

# Interim Core Map Documentation for the Dwarf Lake Iris

## Version 1

**Review Completed:** April 2026

**Core Map Developer:** U.S. Environmental Protection Agency (EPA)s Office of Pesticide Programs (OPP)

## Species Summary

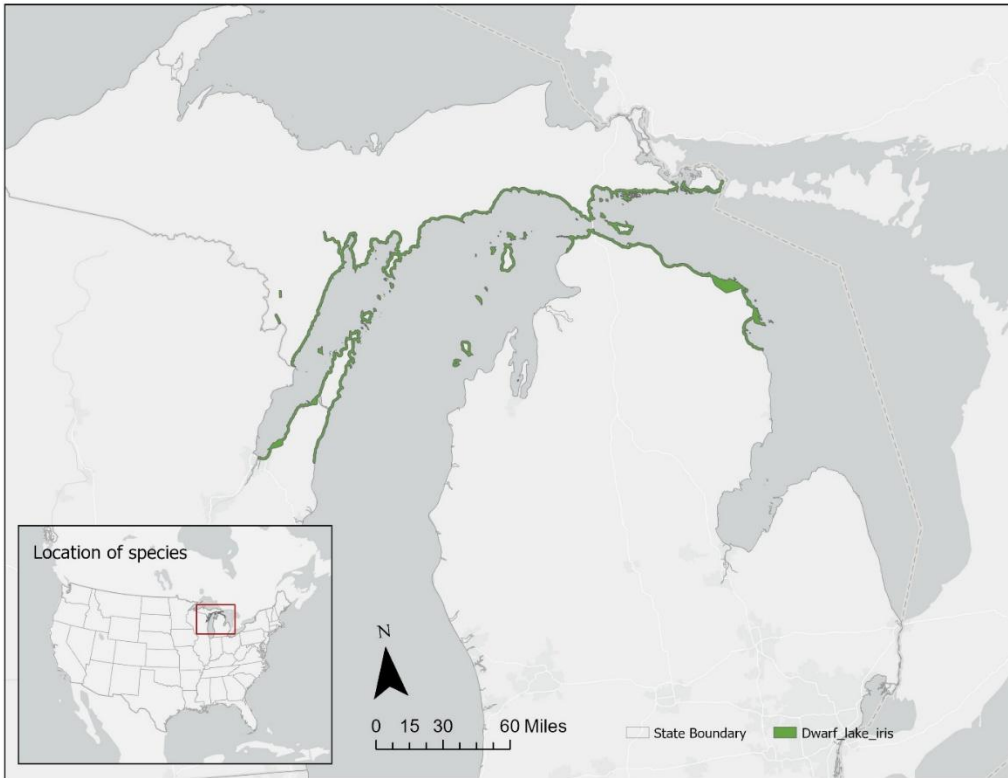
The dwarf lake iris (*Iris lacustris*; Entity ID #950) is a threatened terrestrial plant (monocot). There is no designated critical habitat for this species. This species typically grows in shallow soil over moist calcareous sands, gravel and beach rubble. The dwarf lake iris is a low-growing, perennial, flowering plant with slender rhizomes that is capable of both sexual and vegetative reproduction. Additional information is provided in **Appendix 1**.

## Description of Core Map

The core map for the dwarf lake iris is based on species range, which includes lakeshores for lakes Michigan and Huron. The species range is refined and represents areas important for this species' conservation and is consistent with available occurrence data. There is no designated critical habitat. **Figure 1** depicts the interim core map for the dwarf lake iris. The core map represents approximately 628,357 acres spread out along the banks of lake Michigan and Huron.

The dwarf lake iris is endemic to the shorelines of northern Lakes Huron and Michigan and is found in the states of Michigan and Wisconsin and the province of Ontario. The dwarf lake iris is a gap-phase species, and disturbance is an important component of their habitat. The cyclical fluctuations of Great Lakes water levels, wind, waves, and winter ice formations are significant natural disturbance features that create the necessary soil and light conditions for the dwarf lake iris to thrive. Optimal DLI habitat is openings that provide intermediate light levels, thin soils with minimal litter to discourage faster growing competitors, and adequate soil moisture. Landcover categories within the core map area are included in **Table 1**. Landcover is predominantly woody wetlands, which are generally consistent with the habitat of this species.

The core map developed for the dwarf lake iris is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the dwarf lake iris. 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" (1) best professional classification because it consists of the species' range without additions or subtractions. 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 dwarf lake iris. The total acreage of the interim core map is approximately 628,357 acres.**

**Table 1. Percentage of Interim Core Map Represented by National Land Cover Database (NLCD)<sup>1</sup> 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)	13
Forestry	Evergreen Forest (42)	12
Forestry	Mixed Forest (43)	7
Agriculture	Pasture/Hay (81)	5
Agriculture	Cultivated Crops (82)	3
Mosquito adulticide, residential	Open space, developed (21)	4
Mosquito adulticide, residential	Developed, Low intensity (22)	3
Mosquito adulticide, residential	Developed, Medium intensity (23)	2
Mosquito adulticide, residential	Developed, High intensity (24)	<1
Invasive species control	Woody Wetlands (90)	38
Invasive species control	Emergent Herbaceous Wetlands (95)	3
Invasive species control	Open water (11)	3
Invasive species control	Grassland/herbaceous (71)	2
Invasive species control	Scrub/shrub (52)	<1
Invasive species control	Barren land (rock/sand/clay; 31)	4
<b>Total Acres</b>	<b>Interim Core Map Acres</b>	<b>~ 628,357</b>

## Evaluation of Known Location Information

There are four datasets with known location information for this species:

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

EPA evaluated these sets of data to inform or support the core map. FWS provided the most refined descriptions of the occurrence information and confirmed that all known locations of extant populations are located within the range. iNaturalist had 1,398 research grade observations, which are consistent with the species range GBIF’s occurrence data consisted only of occurrences that had also been accounted for in iNaturalist. NatureServe documented areas all were consistent with the location of the species range. **Appendix 1** includes more information on the available known location information.

<sup>1</sup> 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<sup>2</sup>” (referred to as “the process”). 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, EPA compiled available information for the dwarf lake iris from FWS, as well as observation information available from various publicly available sources (including iNaturalist, GBIF and NatureServe). The information compiled for the dwarf lake iris is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- The species range is refined, following the lake shorelines where the species is known to or likely occurs.
- Occurrence data from other sources are generally consistent with the species range location.

For step 2, EPA used the compiled information to identify the core map type. EPA compared known location data to the range and found that these known locations are consistent with the species range. Based on that the range includes all occurrence data identified by FWS, EPA selected the range to use as the species core map. For step 3, EPA used the ECOS species range for the dwarf lake iris.

## 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.

## Appendix 1. Information Compiled for Species

### 1. Recent FWS Documents

- [Dwarf Lake iris \(Iris lacustris\) 5-year Review 2024](#)
- [Species Status Assessment Report for the Dwarf Lake iris \(Iris lacustris\) 2023](#)
- [Dwarf Lake iris \(Iris lacustris\) 5-Year Review 2022](#)
- [Dwarf Lake iris Recovery Plan 2013](#)
- [Dwarf Lake iris\(Iris lacustris\) 5-Year Review](#)

### 2. Background information on Species

- **Status:** Federally listed as threatened in 1988
- **Taxonomy.** FWS plant group 9: monocot flowering plants.
- **Resiliency** - Medium-Low

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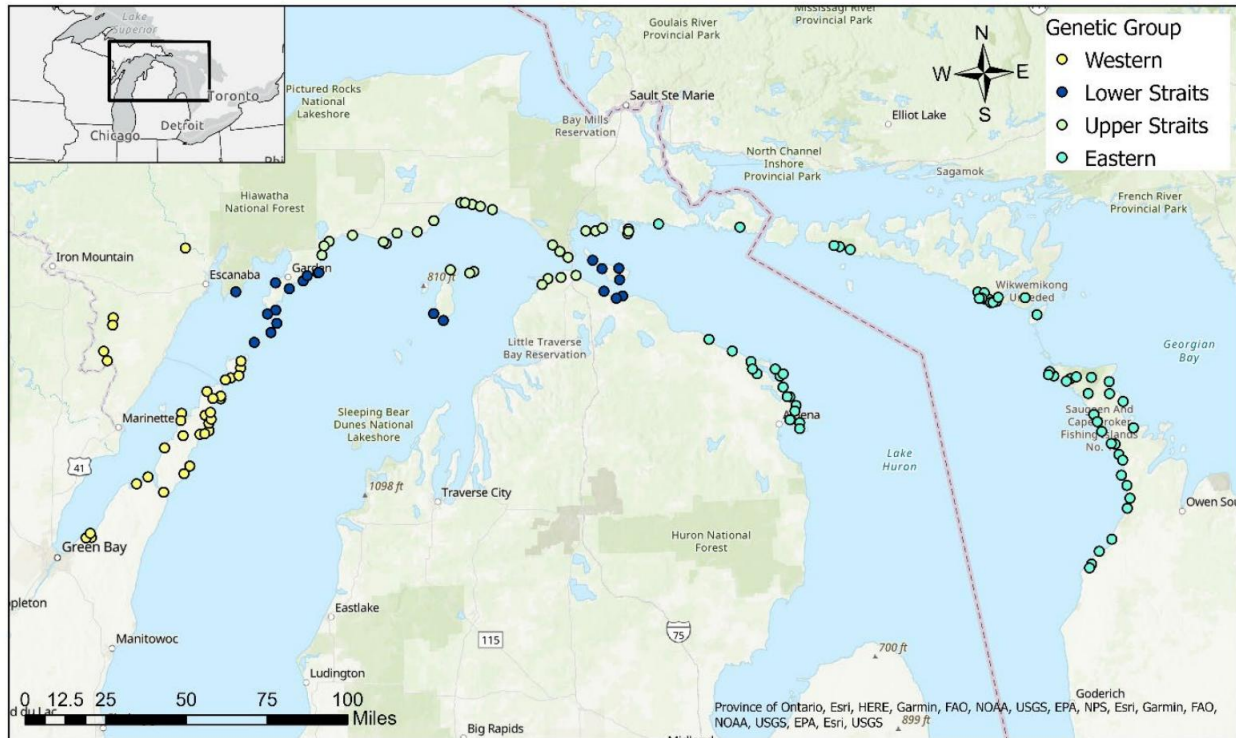
<sup>2</sup> Dated 2024, available online at: <https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-areas>

**Table 2: Summary of number of populations for the dwarf lake iris resiliency across representation units.**

Overall Condition	East	Upper Straits	Lower Straits	West	Total
High	9	4	6	7	26
Medium	29	13	9	15	66
Low	22	13	6	11	52
Total	60	30	21	33	144

Species Status Assessment Report for the dwarf lake iris (*Iris lacustris*) 2023

- Redundancy – Medium-Low**  
 “DLI needs multiple resilient populations distributed throughout its range to reduce the risk of a single catastrophic natural or anthropogenic-induced event negatively affecting a large portion of the species range at any time. Species well distributed across a geographic range are less susceptible to extinction and more likely to maintain viability compared to species confined to a small geographic area. DLI has a relatively limited geographic range but can be found across most of their historic range in Wisconsin, Michigan, and Ontario along the shores of Lakes Michigan and Huron. The number and resiliency of populations found in the four representation groups will be used to assess DLI redundancy.” Species Status Assessment Report for the dwarf lake iris (*Iris lacustris*) 2023
- Representation – Medium-Low**  
 “DLI has limited genetic variability, but recent genetic analysis has determined population clusters corresponding to the geographic regions of east Michigan, the upper Straits of Mackinac, the lower Straits of Mackinac, and west Michigan and Wisconsin (Cohen et al. 2021, entire; Cohen and Turgman-Cohen 2023, entire). These geographic units were used to delineate our representation units for DLI. Due to a lack of genetic data, we included Ontario populations with the closest geographic region of eastern Michigan.” Species Status Assessment Report for the dwarf lake iris (*Iris lacustris*) 2023



**Figure A1-1: Representation groups of extant and unknown dwarf lake iris populations. Species Status Assessment Report for the dwarf lake iris (*Iris lacustris*) 2023**

- **Habitat Description**

“Optimal DLI habitat includes large openings that provide intermediate light levels, thin soils with minimal litter to discourage faster growing competitors, and adequate soil moisture (Van Kley 1989, p. 62; Van Kley and Wujek 1993, p. 218). These conditions occur in many types of natural dwarf lake iris communities, including alvars, fens, dune and swale complexes, conifer swamps, forest openings, Great Lakes barrens, limestone bedrock glades, and Great Lakes shorelines and beaches, and a single DLI population can often be found in multiple community types (Hackett et al. 2022, pp. 9–17; Cohen et al. 2015, entire). DLI can occur semi-continuously for several miles along the lakeshore, interrupted only by local discontinuities in habitat, such as rocky points, marshy bays, and areas modified by residential or other development (Crispin 1981, p. 3). DLI also occurs sporadically on former beach ridges associated with retreating phases of postglacial shorelines, with some populations persisting at significant distances inland (Crispin 1981, pp. 1–2; Makhholm 1986, pp. 22–28; Van Kley 1989, pp. 65–67).” Species Status Assessment Report for the dwarf lake iris (*Iris lacustris*) 2023 p. 5-6.

- **Relevant Life History Information:**

“DLI is a low-growing perennial with very slender, creeping rhizomes (Figure A 1). It is capable of both sexual and vegetative reproduction (Figure 1). An individual DLI plant can be difficult to distinguish from other individual plants. A genet, or a genetically distinct individual, is made up of several ramets connected through underground rhizomes (Figure A 2). A genet often grows in close proximity to other genets and cannot be distinguished from above ground. Consequently, surveys and abundance estimates are usually based on counts of ramets. Flowers are most commonly blue, but white flowers occur sporadically throughout the range of the species (Cruise

and Catling 1972, p. 271; Figure A 3). The majority of flowers bloom from mid-May until early June, with each flower remaining open approximately three days. The majority of fruits ripen from mid-July until mid-August, then burst open (Planisek 1983, p. 93). Seedlings appear at the beginning of the growing season before flowers open and continue to appear throughout the summer (Brotske 2018, p. 25).

“DLI flowers are self-compatible, and one experiment showed 85% fruit set with self-pollination, while outcrossed flowers had 71% fruit set (Planisek 1983, p. 96). Fruit set requires a pollen vector (Planisek 1983, p. 96; Van Kley 1989, p. 19). Known pollination vectors appear to be generalists, and include bee species from four families, the bee hawk-moth (*Hemaris affinis*), flies in the section *Schizophora*, and a species of rove beetle (COSEWIC 2010, p. 17; Brotske Bee species include *Adrena carlini*, *Bombus vagans*, *Bombus impatiens*, *Bombus griseocollis*, *Augochlorella persimilis*, *Augochlorella striata*, *Halictus confusus*, *Andrena nasonii*, and *Hoplitis* spp.

- **Ecology**

“The dwarf lake iris typically grows in shallow soil over moist calcareous sands, gravel and beach rubble. Sunlight is one of the most critical factors to the growth and reproduction of the species and partly shaded or sheltered forest edges are optimal for sexual reproduction. Some form of disturbance is also required to maintain the forest openings that provide these partial shade conditions. The species is most often associated with shoreline coniferous forests dominated by northern white cedar and balsam fir. The principal limiting factor for the dwarf lake iris is the availability of this suitable shoreline habitat.” Dwarf lake iris Recovery Plan 2013

- **Relevant Pesticide Use Sites**

“The shorelines of the Great Lakes are a very popular area for many recreational activities. Human sources of mortality to DLI from these activities include trampling by foot, destruction from off-road recreational vehicle use, and campsite damage (including disturbance, habitat alteration, and introduction of invasive species; Van Kley 1989, p. 39). In addition, management activities for recreation, like mowing, grading, herbicide application, ground disturbance during snow removal, and de-icing with salt (which may alter soil chemistry) can negatively affect DLI populations (FWS 2013, p. 16).” Species Status Assessment Report for the dwarf lake iris (*Iris lacustris*) 2023 p. 12.

- **Threats**

“Current or potential future threats to the dwarf lake iris include development, recreational activities, invasive species, woody encroachment and natural succession, drought, high-lake levels and associated flooding, and climate change” Dwarf lake iris (*Iris lacustris*) 5-year Review 2024 p.5.

- **Reclassification Criteria**

- No reclassification criteria listed.

- **Delisting Criteria**

“Delisting of the species will be considered when the criteria outlined below are met: Criterion 1. The species has a 95% probability of persistence within the next 20 years, based on data

obtained from accepted standardized monitoring methods and on population viability analysis. In order to meet this criterion, the following must be verified:

- 1.a. There is a sufficient number and geographical distribution of element occurrences required to ensure long-term persistence.
- 1.b. Each element occurrence needed to ensure a 95% probability of persistence within the next 20 years must meet a minimum viable population size and exhibit an increasing or stable population trend over a 10-year period.

Criterion 2. Management plans have been developed and are being implemented to protect and manage the habitat associated with the element occurrences identified in Criterion 1.b.

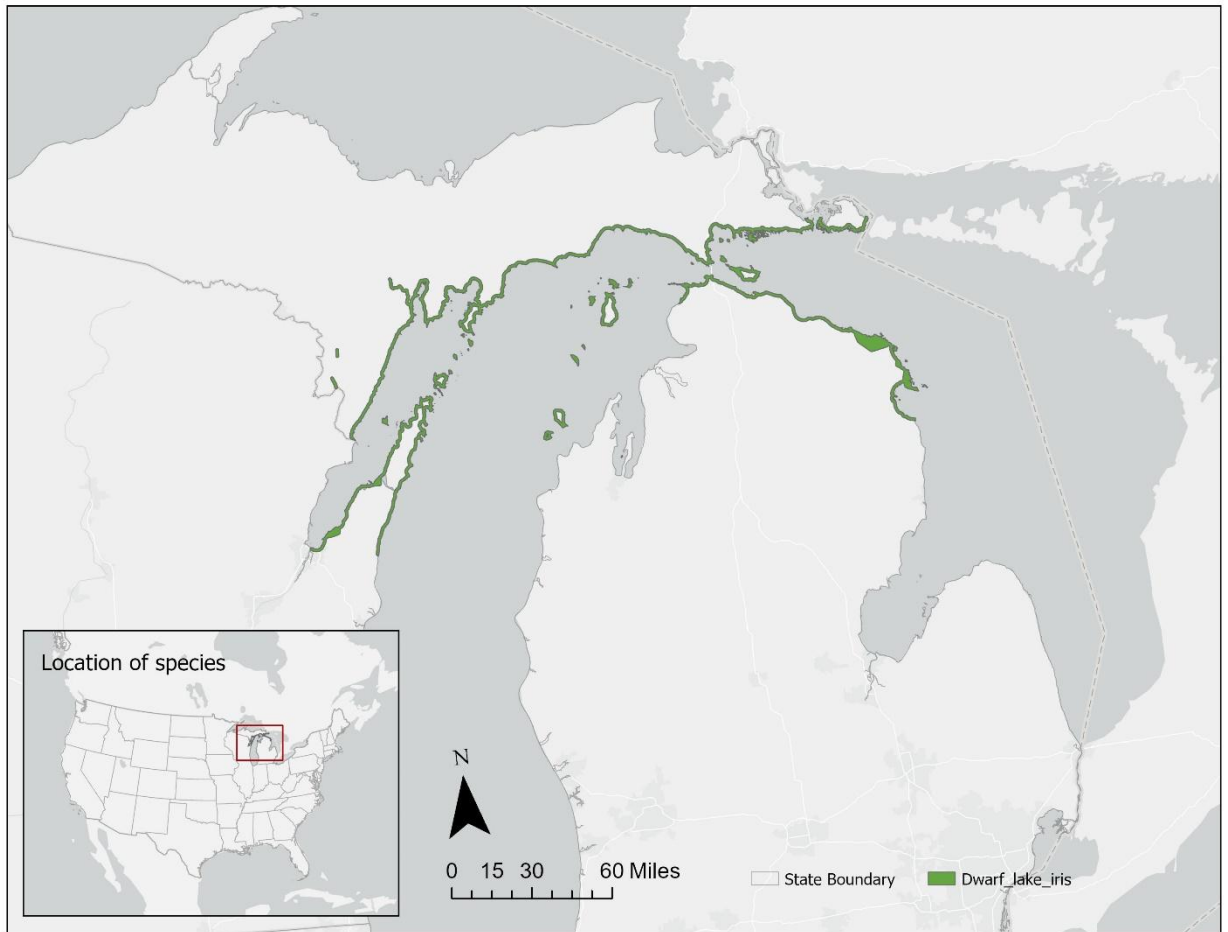
Criterion 3. A plan to provide public outreach and education for the dwarf lake iris has been developed and is being implemented.” Dwarf lake iris Recovery Plan 2013 p. 6-7.

- **Recovery Actions**

- 1) Protect occurrences
- 2) Manage and restore habitat
- 3) Inventory and monitor known sites
- 4) Conduct population viability analysis
- 5) Develop an education program about the dwarf lake iris, other federally listed shoreline species, natural communities, and their protection and management
- 6) Improve understanding of baseline dwarf lake iris ecology
- 7) Review and track recovery progress

- 3. **Description of Species Range**

“The dwarf lake iris is endemic to the modern and ancient shorelines of northern lakes Huron and Michigan, where it ranges from the Door Peninsula of northeastern Wisconsin eastward through the Mackinaw Straits region, south to the Bruce Peninsula of Ontario, following the northern calcareous arc of Silurian and Devonian bedrock. Figure A1-2 depicts the FWS range map of the dwarf lake iris. This range was last updated 6/7/2022 and has an area of approximately 628,357 acres.



**Figure A1-2. Map of the dwarf lake iris range.**

#### **4. Critical Habitat**

There is no designated critical habitat for this species.

#### **5. Known Locations**

Based on genetics, there are 4 groups East, Upper Straits, Lower Straits, and West used to assess DLI representation with 144 populations in total. All these described populations fall within the species range.

- Occurrences Described in iNaturalist:
  - [https://www.inaturalist.org/observations?quality\\_grade=research&subview=map&taxon\\_id=164128](https://www.inaturalist.org/observations?quality_grade=research&subview=map&taxon_id=164128)
  - iNaturalist includes 1,398 observations consistent with the indigenous range
- The core map developers also evaluated occurrences in GBIF(<https://www.gbif.org/>) and NatureServe (<https://explorer.natureserve.org/pro/Welcome>). These datasets did not support expanding the outer extent of the core map beyond the species range.



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

This core map was created based on biological information, including last known location description and associated habitat.

### 1. Dataset References and Software

- NLCD Land Cover 2021
- Software used: ArcGIS Pro 3.2
- FWS Species Range – last updated on 6/7/2022

### 2. Datasets Used in Core Map Development

All datasets used in core map development are described in EPA's process document.

### 3. Core Map Development

- EPA used the species range.
  - Map FWS species range
  - Export NLCD landcover to raster for core map extent
  - Raster to polygon by classname
  - Dissolve by classname to get sum of each landcover category
  - Calculate acres for each landcover category