coosawattee rivers, their tributaries, and tributaries to the Oostanaula River within the Ridge and Valley ecoregion. Genetics indicate that this species had a wide extent in the upper Coosa River Basin and ranged from at least the Little Canoe Creek system near Springville, Alabama to the Upper Conasauga River near Conasauga, Tennessee" (FWS 2017).
- Current Range: "Currently, the Trispot darter is known to occur in Little Canoe Creek, Ballplay Creek tributaries, Conasauga River and tributaries, and Coosawattee River and tributary. For the purposes of this report we considered three historical Management Units (MU's) (Cowans Creek system, Johns Creek system, and Woodward Creek system) and four current MU's for the Trispot darter (Little Canoe Creek System, Ballplay Creek System, Conasauga River System, and Coosawattee River System). Historical MU's were defined as one or more watersheds that the species was collected in prior to 2007. Current MU's were defined as one or more watersheds that the species currently occupies (collections 2007-2017) and were grouped based on similar management strategy requirements and genetic research. Currently, the Trispot darter occupies approximately 20% of its historically known range" (FWS 2017).

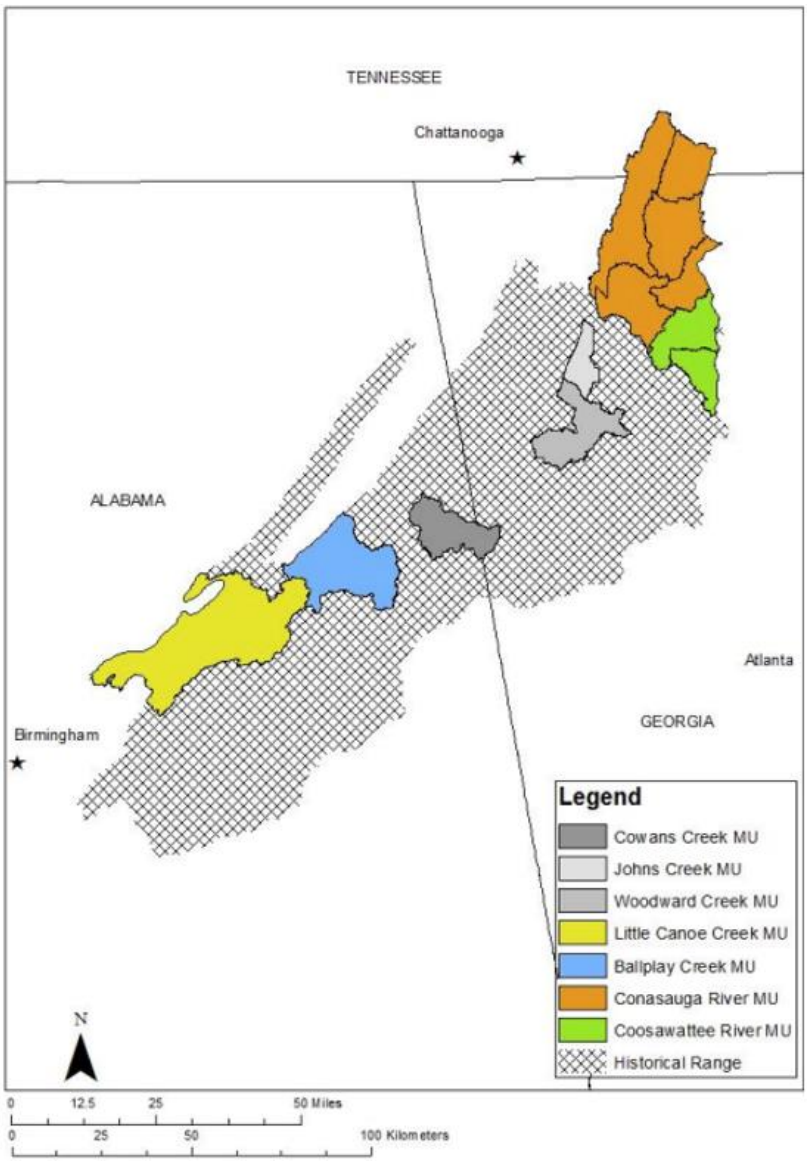

Figure 2. Trispot darter assumed historical range and the watersheds where this species has been collected in the Coosa River basin within the Ridge and Valley region. The grayscale MUs are Historical and the colored MUs are Current. Copied from Figure 1 of the Species Status Assessment (FWS 2017).

4. Critical Habitat

- Critical habitat designated in 2020**.**
- Approximately 175.4 miles (282.3 kilometers) of streams and rivers and 9,929 acres (4,018 hectares), in Calhoun, Cherokee, Etowah, and St. Clair Counties in Alabama; Gordon, Murray, and Whitfield Counties in Georgia; and Bradley and Polk Counties in Tennessee SFWS 2020).
- The physical or biological features essential to the conservation of the Trispot darter consist of the following components:
    - Geomorphically stable, small to medium streams with detritus, woody debris, and stands of water willow (Justicia americana) over stream substrate that consists of small cobble, pebbles, gravel, and fine layers of silt; and intact riparian cover to maintain stream morphology and reduce erosion and sediment inputs.

- Adequate seasonal water flows, or a hydrologic flow regime (which includes the severity, frequency, duration, and seasonality of discharge over time) necessary to maintain appropriate benthic habitats and to maintain and create connectivity between permanently flowing streams with associated streams that hold water from November through April, providing connectivity between the darter's spawning and summer areas.
- Water and sediment quality (including, but not limited to, conductivity; hardness; turbidity; temperature; pH; ammonia; heavy metals; pesticides; animal waste products; and nitrogen, phosphorus, and potassium fertilizers) necessary to sustain natural physiological processes for normal behavior, growth, and viability of all life stages.
- Prey base of aquatic macroinvertebrates.

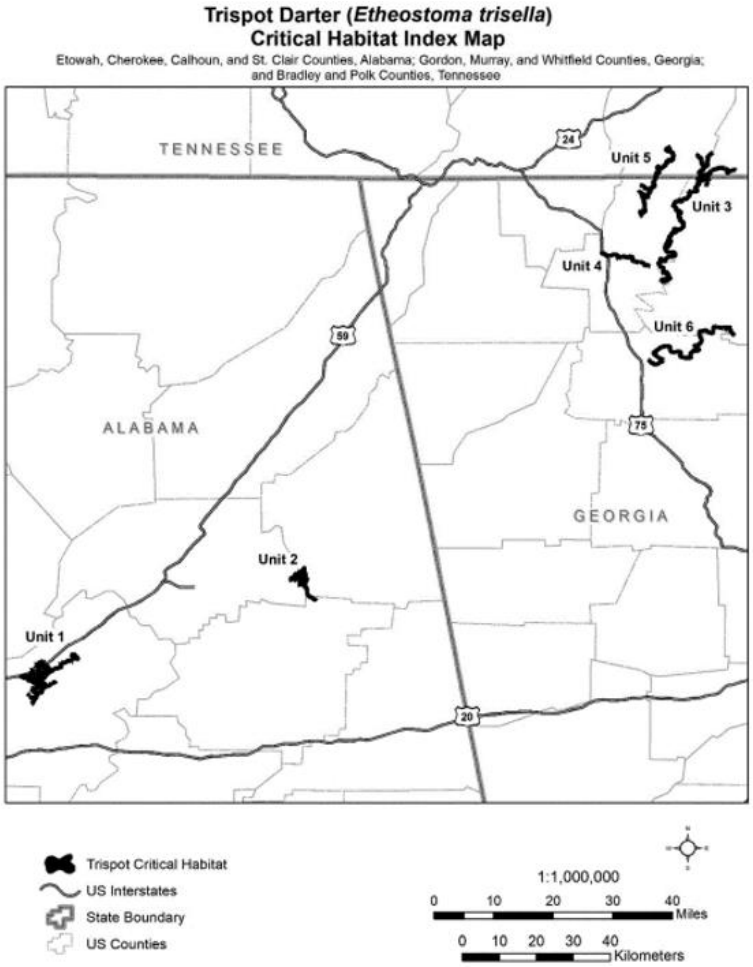

Figure 3. Critical Habitat Index Map for Trispot Darter. Copied from Page 61632 of the Final Rule document (FWS 2020).

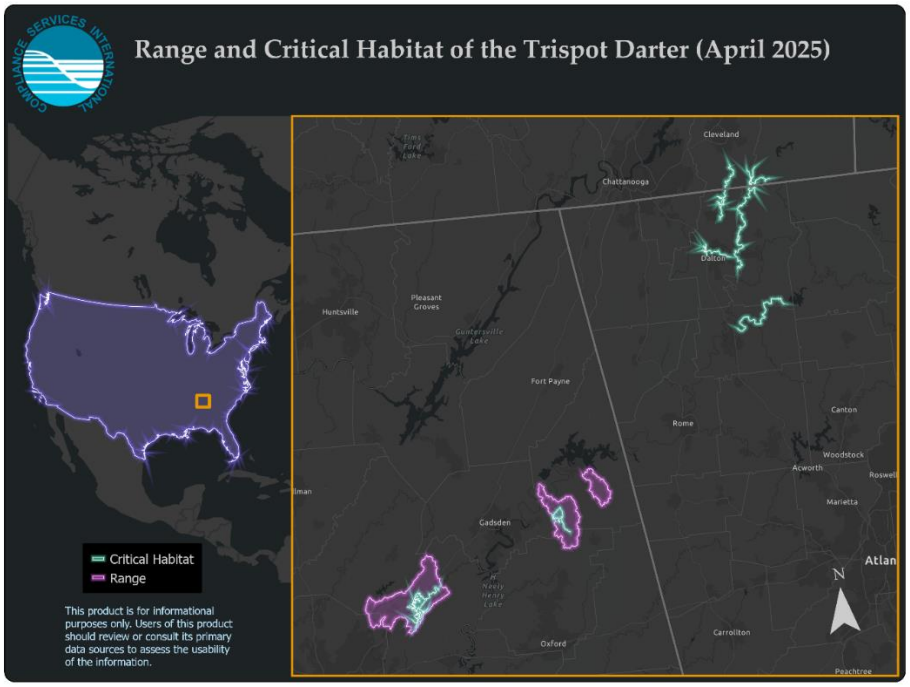

Figure 4. Range and critical habitat of the Trispot Darter (USFWS 2025).

5. Known Locations

- FWS Draft Recovery Plan (2023)
  - "Due to several large impoundments, populations are now fragmented and only occur in Little Canoe Creek and Conasauga River and their tributaries, Coosawattee River and a single tributary, and Ballplay Creek."

- iNaturalist: https://www.inaturalist.org/observations?taxon_id=100556
  - 24 verifiable observations, all of which are research-grade with public coordinate data (**Error! Reference source not found.**).
  - These locations generally align with species range and critical habitat. These occurrences were considered for supplemental areas to critical habitat, but ultimately decided against as critical habitat capture all current populations.

- GBIF: https://www.gbif.org/species/2382382
  - GBIF includes 227 occurrence records, 67 of which are georeferenced; 35 of these include usable coordinate data based on latitude/longitude precision (3+ decimal places) and relative recency (2010-present) in Alabama, Georgia, and Tennessee. As with iNaturalist, this dataset was considered as a supplementary dataset for core map development, but ultimately not used.

- NatureServe Explorer: https://explorer.natureserve.org/
  - Available public EO information from NatureServe Explorer is generally consistent with FWS range and critical habitat, however, critical habitat alone was used to represent current

populations in developing the Trispot darter core map.

Appendix 2. GIS Data Review and Method to Develop Core Map

The core map for this species is based on designated critical habitat. Although the species is considered to be "off-field," the core map extent does not include a significant amount of agricultural area (497 acres); therefore, the removal of cultivated areas > 25 acres was not necessary.

1. **References and Software**
   - Software used: ArcGIS Pro version 3.2.
   - FWS Species Critical Habitat: https://ecos.fws.gov/ecp/species/8219.

2. **Datasets Used in Core Map Development**
   2.1. Critical Habitat

The critical habitat for this species was designated on September 30, 2020. A shapefile including species critical habitat for all critical habitat species was downloaded from the FWS ECOS website on January 24, 2025. The shapefile was converted to a feature class stored in a file geodatabase and reprojected to WKID #4269 ("North America Albers Equal Area Conic").

1. Using an ArcGIS Web Map the species was queried based on the ECOS listed "Entity ID" of 3069 and exported as a feature class to a temporary file geodatabase as a standalone Entity ID-specific layer.
2. The area of the critical habitat was calculated automatically by loading it into the software (ArcGIS Pro version 3.2) and reading its area from the attribute table ("Shape_Area"), then converting its units (square meters) into acres with a conversion rate of 0.000247105.
3. This shapefile was added to an ArcGIS Pro map and compared against the available known locations described in the most recent 5-Year Review (2023), and the available occurrence information from the GBIF, iNaturalist, and NatureServe databases.

Compliance Services International has determined that the shapefile for critical habitat functions well as the basis for the core map.

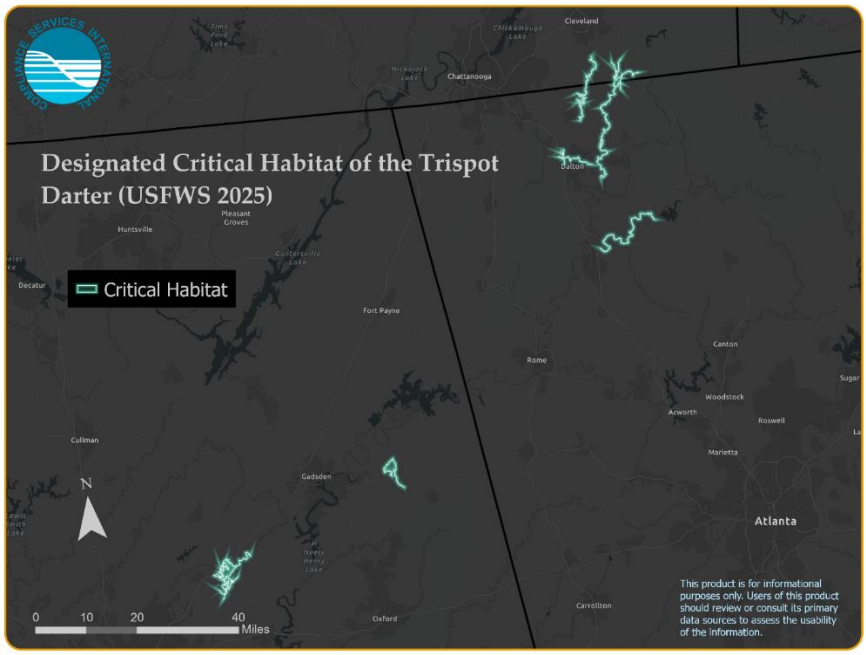

Figure 5. Designated critical habitat of the Trispot Darter (FWS 2025).

3. **Creating the Core Map**
   3.1. Core Map Layer Development

The Trispot darter core map is developed from critical habitat data as follows:

1. Import the species critical habitat as a feature class named "TD_CH."
2. (Optional) Export the previous layer "TD_CH" as a new layer identifiable as the species core map ("TD_CoreMap").

References

Documents

- U.S. Environmental Protection Agency. 2024. Process EPA Uses to Develop Core Maps for Pesticide Use Limitation Areas. Accessed May 12, 2025. https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-areas.
- U.S. Fish and Wildlife Service. 2005. *Draft Recovery Plan for the Trispot Darter*. Accessed May 12, 2025. https://ecos.fws.gov/docs/recovery_plan/078282%2020230125_draft_RP_Trisport%20Darter.pdf.
- U.S. Fish and Wildlife Service. 2020. *Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for* Etheostoma trisella (*Trispot Darter*). Federal Register 85, no. 190 (September 30, 2020): 61619-61638. Accessed May 12, 2025. https://www.govinfo.gov/content/pkg/FR-2020-09-30/pdf/2020-19115.pdf#page=1.
- U.S. Fish and Wildlife Service. 2023. Species Status Assessment for the *Trispot Darter (*Etheostoma trisella*)*. Accessed May 12, 2025. https://iris.fws.gov/APPS/ServCat/DownloadFile/151853.
- U.S. Fish and Wildlife Service. 2025. *Trispot Darter* (Etheostoma trisella). Accessed May 12,

2025. https://ecos.fws.gov/ecp/species/8219.

Spatial Data & Software

- GBIF Secretariat. "*Etheostoma trisella* (Trispot Darter)." *GBIF Backbone Taxonomy*. Accessed May 12, 2025. https://www.gbif.org/species/2382382.
- iNaturalist. "Trispot Darter (*Etheostoma trisella*)." Accessed May 12, 2025. https://www.inaturalist.org/observations?taxon_id=100556.
- NatureServe. 2025. NatureServe Network Biodiversity Location Data accessed through NatureServe Explorer [web application]. NatureServe, Arlington, Virginia. Available https://explorer.natureserve.org/. Accessed May 12, 2025.
- Software used: ArcGIS Pro version 3.2.