

Interim Core Map Documentation for the Brooksville bellflower (*Campanula robinsiae*)

Date Uploaded to EPA's GeoPlatform: October 2025

Draft Interim Core Map Developer: Center for Biological Diversity

EPA Review Notes

This core map was developed by the Center for Biological Diversity (CBD). CBD developed 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 developed by CBD and evaluated if: (1) the map and documentation are consistent with the agency's process; (2) areas added to or excluded from the interim core map are consistent with the species biology and/or recovery needs; (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. EPA did not alter the developer's map and made minor edits to the documentation.

The core map developed in this document for the Brooksville bellflower is considered interim. This core map incorporates information developed by U.S. Fish and Wildlife Service (FWS) and made available to the public. EPA reviewed the core map; 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.

Species Summary

The Brooksville bellflower (*Campanula robinsiae*; entity ID# 653) is an annual herbaceous plant found in Citrus, Hernando, and Hillsborough Counties in Florida. The species occurs along margins of ponds and marshes with fluctuating water levels and in moist seepage areas, typically surrounded by pastures or non-forested habitat. It occurs in association with other obligate and facultative wetland plants. The bellflower can both self-pollinate and cross-pollinate, though its pollinators are unknown. Some of the known locations for the species occur within Withlacoochee State Forest.

Description of Core Map

Figure 1 depicts the resulting interim core map for the Brooksville bellflower. The size of this core map is approximately 9,100 acres. The core map is biological information type based on known location information. While exact location information exists that can be used to pinpoint known sites, these populations already exist in a targeted range and occur primarily on public lands. Thus, while specific known locations were used as the first basis for the core map, references to named tracts of lands within the range of the species were used to buffer known locations appropriately without including degraded habitat where the bellflower could not be found.

The core map developed in this document for the Brooksville bellflower is considered interim. This core map can be used to develop pesticide use limitation areas (PULAs) that include the Brooksville

bellflower. 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. A summary of acreage by National Landcover Database (NLCD) land use type is provided in Error! Reference source not found.. Landcover is predominantly evergreen forest.

Based on EPA’s “best professional judgment classification” system, this core map is graded as “limited” (2) because it is based on the species range and known locations from FWS documents with some spatial refinements. 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 for this species.

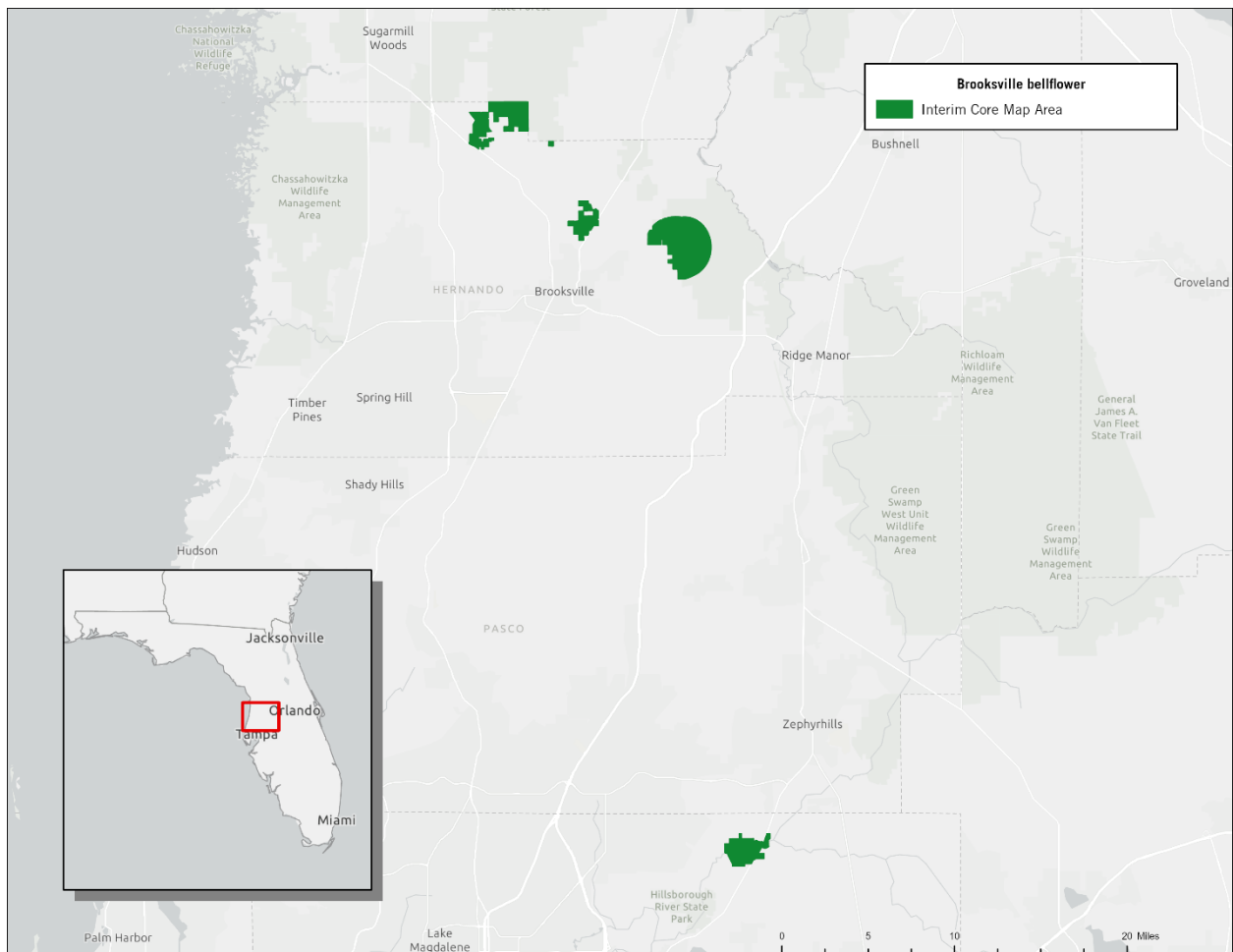


Figure 1. Brooksville bellflower interim core map (approximately 9,100 acres).

Table 1. Percentage of Interim Core Map Represented by NLCD¹ Land Covers and Associated Example Pesticide Use Sites/Types.

Example pesticide use sites/types	NLCD Landcover (Value)	% of core map represented by landcover	% of core map represented by example pesticide use ²
Forestry	Deciduous Forest (41)	0	71
Forestry	Evergreen Forest (42)	71	71
Forestry	Mixed Forest (43)	0	71
Agriculture	Pasture/Hay (81)	8	8
Agriculture	Cultivated Crops (82)	0	8
Mosquito adulticide, residential	Open space, developed (21)	2	3
Mosquito adulticide, residential	Developed, Low intensity (22)	1	3
Mosquito adulticide, residential	Developed, Medium intensity (23)	0	3
Mosquito adulticide, residential	Developed, High intensity (24)	0	3
Invasive species control	Woody Wetlands (90)	17	19
Invasive species control	Emergent Herbaceous Wetlands (95)	1	19
Invasive species control	Open water (11)	0	19
Invasive species control	Grassland/herbaceous (71)	0	19
Invasive species control	Scrub/shrub (52)	1	19
Invasive species control	Barren land (rock/sand/clay; 31)	0	19
Total Acres	Interim Core Map Acres	~9,100	

Evaluation of Known Location Information

There are four datasets with known location information:

- 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 appeared to have the best available occurrence information. FWS known occurrences are located within the species range. There are no relevant occurrences in GBIF. Occurrences in iNaturalist and NatureServe are generally consistent with the FWS known locations and do not support further expanding the core map outside of the FWS range and known occurrences. **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>

² The total percentage is slightly greater than 100% due to rounding.

The Florida Natural Area Inventory (FNAI) has specific location information for the Brooksville bellflower, which is incorporated in the 2024 5-Year Review. As detailed in **Appendix 1**, this information is robust and targeted enough to inform the basis of the core map.

Approach Used to Create Core Map

This core map was developed by EPA 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, CBD compiled available information for the Brooksville bellflower from FWS. **Appendix 1** provides the compiled information for the bellflower, and influential information includes the 2024 5-Year Review.

For step 2, CBD used the compiled information to identify the core map type. The 5-Year Review included robust and targeted location information, as well as narrative descriptions of each tract. To generalize the point locations to a greater area of occupancy, CBD cross-referenced narrative descriptions of public lands that the bellflower exists on. Where the tract of land was extremely large, we relied upon a portion of the range within suitable habitat.

For step 3, CBD used the best available data sources to generate the core map. All GIS data sources used for the bellflower are discussed in process document, with the primary dataset being the 5 Year Review and Range maps. For this core map, CBD used the known location information buffered by narrative description and range.

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

CBD considered using a simple range PULA. However, as discussed below, some occurrences were found outside of the FWS range. Some clearly degraded habitat was within the range as well, and while activities in those areas might cause a disturbance, for purposes of core mapping, those areas should not be included.

Appendix 1. Information compiled for species during Step 1

1. Recent FWS Documents

- [Brooksville Bellflower \(*Campanula robinsiae*\) Status Review: Summary and Evaluation \(2024\)](#)
- [Brooksville Bellflower \(*Campanula robinsiae*\) 5-Year Review: Summary and Evaluation \(2019\)](#)
- [Recovery Plan, Brooksville Bellflower \(*Campanula robinsiae*\) and Cooley's Water-Willow \(*Justicia cooleyi*\) \(1994\)](#)

2. Background Information

Status: Endangered

Resiliency, Redundancy, and Representation (the 3Rs):

FWS documents do not explicitly describe the 3Rs. The following information provided in the FWS documents may be relevant.

- Seed banks for the Brooksville bellflower can be very resilient and remain dormant for years of low water levels and reappear when environmental conditions are favorable. (5-Year Review, 2024)
- As the Brooksville bellflower has a very limited number of populations on public lands and a narrow geographic distribution, habitat degradation remains the main threat to this species. (5-Year Review, 2024)
- FWS is not aware of any climate change information specific to the habits or habitat of Brooksville bellflower that would indicate what potential effects climate change and increasing temperatures and rainfall, or extended drought conditions may have on this species. FWS has no evidence that climate changes observed to date have had any adverse impact on the species, or its habitat nor is there information suggesting that the species will not be able adapt to predicted changes in weather conditions. (5-Year Review, 2024)

Habitat, Life History, and Ecology

- **Habitat:** *Campanula robinsae* is an herbaceous marginal plant found around marshes, ponds, and moist drainage areas. *Campanula robinsae* is highly dependent on Winter-Spring water levels. Only seven populations of this plant are known in Citrus, Hernando, Hillsborough Counties in Florida. (5-Year Review, 2024)
- **Pollination:**
 - The plant is both chasmogamous (open-flowered, cross-pollinating) and cleistogamous (close-flowered, self-pollinating). Seed production proceeds while flowering continues. Seeds are about 1 mm long, the smallest of any genus in North America (Recovery Plan, 1994).
 - Pollinators of the bellflower are unknown. (5-Year Review, 2019)

Taxonomy:

Kingdom: Plantae
Clade: Tracheophytes
Clade: Angiosperms
Clade: Eudicots
Clade: Asterids
Order: Asterales
Family: Campanulaceae
Genus: *Campanula*
Species: *robinsiae*

Relevant Pesticide Use Sites:

Developed land adjacent to occupied habitat may increase herbicide runoff into the habitat of the bellflower, which may affect growth and germination. (5-Year Review, 2019; Recovery Plan, 1994)

Relevant Recover Criteria and Actions:

Objective: Delisting through protection of habitat and reestablishment of populations.

Criteria: Understanding the distribution of annual populations of *C. robinsiae* through monitoring of the species on government-owned sites. Reestablishment of at least 10 viable and self-sustaining populations of *C. robinsiae* in pond margin habitats, consisting of 10,000 individuals on prolific years.

Recovery Actions:

1. Develop management and protection criteria for populations on current managed areas (includes collection of biological/systematic data and control of exotic plants).
2. Acquire additional habitat, or protect habitat through conservation easements.
3. Conduct additional surveys for new populations of the species.
4. Augment existing cultivated populations, including establishment of a germ plasm bank.
5. Develop plans for possible (re)introduction of plants into suitable habitats (includes 10-year monitoring of existing and/or reintroduced populations). (Recovery Plan, 1994)

Recommendations for Future Actions:

Relevant future actions include:

1. Support research on: effects of cattle grazing; life history needs; microhabitat requirements; temperature effects on germination; and the effects of drought and fluctuating water levels on germination.
2. Transplant experiments, long-term seed viability trails, and optimizing germination protocols.
3. Collaborating with land managers to increase beneficial habitat management.
4. Continue conducting surveys at known locations and expand surveys to included potential suitable areas. (5-Year Review, 2024)

3. Description of Species Range

The FWS species range for the Brooksville bellflower (last updated May 25th, 2022) lies within rounded buffers around known occupied sites (**Figure A1-2**). Some locations in northern Hernando County are not included within this range.

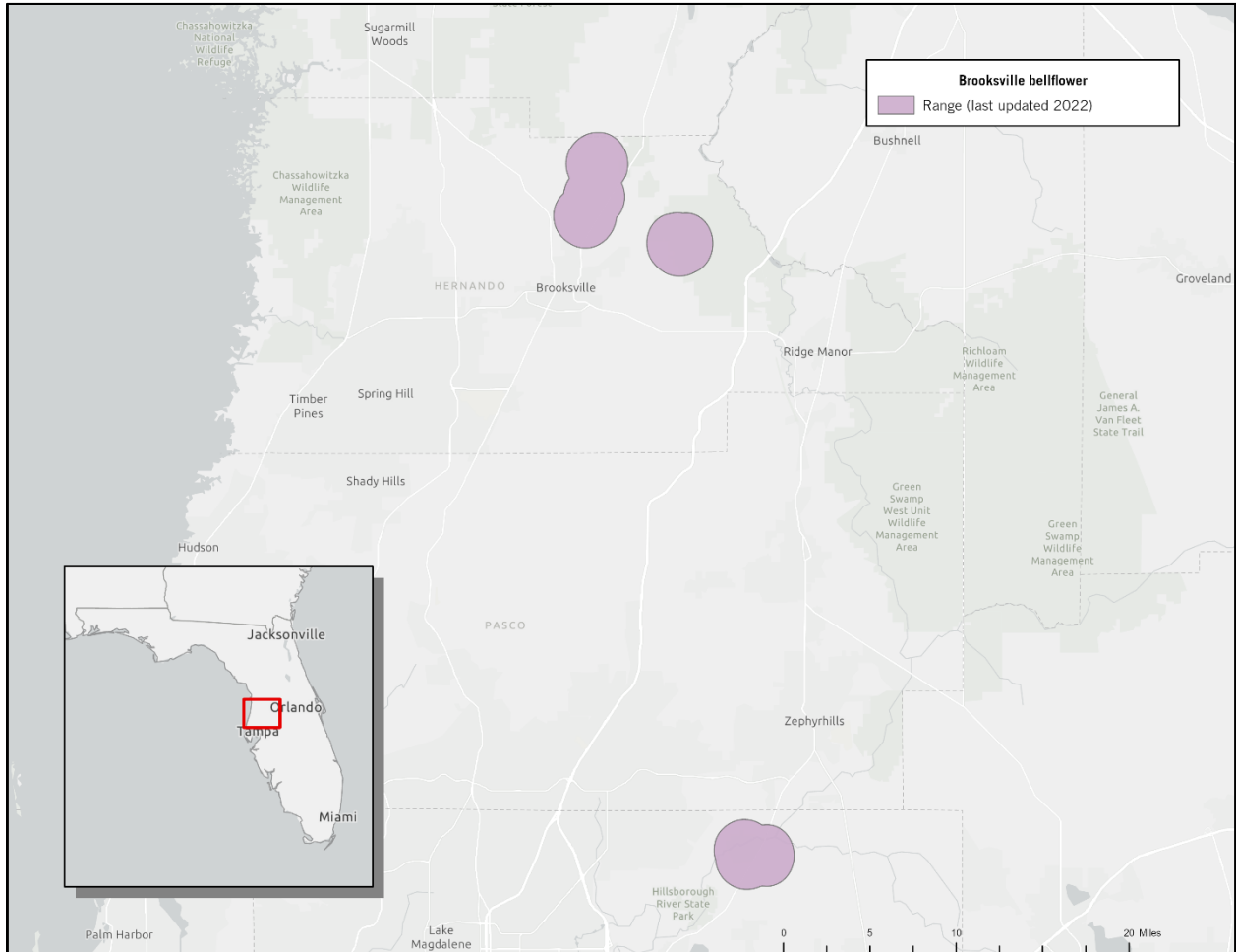


Figure A1-1. FWS species range for the Brooksville bellflower (updated 04-25-2022; approximately 23,275 acres)

4. Critical Habitat

The Brooksville bellflower does not have critical habitat.

5. Known Locations

- **Known Locations Described in FWS Documentation:**

FWS documents cite the FNAI occurrence database. The database contained seven locations as of 2023, with three populations recently documented as of the 2024 5-Year Review that had not yet been assigned an element occurrence (EO) number by FNAI, resulting in a total of 10 known locations. Figure 2 in FWS’s 2024 5-Year Review illustrates some occurrence information for this species.

The 2024 5-Year Review includes detailed descriptions of each site and includes a table with short summaries of EOs (**Table 2**). The only location identified on the table that is not identified on the map is the Hillsborough River State Park population.

Table 2. EO Locations of Brooksville Bellflower from 5 Year Review.

Location	EO #	County	Last observed	Plants Recorded	Status
Brooksville Sec 24	1	Hernando	03/20/2012	0	Extirpated
Burns Prairie	2	Hernando	03/29/2024	1,118	Extant
Chinsegut Hill	3	Hernando	04/12/2010	0	Extirpated
Hillsborough River S.P.	4	Hillsborough	03/28/2024	2,281	Extant
Croom 1 South	5	Hernando	03/28/2024	471	Extant
Cason 1 South	6	Hernando	03/08/2024	Present	Extant
Annutteliga Hammock	7	Hernando	03/05/2024	25	Extant
Cason 2 North		Hernando	03/01/2024	357	Extant
Croom 2 North		Hernando	03/27/2024	1,505	Extant
Croom Power Line Road		Hernando	03/21/2023	0	Extirpated?

Brooksville Sec 24 and Chinsegut Hill are considered extirpated, noting that the habitat is degraded and that Brooksville Sec 24 has planned housing development at the site. The Croom Power Line Road population has not been continuously surveyed, and while habitat has been degraded, the population is on public land and could potentially still exist. However, no more than 10 plants have been observed in a single year and plants were not found at this location in 2023 or 2024. FWS notes that additional surveys are needed to confirm this determination. (5-Year Review, 2024)

• **Occurrences Included in Public Databases:**

- a. EPA queried iNaturalist, GBIF, and NatureServe.
- b. iNaturalist (available [here](#)) included three research-grade observations from March 2021-March 2024 for Brooksville bellflower under the Latin name *Protocodon robinsiae*. The coordinates of these observations were obscured due to the species status, so the coarse locations of the observations were reviewed. All observations appear to be within the range, with the two southern observations likely representing the known locations in Hillsborough River State Park and the northern observation likely representing the known locations in Withlacoochee State Forest.
- c. GBIF (available [here](#)) included no occurrences with or without geographic coordinates.
- d. NatureServe (available [here](#)) was searched and the species distribution shown on the map generally aligned with the FWS known locations. The entry for *C. robinsiae* (called “Robins’ bellflower” in the database) cites four occurrences in Hernando and Hillsborough Counties.

Appendix 2. GIS Data Review and Method to Develop Core Map (Step 3)

The totality of Appendix 2 developed the draft interim core map developer is not included in this documentation due to the fine resolution of the occurrences.

The core map type for this species is based on biological information of known locations listed in the 2024 5-Year Review. Under the heading of “Habitat and Distribution” in the 5-Year Status Review, **Table 2** and **Figure 2** were used to determine the general location areas. The “Status” column of **Table 2** where a “Location” is shown as “Extant” defines the seven known populations. **Figure 2**, once geo-referenced, shows the general locations of six of the seven known extant populations. The seventh population is named “Hillsborough River State Park”.

The FWS ECOS Brooksville Bellflower’s April 25, 2022, range was used as a step to refine the map areas for the known locations in Hillsborough River State Park and the Croom Tract of Withlacoochee State Forest.

The map of Hernando County, Florida, was used to refine the Citrus Tract of Withlacoochee State Forest. Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (TIITF) and Florida A&M University parcel ownership was used to refine the Annutteliga Hammock and Cason South and North known locations.

1. References and Software

- World UTM Grid:
https://services.arcgis.com/P3ePLMYs2RVChkJx/arcgis/rest/services/World_UTM_Grid/FeatureServer
- FWS Species range:
https://ecos.fws.gov/docs/species/shapefiles/usfws_Q1TV_P01_Campanula_robinsiae_current_range.zip
- Florida Fish and Wildlife Commission – Wildlife Management Areas Florida (downloaded shapefile named “Wildlife_Management_Areas_Florida”)
https://geodata.myfwc.com/datasets/d7f8470d9df1451d8e950cdd409bee66_1/explore
- USGS (Protected Areas Database US) PAD-US file Version 4.0
<https://www.usgs.gov/programs/gap-analysis-project/science/pad-us-data-download>
- USA county/parish boundaries of United States in the 50 states and the District of Columbia
https://services.arcgis.com/P3ePLMYs2RVChkJx/arcgis/rest/services/USA_Census_Counties/FeatureServer
- Florida Department of Revenue 2024 Hernandez County Parcels
<https://floridarevenue.com/property/dataportal/Pages/default.aspx?path=/property/dataportal/Documents/PTO%20Data%20Portal/Map%20Data/2024F/2024F%20PAR>
- Exported .tif image of Figure 2 from Brooksville Bellflower (*Campanula robinsiae*) 5-Year Status Review 2024
- Software used: ArcGIS Pro version 3.2