Interim Core Map Documentation for the White Irisette

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

Species Summary

The white irisette (*Sisyrinchium dichotomum*; Entity ID # 1153) is a monocot plant listed as endangered in 1991. This species is found in western North Carolina and northern South Carolina, growing in dry to mesic soils with a pH close to neutral, in sloped areas containing open oak-hickory forests with 25%-50% canopy cover. It has grasslike leaves and grows up to 40 centimeters tall, with a solitary white and yellow flower. Critical habitat has not been designated for this species. Additional information is provided in **Appendix 1**.

Description of Core Map

The core map for the **Error! Reference source not found.** irisette is biological information type based on suitable habitat to include only areas with suitable oak-hickory habitat and appropriate level of tree canopy cover. EPA did not find evidence that any key areas for this species exist outside of the outer boundaries of the range or this core map. **Figure 1** depicts the interim core map for the white irisette. The core map represents approximately 26,269 acres.

The white irisette prefers open oak-hickory forests with 25%-50% canopy cover. **Table 1** includes a summary of example pesticide use sites associated with the combined core map based on the available landcover classes found in the National Land Cover Database (NLCD). Landcover within the core map is predominantly deciduous forest, which is consistent with the habitat of this species.

The core map developed for the white irisette is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the white irisette. This core map incorporates information developed by 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 "moderate" (4) best professional judgment classification for data interpretation due to assumptions made when selecting the suitable forested habitat, which serves as the basis for the core map, and the uncertainties and precision of the data. This core map does not replace or revise any range or designated critical habitat developed by FWS for this species.

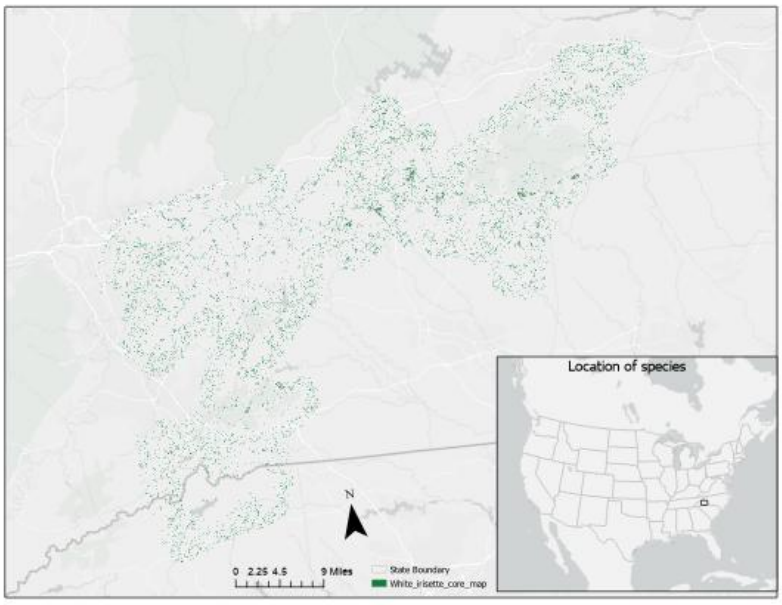

Figure 1. Interim core map for the white irisette. The total acreage of the core map is approximately 26,269 acres.

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 Class/Value	% Area
Forestry	Deciduous Forest (41)	52%
Forestry	Evergreen Forest (42)	2%
Forestry	Mixed Forest (43)	10%
Agriculture	Pasture/Hay (81)	9%
Agriculture	Cultivated Crops (82)	0%
Mosquito adulticide, residential	Developed Open Space (21)	20%
Mosquito adulticide, residential	Developed Low Intensity (22)	3%
Mosquito adulticide, residential	Developed Medium Intensity (23)	0%
Mosquito adulticide, residential	Developed High Intensity (24)	0%
Invasive species control	Woody Wetlands (90)	0%
Invasive species control	Emergent Herbaceous Wetlands (95)	0%
Invasive species control	Open Water (11)	0%
Invasive species control	Grassland/Herbaceous (71)	2%
Invasive species control	Shrub/Scrub (52)	1%
Invasive species control	Barren Land (31)	0%
Total Acres	**Interim Core Map Acres**	**~26,269**

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 Global Biodiversity Information Facility (GBIF)
- Occurrence locations in NatureServe

EPA evaluated these four sets of data before selecting the type of core map and developing it. FWS appeared to have the best available occurrence information, providing a map in the 2024 5-year review that depicted the current known locations and names and descriptions of current land ownership. Occurrences in iNaturalist, GBIF, and NatureServe did not support further expanding the core map outside of the FWS range and known locations. **Appendix 1** includes more information on the available range and 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

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

Habitats"[2] (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
4. Document the core map

For step 1, EPA compiled available information for the white irisette from FWS documentation such as the 2024 5-year review. The information compiled for the white irisette is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- Occupies oak-hickory forests
- Occupies areas of dappled shade, 25-50% canopy cover
- Occupies soils with a pH close to neutral
- Occupies scattered sloped areas in western North Carolina and northern South Carolina
- Named location descriptions found in the FWS documentation

For step 2, EPA used the compiled information to identify the core map type. Based on this information, EPA identified **Error! Reference source not found.** for the white irisette core map as biological information. The range of the species was not selected as the core map because it contains currently unoccupied habitat and unsuitable unforested areas, but the range was used to confirm the extent of the core map. Critical habitat was not selected as the core map because the critical habitat does not exist.

For step 3, EPA used the best available data sources to generate the core map. Geographic Information System (GIS) data sources and geoprocessing steps used for the white irisette are discussed in Appendix 2, with the primary dataset being the NLCD.

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

EPA considered incorporating datasets related to soil pH and slope/elevation into the refinement of the core map, such as SSURGO and the World Soils 250m pH and the USGS 3DEP Elevation datasets. However, when such datasets were brought into ArcGIS Pro for geoprocessing, they did nothing to refine the core map further. The refinements by percent canopy cover as well as landcover type refined the core map to the farthest extent possible. There were no areas of unsuitable slope/elevation/soil pH to be removed from the open canopy forested areas. Also, this species does not occur on cultivated lands, but there was no need to explicitly remove cultivated lands using EPA's modified cultivated layer from this core map. This is because no cultivated lands were included in the core map once the open canopy forested area refinements were applied.

[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**
   - White Irisette (*Sisyrinchium dichotomum*) 5- Year Status Review: Summary and Evaluation 2024: https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/14400.pdf
   - Recovery Plan for White Irisette (*Sisyrinchium dichotomum*) 1995: https://ecos.fws.gov/docs/recovery_plan/950410.pdf

2. **Background information**
   - Status: **Error! Reference source not found.** in 1991
   - Resiliency, redundancy, and representation (the 3Rs)
     - "Recent surveys indicated that electric transmission right of way maintenance via herbicide spraying and vegetation clearing is a threat. In 2023, numerous individuals of two sub-populations were lost to vegetation clearing and backpack spraying inside a state park by contractors maintaining power line right-of-way. We expect this threat to continue in the future, without proper communication between electric transmission contractors, supervisors, and land managers. Trampling stemming from nearby hiking trails is ongoing and severe. These examples show that even within protected lands, the plant is still vulnerable to the threats of habitat destruction. We have no indication that overutilization for commercial, recreational, scientific, or educational purposes (Factor B) poses a significant threat for the species. 5 Invasive epigeic earthworms (Factor C) are the only known possible predators of the white irisette, and evidence of the severity of this threat is still inconclusive (see Service 2019 for details). The inadequacy of existing regulatory mechanisms (Factor D) remains a threat to the species as acknowledged in the recovery plan (Service 1995). Suppression of natural disturbance (such as grazing/browsing and possibly fire) and encroachment by exotic species (Factor E) were identified in the listing rule (Service 1991). These threats reduce growth and survival by increasing competition for light and space and can impact the whole species range. Although it can be moderate, it is still ongoing. Species requires disturbance to maintain its open habitat and populations located away from openings are vulnerable to extirpation due to shading" (5-year review 2024)

     - "Very little specific information is available on the life history and population biology of the white irisette. An individual plant is defined as a cluster of stems arising from fibrous roots. There may be 10 or more stems on one plant. Even very small plants flower (sometimes with only one stem); therefore, the percentage of flowering plants in a population is rather high. There are no data on pollinators or seed vectors. Inbreeding is suggested by distance between populations and small population sizes. Pollen stainability counts from one population showed only 63 percent fertility on average.

- **Habitat, Life History, and Ecology**
  - **Habitat**:
    - **Error! Reference source not found.**White irisette is a perennial herb that occurs on mid-elevation scattered mountain slopes in western North Carolina and northern South Carolina (400 to 1000 meters above sea level" (5-year review 2024)
    - "It grows on circumneutral soils of middle-elevation slopes in dry to mesic, open oak-hickory forests, most often in dappled shade" (Recovery Plan 1995)
    - "The species seems to grow best on regularly disturbed sites, such as power lines, roadsides, and woodland edges. Populations occur at altitudes ranging from 400 to 1,000 meters on gentle to very steep slopes." (Recovery Plan 1995)
    - "The soils on which white irisette grows are generally shallow, due to the rockiness and steepness of the terrain. Soil pH is circumneutral, ranging from 6.0 (Feil 1987) to 7.5 to 8.0 (Pittman and Rayner 1992). Weathered amphibolite may be responsible for the high pH values." (Recovery Plan 1995)

  - **Reproduction/pollinators**:
    - "*Sisyrinchium dichotomum* is a perennial herb, 26 to 40 centimeters (cm) tall. Stems are winged, 2.0 to 3.6 millimeters (mm) wide and about one-half the height of the plant (11 to 20 cm). There are three to five nodes, with successively shorter internodes between dichotomous branches. Basal leaves are one-third to one-half the height of the plant (11 to 19 cm long and 2.2 to 3.6 mm wide). Stem leaves are as. broad or broader than the stem (9 to 14 cm long and 2.8 to 5.0 mm wide) and long-attenuate, with an acuminate apex. There are one to three winged peduncles per node (4 to 7 cm long and 0.7 to 0.9 mm wide). Spathes are small and delicate and are not much. Tepals are 7.5 mm long and are white and recurved. Capsules are mostly globose (2.1 to 3.1 mm long and 2.4 to 3.2 mm wide). Seeds are black, rugulose, globose to elliptical, and 1.0 to 3.0 mm in diameter: only three to six seeds are contained in each capsule. The chromosome number is 2n = 32. The flowering period is from late May through July (Hornberger 1987)." (Recovery Plan 1995)
    - According to the Recovery Plan 1995, little is known about the pollinators and mechanisms for pollinations and seed dispersal.
- **Taxonomy**
  - Rare herb monocot plant

- **Relevant Pesticide Use Sites in FWS Documents**
  - "Recent surveys indicated that electric transmission right of way maintenance via herbicide spraying and vegetation clearing is a threat. In 2023, numerous individuals of two sub-populations were lost to vegetation clearing and backpack spraying inside a state park by contractors maintaining power line right-of-way. We expect this threat to continue in the future, without proper communication between electric transmission contractors, supervisors, and land managers. Trampling stemming from nearby hiking trails is ongoing and severe. These examples show that even within protected lands, the plant is still vulnerable to the threats of habitat destruction." (5-year review 2024)

- **Relevant Recovery Criteria and Actions (source: Recovery Plan 1995)**
  - "White irisette will be considered for delisting when there are at least nine geographically distinct, self-sustaining populations that are protected to such a degree that the species no longer qualifies for protection under the Endangered Species Act."
- "Actions Needed:
  1. Survey suitable habitat for additional populations
  2. Monitor and protect existing populations
  3. Conduct research on the biology of the species
  4. Establish new populations or rehabilitate marginal populations to the point where they are self-sustaining
  5. Investigate and conduct necessary management activities at all locations"

3. Description of the species range

- The range of this species is shown in **Figure A1-1** and can be accessed on the FWS Environmental Conservation Online System (ECOS) website via the following link: https://ecos.fws.gov/ecp/species/8097#rangeInfo
- The range was last updated 04/07/2022

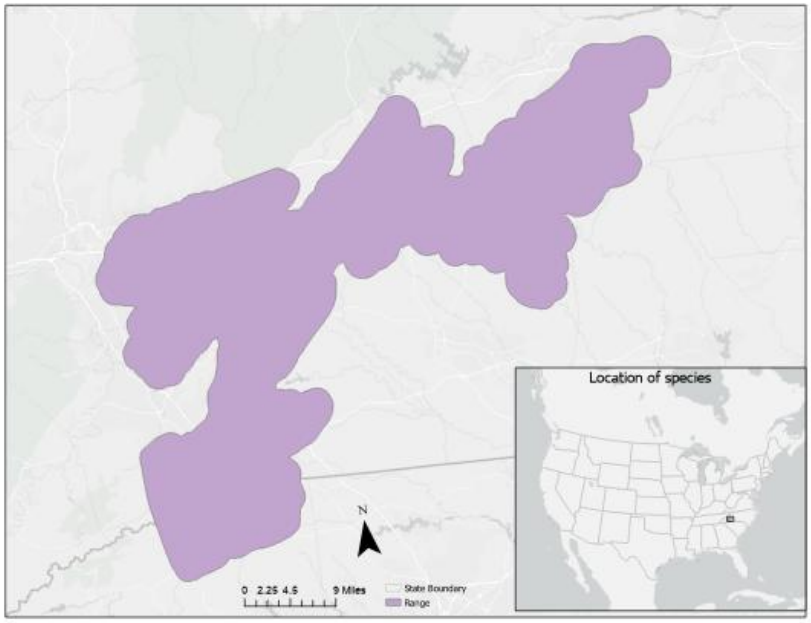

Figure A1-1. FWS Range of the white irisette. The total acreage is approximately 697,684 acres.

4. Critical Habitat

- Critical habitat has not been designated for the white irisette.

5. Known Locations

- **Known Locations Described in FWS Recovery Documents**
  - As of 2023, there are 15 populations of the white irisette (Table A1-1, reproduced from 5-year review 2024).
  - 92 sub-populations with a median value of 11 clumps per sub population (5-year review 2024).

- When considering the locations of the current extant populations (**Figure A1-2**), they are consistent with the location of the range.

Table A1-1. Known populations of the white irisette, reproduced from the 5-year review 2024.

Table A1-1a. Number of White irisette clumps counted within each population by five-year window. Cells with "ns" indicates no survey was conducted. Not all sub-populations were counted within each five-year window (see Table A1-1b). Situations where exact number of clumps in a subpopulation was not recorded (e.g., clumps were seen but not counted) are indicated with a "+".

Population	State	County	2004-2008	2009-2013	2014-2018	2019-2023
Round Mountain	NC	Polk	ns	ns	6	20
Melrose Mountain	NC/SC	Polk/Greenville	ns	445	312	167
Whiteoak/Chesnut/Miller	NC	Polk	1130	1600	248+	4
Cliffield Mountain/Deep Gap	NC	Henderson, Polk	ns	ns	115	ns
World's Edge/Sugarloaf	NC	Henderson, Polk, Rutherford	541+	9+	237+	772
Rotten Creek Headwater	NC	Polk	ns	ns	12	ns
Rumbling Bald/Cedar Knob/Round Top Mountain	NC	Rutherford	548	568	ns	670
Harris Mountain/Upper Cathys Creek	NC	Rutherford	ns	ns	ns	19
South Mountain Yellowtop/Biggerstack/Middle Mtn	NC	Rutherford	75	1+	ns	ns
Cherry Mountain	NC	Rutherford	19	ns	ns	ns
South Mountain Silver Creek Little Huckleberry Mountain	NC	Burke, Rutherford	268	ns	ns	233
South Mountain Hall Knob	NC	Burke	4	ns	ns	ns
South Mountain Mike Mountain/Windy Gap	NC	Rutherford, McDowell	ns	ns	ns	ns
Chesnut Ridge	SC	Greenville	ns	ns	ns	135
Hooker/Bailey Ridges	SC	Greenville	50-60	ns	ns	38
Totals			2635+	2623+	930+	2058

Table A1-1b. Number of white irisette sub-populations surveyed within each population, by 5-year window (there are currently 92 known subpopulations). Cells with "ns" indicates no survey was conducted.

Population	State	County	2004-2008	2009-2013	2014-2018	2019-2023
Round Mountain	NC	Polk	ns	ns	1	1
Melrose Mountain	NC/SC	Polk/Greenville	ns	2	2	2
Whiteoak/Chesnut/Miller	NC	Polk	4	4	4	1
Cliffield Mountain/Deep Gap	NC	Henderson, Polk	ns	ns	1	ns
World's Edge/Sugarloaf	NC	Henderson, Polk, Rutherford	16	2	8	7
Rotten Creek Headwater	NC	Polk	ns	ns	1	ns
Rumbling Bald/Cedar Knob/Round Top Mountain	NC	Rutherford	3	3	ns	1
Harris Mountain/Upper Cathys Creek	NC	Rutherford	ns	ns	ns	1

Population	State	County	2004-2008	2009-2013	2014-2018	2019-2023
South Mountain Yellowtop/Biggerstack/Middle Mtn	NC	Rutherford	2	1	ns	ns
Cherry Mountain	NC	Rutherford	1	ns	ns	ns
South Mountain Silver Creek Little Huckleberry Mountain	NC	Burke, Rutherford	1	ns	ns	1
South Mountain Hall Knob	NC	Burke	1	ns	ns	ns
South Mountain Mike Mountain/Windy Gap	NC	Rutherford, McDowell	ns	ns	ns	ns
Chesnut Ridge	SC	Greenville	ns	ns	ns	16
Hooker/Bailey Ridges	SC	Greenville	2	ns	ns	5
Totals			30	12	18*	14*

***Totals as reported in the 5-year review 2024**

- **Occurrences Described in Public Datasets**
  - **iNaturalist**
    - Accessed at the link https://www.inaturalist.org/observations?subview=map&taxon_id=129702 on 11/25/2025.
    - There are 26 research grade observations available from 2011-2024.
    - Coordinates are obscured due to the species status but appear to be within the **Error! Reference source not found.**

  - **Occurrences in NatureServe**
    - Accessed at the link https://explorer.natureserve.org/pro/Map?taxonUniqueId=ELEMENT_GLOBAL.2.131951 on 11/25/2025.
    - There are 5 research grade observations available from 2026.
    - Coordinates are obscured due to the species status but appear to be within the **Error! Reference source not found.**

  - **Occurrences in GBIF**
    - Accessed at the link https://www.gbif.org/occurrence/map?q=Sisyrinchium%20dichotomum on 11/25/2025.
    - There are 26 research grade observations available from 2011-2024.
    - Coordinates are obscured due to the species status but appear to be within the **Error! Reference source not found.**

  Collectively, the occurrence data from iNaturalist, GBIF, and NatureServe do not support expanding the core map beyond the outer bounds of the core map.

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

The white irisette core map ("White_irisette_core_map.dbf") was created based on biological information, specifically the species' preferred habitat and canopy cover. EPA used the FWS species range as the starting point (outer extent) for developing this core map. The range was overlaid with known locations to confirm they overlapped—none appeared outside of the range. Next, the National Land Cover Database (NLCD) was overlaid on top of this and filtered to include only deciduous and mixed forest land cover types (since the species prefers oak-hickory forests). Finally, NLCD tree canopy cover data was overlaid on top of this and filtered to include only areas with 25%-50% canopy cover (since the species prefers dappled shade).

1. Dataset References and Software
   - Software used: ArcGIS Pro 3.5
   - FWS Species Range – last updated on 04/07/2022

2. Datasets Used in Core Map Development
   - FWS Species Range: https://ecos.fws.gov/ecp/species/8097#rangeInfo
   - NLCD Tree Canopy Cover: https://epa.maps.arcgis.com/home/item.html?id=f2d114f071904e1fa11b4bb215dc08f3
   - USA NLCD Land Cover: https://www.arcgis.com/home/item.html?id=3ccf118ed80748909eb85c6d262b426f

3. **Core Map Development**

   - First, select only areas where suitable oak-hickory forested habitat can be found, starting by importing the NLCD into the map project.
   - The NLCD was limited to the extent of the species range by using "Export Raster," then the "Raster to polygon" tool was applied indicating "ClassName" as the field of interest.
   - Once the NLCD was vectorized, a "Select by Attributes" query was run with the expression: Where ClassName is equal to Deciduous Forest OR ClassName is equal to Mixed Forest.
   - The output of the "Select by Attributes" query was exported as its own layer, to be used for subsequent refinement steps with other datasets like percent tree canopy cover.
   - Next, select only areas of 25%-50% tree canopy cover using the NLCD tree canopy cover layer, starting by importing that dataset into the map project.
   - The NLCD tree canopy cover was limited to the extent of the deciduous and mixed forest refined area using "Export Raster," then the "Raster to polygon" tool was applied indicating "ClassName" as the field of interest.
   - Once the canopy cover dataset was vectorized, a "Select by Attributes" query was run with the expression: Where ClassName is equal to 25-50%. This was done because the species prefers areas of dappled shade.
   - The output of the "Select by Attributes" query was exported as its own layer, then it was dissolved to make the area draw more efficiently on the map. This was saved as the interim core map for the white irisette, which is shown in Figure 1 of the main document. Removing unsuitable percent tree canopy areas and areas that were not deciduous or mixed forest reduced the core map acreage considerably from the range (range totaled ~697,684 acres while the core map totals ~26,269 acres).