Interim Core Map Documentation for Florida Prairie-Clover

Version 1
Review Completed: April 2026
Core Map Developer: U.S. Environmental Protection Agency (EPA), Office of Pesticide Programs (OPP)

Species Summary

The Florida prairie-clover (*Dalea carthagenensis* var. *floridana*; Entity ID #5273) is an endangered terrestrial plant (dicot). This species typically occurs in pine rockland, rockland hammock, marl prairie, and coastal berm habitats, specifically in open, well-lit areas maintained by disturbance. The species may also occur along roadsides within these habitats. The Florida prairie-clover is currently found in Miami-Dade and Monroe Counties in southern Florida. Pollinators for this species are unknown; seeds often fall to the ground but can be dispersed short distances by wind. There is proposed critical habitat for this species. Additional information is provided in **Appendix 1**.

Description of Core Map

The core map for the Florida prairie-clover is biological information type based on the proposed U.S. Fish and Wildlife Service (FWS) critical habitat. **Figure 1** depicts the interim core map for the Florida prairie-clover (green areas on map). The core map represents approximately 204,499 acres. Most known occurrences of this species fall within the proposed critical habitat; three species records in Palm Beach County in/near Boca Raton that are outside of the critical habitat are recent; however, these were not included in the core map due to the precision and positional accuracy of the occurrences and because they appear to conflict with FWS documentation. The occurrences did not support expanding the core map.

The Florida prairie-clover occurs in habitat classified as pine rockland, marl prairie, rockland hammock, and coastal berm, in addition to disturbed sites adjacent to these habitats, such as roadsides and mowed areas still dominated by native species. Landcover categories within the core map area are included in **Table 1**. Landcover within the core map is predominantly emergent herbaceous wetlands, which is consistent with the habitat of this species.

The core map developed for the Florida prairie-clover is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the Florida prairie-clover. 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 "limited" best professional judgment classification because it consists of the species' critical habitat with limited additions or subtractions (critical habitat with a 400-meter buffer; see **Appendix 2**). There is confidence in the core map because the species' critical habitat is highly refined, represents areas important for this species' conservation, and contains all known occurrences for this species outside of three locations in Boca Raton, Palm Beach County. This core map does not replace or revise any range or designated critical habitat developed by FWS for this species.

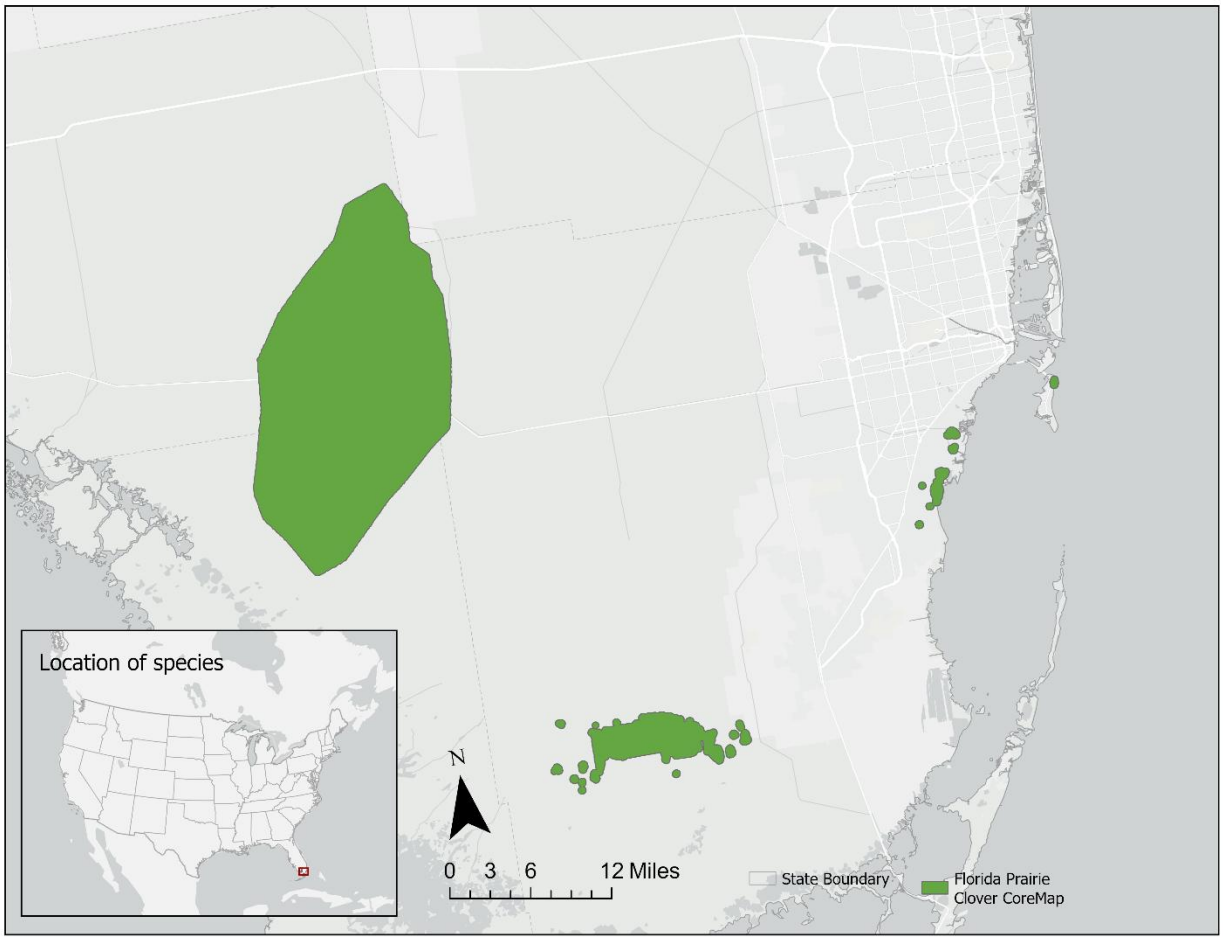

Figure 1. Interim core map for the Florida prairie-clover. The total acreage of the core map is approximately 204,499 acres.

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

Example pesticide use sites/types	NLCD Landcover (Value)	% of core map represented by landcover
Forestry	Deciduous Forest (41)	<1
Forestry	Evergreen Forest (42)	4
Forestry	Mixed Forest (43)	2
Agriculture	Pasture/Hay (81)	<1
Agriculture	Cultivated Crops (82)	<1
Mosquito adulticide, residential	Open space, developed (21)	<1
Mosquito adulticide, residential	Developed, Low intensity (22)	<1
Mosquito adulticide, residential	Developed, Medium intensity (23)	<1
Mosquito adulticide, residential	Developed, High intensity (24)	<1
Invasive species control	Woody Wetlands (90)	0
Invasive species control	Emergent Herbaceous Wetlands (95)	67
Invasive species control	Open water (11)	<1
Invasive species control	Grassland/herbaceous (71)	<1
Invasive species control	Scrub/shrub (52)	1
Invasive species control	Barren land (rock/sand/clay; 31)	25
Total Acres	**Interim Core Map Acres**	**~ 204,499**

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)
- Occurrence locations in NatureServe

EPA evaluated these four sets of data before selecting the type of and developing the core map. FWS' most recent 5-year review (2023) detailed known locations of this species. FWS described 18 documented occurrences that are extant and extirpated plus one location where the population status is unknown. Currently, there are 13 extant populations, which have locations that are consistent with the critical habitat. Other publicly available occurrence data did not support expanding the core map given the data's scale and resolution. **Appendix 1** includes more information on the available known location information.

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

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"[2] (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
4. Document the core map

For step 1, EPA compiled available information for the Florida prairie-clover from FWS as well as observational information available from various publicly available sources (discussed in the previous section). The information compiled for the Florida prairie-clover is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- Current existing populations generally occur in locations consistent with the critical habitat
- FWS critical habitat is recent and up to date

For step 2, EPA used the compiled information to identify the core map type, including the species range, critical habitat, and known location information. EPA compared known location data to the range and critical habitat and found that the FWS known locations of currently existing (extant) populations are generally consistent with the location of the proposed 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 also much larger than the areas where known locations occur. Based on this information, EPA used the proposed critical habitat as the core map.

For step 3, EPA used the proposed critical habitat available from FWS to create the Florida prairie-clover core map. EPA used the FWS proposed critical habitat; however, a GIS file of the critical habitat is not available from FWS; therefore, EPA used the critical habitat image from the ECOS (ecos.fws.gov) website and georeferenced it in GIS to create the core map. Due to some uncertainty in georeferencing images, a 400-meter buffer was added to ensure the species critical habitat is fully represented.

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

EPA did not explore approaches other than those described in this documentation.

[2] 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

1. **Recent FWS Documents/Links**

- Florida Prairie-Clover 5-year review 2023 – (7/18/2023)
- Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Sideroxylon reclinatum* ssp. *austrofloridense* (Everglades bully), *Digitaria pauciflora* (Florida pineland crabgrass), *Chamaesyce deltoidea* ssp. *pinetorum* (pineland sandmat), and *Dalea carthagenensis* var. *floridana* (Florida prairie-clover) – (10/14/2022)

2. **Background information**
    - **Status:** Federally listed as endangered in 2017
    - Resiliency, redundancy, and representation (the 3Rs)
        - "Most Florida prairie-clover populations are on small remnant pine rockland sites and adjacent disturbed areas, with population sizes only ranging from the tens to hundreds of individuals. Five of the eight extant population have fewer than 25 individuals. Therefore, the resiliency of the populations and redundancy of the species will continue to be influenced by the amount of habitat remaining in the Monroe, Collier, and Miami-Dade Counties." (Critical Habitat 2022, 62576)

    - **Habitat, Life History, and Ecology**
        - **Habitat**:
            - "Florida prairie-clover is a shrub in the pea family (Fabaceae) with a woody base that typically grows in pine rockland, rockland hammock, marl prairie, and coastal berm habitats, specifically in open, well-lit areas maintained by disturbance. It is also noted that Florida prairie-clover may also occur along roadsides within the aforementioned habitats (Service 2017). " (2022 5-Year Review, 2)
            - The proposed critical habitat document indicates that the species may occurs at "disturbed sites adjacent to these habitats, such as roadsides and mowed areas still dominated by native species." (2022 Critical Habitat, 62570)
            - "These habitats and their associated plant communities provide vegetation structure that allows for adequate growing space, moisture, sunlight, pollinators, and a competitive regime that is required for Florida prairie-clover to persist and spread. The plant also requires a calcareous limestone substrate that varies from nearly bare to thin layers or small pockets of shallow soil to provide suitable growing conditions (e.g., pH, nutrients, anchoring, and proper drainage). As a result of these marginal soil conditions, plants such as Florida prairie-clover rely on sparse competition and periodic disturbance to thrive and persist." (2022 Critical Habitat, 62570)

        - **Reproduction/pollinators**:
            - "Pollinators for this species are unknown. Seeds often fall to the ground but can be dispersed short distances by wind. Larger plants can produce over 500 seeds. Seedling recruitment varies widely from year to year, with lower recruitment in drier years. While the species is a short-lived plant, they produce a large quantity of seeds, providing a significant seed bank." (2022 5-Year Review, 2)
            - "The Service recognizes that dynamics of temperature and soil moisture have a noteworthy impact on seedling survival in Florida prairie-clover (Service 2017).

Specifically, "low winter temperature coupled with average rainfall resulted in high seedling recruitment … However, if rainfall followed cold winter temperatures, seedling mortality was high" (Service. 2017). Prescribed fire is also important for maintaining healthy Florida prairie-clover habitat to prevent hardwood encroachment and shading out by other plant species. Pine rocklands and marl prairies as a whole are dependent on frequent fires in order to prevent their succession into fully hardwood habitats (Bradley and Gann 1999; Florida Natural Areas Inventory (FNAI) 2010; Everglades National Park (ENP) 2015; Service 2017)." (2022 5-Year Review, 2)

- **Taxonomy**
  - "The current accepted taxonomy for this variety remains *Dalea carthagenensis* var. *floridana* according to [the] Integrated Taxonomic Information System (2022). The most current taxonomy accepted by experts in the southeast have elevated this variety to full species status, *Dalea floridana*, because of its isolated range and distinct morphology (Diggs and Weakley 2017, Weakley and Southeastern Flora Team 2022). This updated nomenclature does not impact our assessment of the listed entity, and it is still considered a valid entity by the Service. Until we finalize a technical correction of the name, we will continue to reference the species using the name as it was listed." (2023 5-Year Review, 2)
  - FWS Category: Flowering dicot plant, out-crosser with biotic pollination vectors (group 9)

- **Essential Physical Biological Features (PBFs) for Designated Critical Habitat:**

South Florida pine rockland, marl prairie, rockland hammock, and coastal berm habitat and adjacent disturbed areas:

  - Consisting of limestone substrate that provides nutritional requirements and suitable growing conditions (e.g., pH, nutrients, anchoring, and drainage)
  - Characterized by an open canopy and understory with a high proportion of native plant species to provide for sufficient sunlight to permit growth and flowering
  - Subjected to a monthly mean temperature characteristic of the subtropical humid classification in Miami-Dade County or the tropical humid classification in Collier and Monroe Counties and short hydroperiods ranging up to 60 days each year
  - Subjected to periodic natural (e.g., fire, hurricanes, and storm surge) or unnatural (e.g., prescribed fire, mowing) disturbance regimes to maintain open canopy conditions
  - Containing the presence of native pollinators for natural pollination and reproduction (Critical Habitat 2022, 62573)

- **Relevant Pesticide Use Sites in FWS Documents**
  - Information on pesticide threats to the species are not included in the FWS documents.

- **Threats**
  - "The primary threat to Florida prairie-clover populations are habitat loss and habitat fragmentation (Factor A). Habitat loss results from land use changes, introduction of invasive species, and succession of habitats to conditions inhospitable for Florida prairie-clover. Habitat and plants can also be directly impacted from off-road vehicle use (Bradley and Gann 1999). Continued land use changes also result in habitat

fragmentation due to a variety of land developments increases population isolation." (2022 5-Year Review, 3)

- **Relevant Recovery Criteria and Actions**
  - There is no finalized recovery plan for this species, and therefore information on recovery criteria and de-listing criteria are not available.
  - The 2022 5-Year Review identifies potential recovery activities:
    - Continue regular fire prescriptions (every 3-7 years) at R. Hardy Matheson Preserve.
    - Identify other occurrences which may be candidates for prescribed fire.

    (5-Year Review, 7)
  - The 2022 5-Year Review also identifies potential monitoring/research activities:
    - Identify new occurrences through broadscale surveys for extant Florida prairie clover populations. This effort may be aided by education. By teaching the public to identify and report this species through widely available platforms like iNaturalist new occurrences may be identified.
    - Identify methods to mimic prescribed fire where the application of fire is impractical, like publicly owned conservation lands embedded within urban communities.
    - Identify open mesic to xeric shrub communities (pine rockland, marl prairie, coastal strand, and ecotones between each of these habitats and rockland hammocks) with a high probability of persistence given sea-level rise projections. Pursue the sustained restoration and preservation of these sites be they preserves, parks, or private property.
      - One such location may be the Richmond Pine Rockland.

    (2022 5-Year Review, 7)

3. Description of the species range

- "The Florida prairie-clover is currently restricted to pine rocklands and similar habitats in Miami-Dade and Monroe counties." (2023 5-Year Review, 3).
- Figure A1-1 depicts the current FWS species range (last updated 2/15/2022).
- The species range is approximately 6,900,000 acres.

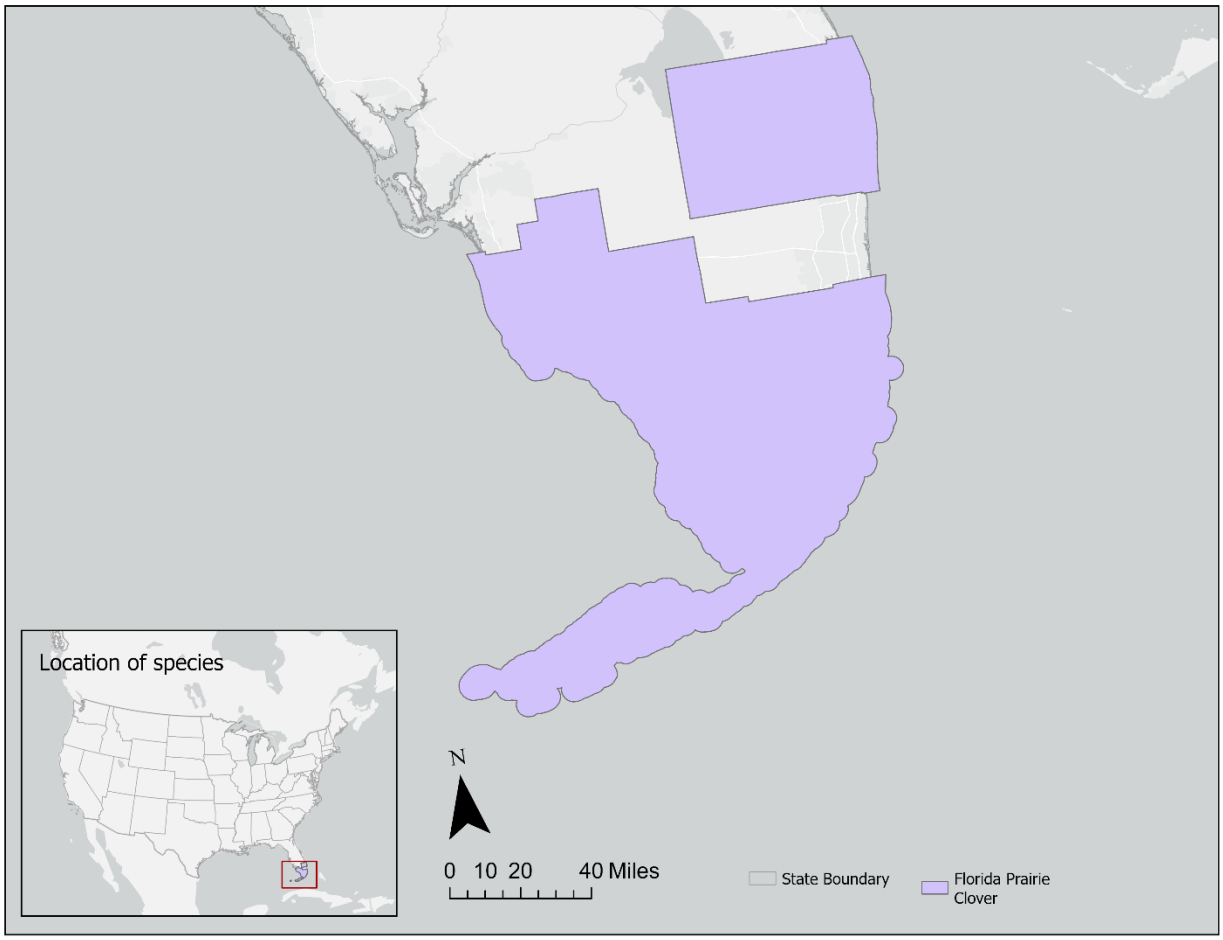

Figure A1-1. FWS Range for the Florida prairie-clover.

4. **Critical Habitat**
   - The Florida prairie-clover critical habitat designation was proposed in 2022.
   - The proposed rule indicates that "Florida prairie-clover occurs in Collier, Miami-Dade, and Monroe Counties in communities classified as pine rockland, marl prairie, rockland hammock, and coastal berm, in addition to disturbed sites adjacent to these habitats, such as roadsides and mowed areas still dominated by native species." (Critical Habitat 2022, 62570)
   - The proposed critical habitat includes 179,300 acres (72,560 ha) in four units in Monroe, Collier, and Miami-Dade Counties. (2022 Critical Habitat, 62564)
   - The four critical habitat units are: 1) Big Cypress National Preserve, Collier, Miami-Dade, and Monroe Counties (169,885 acres; 68,750 ha); 2) Everglades National Park, Miami-Dade County (8,728 ac; 3,532 ha); 3) U.S. Department of Agriculture Subtropical Horticultural Research Station, Miami-Dade County (630 ac; 255 ha); 4) Crandon Park, Miami-Dade County (57 ac; 23 ha). (2022 Critical Habitat, 62597-62600)
   - **Figure A1-2** depicts the proposed critical habitat.

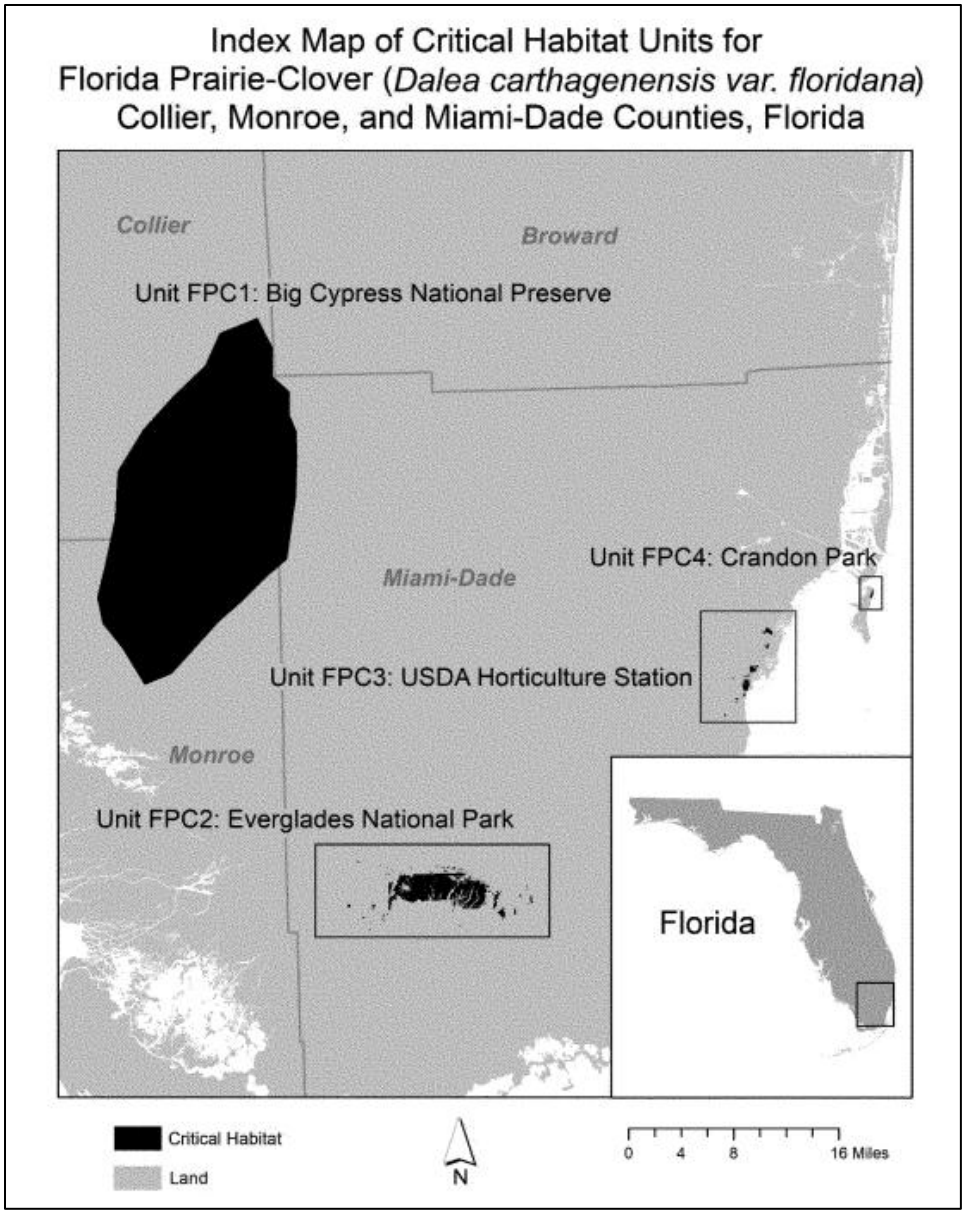

Figure A1-2. Critical habitat units for the Florida prairie-clover. Reproduced from FWS Designation of Critical Habitat proposed rule (2022 Critical Habitat, 62596).

5. **Known Locations**
    - **Known Locations Described in FWS Documents**
        - There are currently 18 known occurrences of Florida prairie-clover and one location where the population status is unknown (**Table A1-1**).
        - Of these, 13 occurrences are currently known to be extant.
        - Five historically known occurrences are likely extirpated, including one in Palm Beach County.
        - When considering the locations of the current extant populations (**Figure A1-3**), they are consistent with the location of the critical habitat (**Figure A1-2**).

Table A1-1. Summary of known occurrences for the Florida prairie-clover summarized by FWS. Occurrences in bold indicate the 13 occurrences presumed extant at the time of the 2023 5-Year Review. (2023 5-Year Review, 4)

Occurrence	Land ownership	Most recent population estimate (year of estimate)
Big Cyress National Park, North Oasis Visitor Center	National Park Service	236 individual plants (2014); 40 individuals founds in 2018
Big Cypress National Park, Pinecrest region, along Loop Road	National Park Service	17 individual plants (2014); no plants found in 2018
Big Cypress National Park, 11-Mile Road	National Park Service	Extirpated
Everglades National Park (cumulative)	National Park Service	100 individual plants (2018)*
Everglades National Park, road to Mahogany Hammock	National Park Service	At least one individual plant (2018)
Everglades National Park, Rowdy Bend	National Park Service	At least one individual plant (2018)
Everglades National Park, road to water treatment plant	National Park Service	At least one individual plant (2018)
Deering Estate (cumulative)	Miami-Dade County	372 individual plants (2020)
Deering Estate, north pine rock-land	Miami-Dade County	291 individual plants (2020)
Deering Estate, south addition pineland	Miami-Dade County	81 individual plants (2020)
Deering Estate, southern edge	Miami-Dade County	Presumed extant; however, no plants observed (2020)
R. Hardy Matheson Preserve	Miami-Dade County	327 individual plants (2020)
Crandon Park	City of Miami	143 individual plants (2021)
Virginia Key	Private	Likely extirpated
Strawberry Fields Hammock (next to Natural Forest Community), Cutler Bay	Private	35 individual plants (2018)
Florida Department of Health and Rehabilitation Services, Cutler Bay	Private	173 individual plants (2018)
Florida Power and Light property (Very near to the Deering Estate), Cutler Bay	Private	Presumed extant; however, no plants observed (2018)
Coral Gables Area	Private	Extirpated
Cox Hammock Preserve	Miami-Dade County	Extirpated
Pineland South of Miami River	Private	Unknown
Palm Beach County	Private	Extirpated

*The species as assumed extirpated from Everglades National Park at the time of listing in 2017.

- **Occurrences in iNaturalist**
  - Searched on 7/9/2025.
  - https://www.inaturalist.org/observations?quality_grade=research&subview=map&taxon_id=240262&verifiable=any
  - There are 29 research grade observations available from 2017-2025.
  - Due to the coarse resolution of these data, some of the observations are mapped in the ocean. The uncertainty around these points as presented in iNaturalist includes land area that is consistent with the species' critical habitat.
  - The three observations near Boca Raton in Palm Beach County are not accounted for in the proposed critical habitat but are consistent with the species' historic range. FWS documents indicate that the species was once found in Palm Beach County, but was extirpated (2022 5-Year Review, 3). The locations could possibly occur in the city of Boca Raton and in the Gumbo Limbo Nature Center; however, there is some uncertainty surrounding accuracy of iNaturalist observations.

Occurrences in NatureServe

- NatureServe was searched on 7/9/2025.
- https://explorer.natureserve.org/pro/Map?taxonUniqueId=ELEMENT_GLOBAL.2.142674
- NatureServe has four documented locations in southern Florida.
- These locations are generally consistent with the location of the range and proposed critical habitat.

Occurrences in GBIF

- GBIF was searched on 7/9/2025.
- There were 22 "human observations" available from 2004-2025.
- Many of the observations are included in either iNaturalist or NatureServe.
- https://www.gbif.org/occurrence/map?basis_of_record=HUMAN_OBSERVATION&taxon_key=5353500
- The northernmost observation was not accounted for in the proposed critical habitat.

Collectively, the occurrence data from iNaturalist, GBIF, and NatureServe do not support expanding the core map for the Florida prairie-clover beyond the proposed critical habitat. Although three observations from iNaturalist were outside of the critical habitat, FWS has suggested these areas do not likely contain the species, and there is limited area for the species to occur. Finally, there is uncertainty surrounding accuracy of where the species observations occur.

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

This core map was created based on critical habitat.

Dataset References and Software

- Software used: ArcGIS Pro 3.2
- FWS Species Critical habitat – last updated on 05/13/2022
  - Designated critical habitat is described in: 87 FR 62564 62611 and is available at the following link: https://www.govinfo.gov/link/fr/87/62564

Core Map Development

- EPA used the FWS proposed critical habitat; however, FWS has not released a GIS cultivated file. EPA took the critical habitat image and georeferenced it in GIS to create the core map. Due to some uncertainty in georeferencing images, a 400-meter buffer was added to ensure the species critical habitat is fully represented.
  - National Land Cover Database (NLCD) dataset was clipped to the core map extent using export raster.
  - Raster to polygon.
  - Pairwise dissolve by Classname to create single polygons per landcover type.
  - Calculate geometry to get acres per landcover category.