

Interim Core Map Documentation for Seabeach amaranth

Version 1

Review Completed: April 2026

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

Species Summary

The seabeach amaranth (*Amaranthus pumilus*, Entity ID 1019) is a threatened terrestrial plant. As an annual and fugitive species, the number of individual plants observed at a population in any given year fluctuates greatly as the species goes through boom-and-bust years. The U.S. Fish and Wildlife Service (FWS) has not designated a critical habitat for the seabeach amaranth. This species is found on sandy barrier (island) beaches of the Atlantic Coast. Areas that are 0.77 to 2 meters (2.5 to 6.6 feet) above the mean high water with limited vegetation and south to southwest facing beaches provide the ideal habitats for this species. The species is likely wind pollinated but is also capable of self-pollination. Currently, seabeach amaranth has persistent populations that are found in 5 out of its 9 states – and has ongoing or recent reintroduction efforts in 3 out of the 4 remaining states that make up the species' native range. Additional information on the species is provided in **Appendix 1**.

Description of Core Map

The core map for the seabeach amaranth is based on the species range, which includes barrier beaches along the coast of eight states: Delaware (DE), Massachusetts (MA), North Carolina (NC), New Jersey (NJ), New York (NY), South Carolina (SC) and Virginia (VA). Although Rhode Island is part of the historical range, it has neither extant populations nor any reintroduction efforts and is not part of the current species range. All the eight states that make up the species range have either extant populations known to FWS (though not explicitly named) or ongoing or recent reintroduction efforts. As such, the species range is highly refined and represents areas important for the species' conservation. There is no designated critical habitat.

Figure 1 depicts the resulting interim core map for the seabeach amaranth. The size of this core map is approximately 114,648 acres. Landcover categories within the core map area are included in **Table 1**. Landcover is predominantly barren land and open water areas. Since this species occurs in sandy barrier beaches, many of these areas potentially represent habitat.

The core map developed for the seabeach amaranth is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the seabeach amaranth. 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 species expert feedback from FWS. This interim core map has a "none" 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.

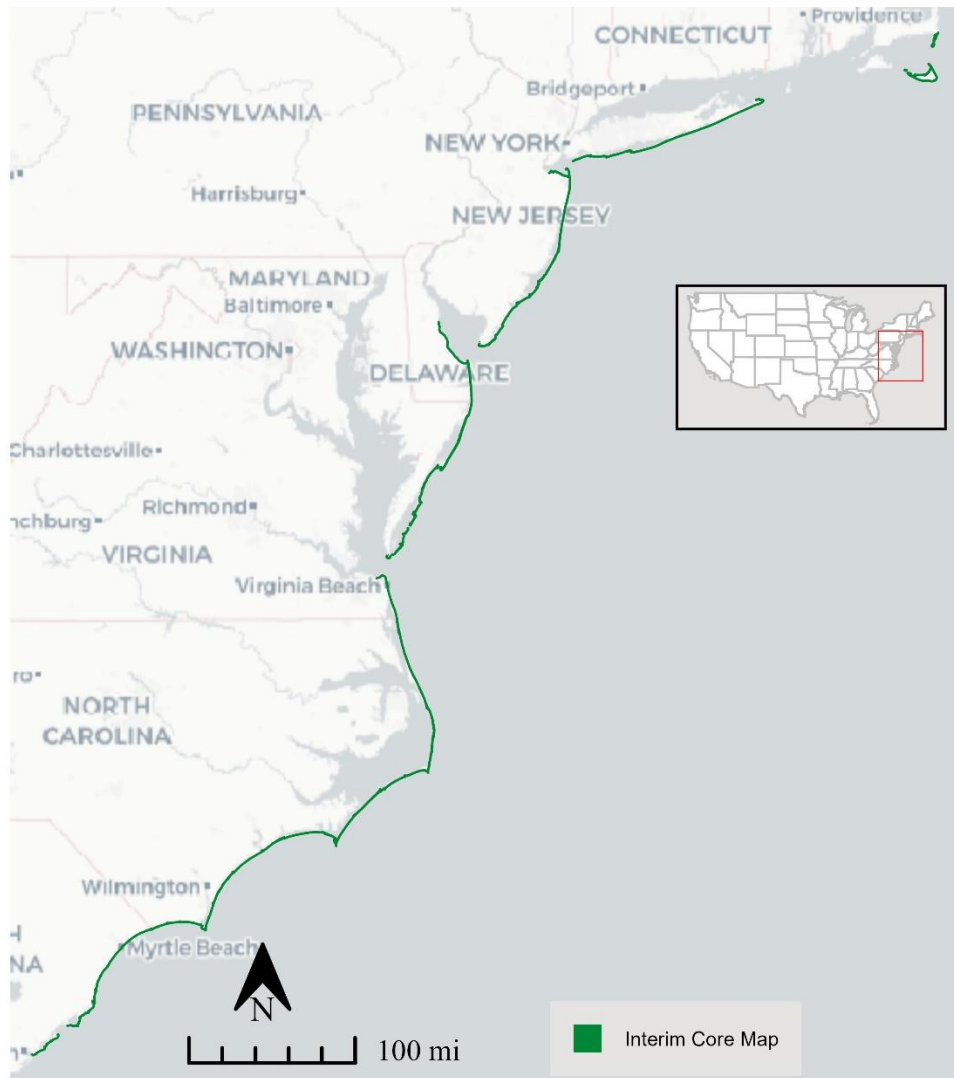


Figure 1. Interim core map for the seabeach amaranth.

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 Class/Value	% Area
Forestry	Deciduous Forest (41)	0%
Forestry	Evergreen Forest (42)	1%
Forestry	Mixed Forest (43)	0%
Agriculture	Pasture/Hay (81)	0%
Agriculture	Cultivated Crops (82)	0%
Mosquito adulticide, residential	Developed Open Space (21)	1%
Mosquito adulticide, residential	Developed Low Intensity (22)	4%
Mosquito adulticide, residential	Developed Medium Intensity (23)	9%
Mosquito adulticide, residential	Developed High Intensity (24)	6%
Invasive species control	Woody Wetlands (90)	2%
Invasive species control	Emergent Herbaceous Wetlands (95)	13%
Invasive species control	Open Water (11)	16%
Invasive species control	Grassland/Herbaceous (71)	1%
Invasive species control	Shrub/Scrub (52)	1%
Invasive species control	Barren Land (31)	46%
Total Acres	Interim Core Map Acres	~114,648

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

EPA evaluated these four sets of data to inform or support the core map. Although FWS did not provide location descriptions of the known extant populations, they have confirmed that all known locations of extant populations are located within the range. iNaturalist had 250 research grade observations, which are consistent with the species range, all of them occurring within the eight states that comprise the species range. GBIF’s occurrence data consisted only of one occurrence that is unique from iNaturalist – the remainder of which are accounted for in iNaturalist. NatureServe included 250 documented areas, all of which were consistent with the location of the species range. **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”). EPA developed the core map 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 seabeach amaranth from FWS, as well as observation information available from various publicly available sources (including iNaturalist, NatureServe, and GBIF). The information compiled for the seabeach amaranth is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- The species range follows the Atlantic coastline for the aforementioned eight states where the species is known to occur.
- The FWS documentation mentions that all known extant populations are within the species’ range.
- 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 the narrow range that includes all states 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 seabeach amaranth.

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 the Seabeach amaranth

1. Recent FWS documents/links and other data sources

- Five Year Review (2023) (https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/4096.pdf)
- Five Year Review (2018) (https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2554.pdf)
- Five Year Review (2007) (https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1053.pdf)
- Recovery Plan (1996) (https://ecos.fws.gov/docs/recovery_plan/961112b.pdf)
- Nature Serve (2020) (https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.141860/Amaranthus_pumilus)

2. Background information

- **Status:** Federally listed as threatened in 1993
- **Resiliency, redundancy, and representation** (the 3Rs)

Resiliency: Small population sizes compared to 20 years ago indicate reduced resiliency of seabeach amaranth and emphasize the vulnerability of the species to stochastic disturbances.” (Five Year Review 2023)

Redundancy: “The disappearance of populations in the Carolinas indicates reduced redundancy, increasing the risk of extirpation of these vulnerable occurrences. In general, the southern end of the species range suffers from a lack of redundancy likely due to the shorter hurricane return period compared to NJ and NY.” (Five Year Review 2023)

Representation: “Additional threats to the species that have been identified since listing include climate change and associated sea level rise which will reduce available habitat for the species over time (see Factor A above). Storms are necessary to create and maintain habitat in a natural beach system. However, climate change may increase the frequency and intensity of tropical storms which could negatively impact populations from flooding and erosion (Knutson 2022; U.S. Global Change Research Program 2017). With increased storms patterns and modified coastlines, we are likely to lose habitat, and more often truncate the growing season. Mallindine (2014) found that saltwater inundation, regardless of the duration of exposure, resulted in complete mortality in juvenile seabeach amaranth plants, indicating that the species is negatively impacted by coastal flooding. All of these factors indicate poor representation for this species which only occurs in sandy beach habitat. Invasive species such as beach vitex, Asiatic sand sedge and puncturevine, all identified since listing, threaten seabeach amaranth by growing in the same habitat and competing for limited resources (Cousins, et al. 2010). In addition, native dune grasses planted after beach nourishment projects may compete with seabeach amaranth. Impacts from climate change and invasive species occur throughout the range of seabeach amaranth and their impacts appear to have increased in recent years and likely pose a threat to the species.” (Five Year Review 2023)

- **Habitat**
 - Sandy barrier beaches of the Atlantic Coast. Specifically, requires extensive areas of barrier island beaches and inlets, functioning in a relatively natural and dynamic manner which allows for movement around the landscape occupying suitable habitat as it becomes available. (Five Year Review 2018)
 - For optimum growth, plants should be located on south to southwest facing beaches located in areas between .77 to 2 meters (2.5 to 6.6 ft) above the mean high water with limited vegetation cover. (Five Year Review 2018)
 - Thrives in unstable or disturbed environments by rapidly colonizing new areas and reproducing quickly. (Recover Plan 1996)

- **Pollinator/reproduction**
 - Annual species
 - Germination takes place over a long period of time beginning in April and continuing at least through July.
 - Flowering begins as soon as plants have reached sufficient size, sometimes as early as June in the Carolinas but more typically in July and continuing until their death in late fall or early winter.
 - Seed production begins in July or August and reaches a peak in most years during September.
 - The relative roles of banked seeds vs. fresh seeds are unknown but it is known that century-old seeds are capable of successful germination.
 - Likely wind pollinated—based on morphology of the flower and inflorescence and is consistent with most amaranth species—but is also capable of self-pollination.

- **Taxonomy**
 - Terrestrial Plant – annual herb

- **Relevant Pesticide Use Sites**
 - None

- **Recovery Criteria/Objectives (2006 recovery plan)**
 - “Delisting will be considered when a minimum of 75 percent of the sites with suitable habitat within at least six of the nine historically occupied States are occupied by seabeach amaranth populations for 10 consecutive years.” (Recovery Plan 1996)

- **Recovery Actions (from 2006 recovery plan)**
 - Survey suitable habitat for additional populations
 - Monitor and protect existing populations
 - Conduct research on the biology of the species
 - Establish new populations or rehabilitate marginal populations to the point ‘ where they are self-sustaining
 - Investigate and conduct necessary management activities at all key sites

3. Description of Species Range

- Figure A1-1 depicts the FWS range. The range was last updated on 08-16-2023. The total acreage of the range is around 114,648 acres.

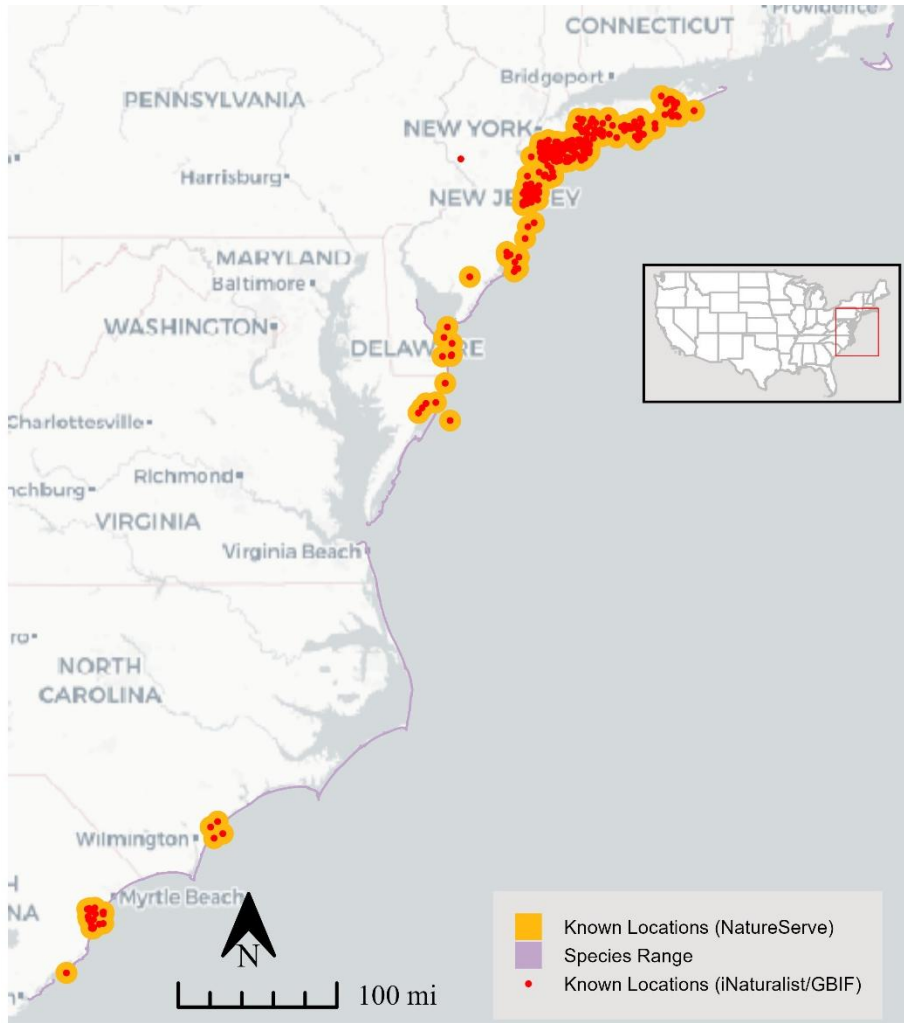


Figure A1-1. FWS range for the seabeach amaranth compared with occurrences and known locations. The total acreage of the range is around 114,648 acres.

4. Critical Habitat

- FWS has not designated a critical habitat for this species (<https://ecos.fws.gov/ecp/species/8549>)

5. Known Locations

- Occurrences Described in FWS Documents
 - Not specific—FWS documentation mentions only eight states including Delaware (DE), Massachusetts (MA), North Carolina (NC), New Jersey (NJ), New York (NY), South Carolina (SC), and Virginia (VA).
- Occurrences Described in iNaturalist: https://www.inaturalist.org/observations?d1=2010-01-01&d2=2025-07-31&quality_grade=research&subview=map&taxon_id=158252

- iNaturalist includes 250 research grade observations (since 2010) consistent with the indigenous range (all within the aforementioned 8 states)
 - Figure A1-1 depicts the locations of these observations.
- Occurrences Described in GBIF:
 - https://www.gbif.org/occurrence/download?basis_of_record=HUMAN_OBSERVATION&dataset_key=14d5676a-2c54-4f94-9023-1e8dcd822aa0&has_coordinate=true&has_geospatial_issue=false&taxon_key=5384399&year=2010,2025
 - Only one observation (since 2010) that is *not* also included in iNaturalist.
 - Occurrences Described in NatureServe:
 - https://explorer.natureserve.org/pro/Map/?taxonUniqueld=ELEMENT_GLOBAL.2.141860
 - NatureServe has 250 documented locations consistent with the indigenous range and overlaps with iNaturalist locations (Figure A1-1).
 - NatureServe notes that “If ground-disturbing activities are proposed on a site, the appropriate NatureServe Network Program should be contacted for a site-specific review of the project area. For contact information, go to the NatureServe Network Directory at: <https://www.natureserve.org/ns-network-directory>.”
 - NatureServe. 2025a. NatureServe Network Biodiversity Location Data accessed through NatureServe Explorer [web application]. NatureServe, Arlington, Virginia. Available <https://explorer.natureserve.org/>. (Accessed: August 2025).