

Interim Core Map Documentation for Ventura Marsh Milk-vetch

Version 1

Review Completed: June 2025

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

Species Summary

The Ventura marsh milk-vetch (*Astragalus pycnostachyus* var. *lanosissimus*, Entity ID 511) is an endangered terrestrial plant (dicot). The U.S. Fish and Wildlife Service (FWS) has designated critical habitat for this species whose historical habitat includes dynamic alluvial habitats and adjacent wetlands and transitional habitats. Some populations have been actively restored in dune, coastal sage scrub, and willow scrub vegetation communities, and both are in close association with a high-water table, although neither population is considered natural. The one natural population inhabits palustrine/lacustrine wetland margins within coastal dune systems and transitional areas between wetlands and uplands adjacent to salt marshes and coastal lagoons with freshwater marsh areas appearing to be preferred over coastal marsh areas.

Description of Core Map

Figure 1 depicts the resulting interim core map for the Ventura marsh milk-vetch. The size of this core map is approximately 806 acres. The core map is based on biological information, specifically, the map is composed of designated critical habitats and two sites where the species has been artificially introduced and is confirmed extant using known locations data. The sites where the species was introduced, Coal Oil Point Reserve and North Campus Open Space, are adjacent areas that lack any official boundaries. Consequently, the Agency used information in the FWS SSA to manually draw boundaries for these two sites while considering tributaries that are sometimes seasonally active. Landcover categories within the core map area are included in **Table 1**. Landcover is predominantly low intensity development, emergent herbaceous wetlands, and grassland/shrub, which are generally consistent with the habitat of this species.

The core map developed for the Ventura marsh milk-vetch is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the Ventura marsh milk-vetch. The core map has a best professional judgment level of 2 “limited” because it consists of the species critical habitat with the addition of two well defined reintroduction areas. This core map incorporates information developed by FWS and made available to the public; however, the core map has not yet been formally reviewed by FWS. This interim core map may be revised in the future to incorporate expert feedback from FWS. 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 Ventura Marsh Milk-vetch.

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
Forestry	Deciduous Forest (41)	0
Forestry	Evergreen Forest (42)	0
Forestry	Mixed Forest (43)	0
Agriculture	Pasture/Hay (81)	3
Agriculture	Cultivated Crops (82)	0
Mosquito adulticide, residential	Open space, developed (21)	12
Mosquito adulticide, residential	Developed, Low intensity (22)	18
Mosquito adulticide, residential	Developed, Medium intensity (23)	9
Mosquito adulticide, residential	Developed, High intensity (24)	1
Invasive species control	Woody Wetlands (90)	0
Invasive species control	Emergent Herbaceous Wetlands (95)	25
Invasive species control	Open water (11)	4
Invasive species control	Grassland/herbaceous (71)	12
Invasive species control	Scrub/shrub (52)	16

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

Example pesticide use sites/types	NLCD Landcover (Value)	% of core map represented by landcover
Invasive species control	Barren land (rock/sand/clay; 31)	0
Total Acres	Interim Core Map Acres	~806

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 four sets of data to inform or support the core map. FWS considers there to be six extant populations (the North Shore site, and five introduction sites). Three historical introductions have failed, do not have suitable habitat, and are considered extirpated. EPA only considered populations that currently have, or are likely to have, suitable habitat and a viable seedbank as extant.

Reintroduction sites where habitat was found to not be suitable and where a seed bank is unlikely to persist, or where germination potential and survival is low, are considered extirpated. iNaturalist had five research grade observations between 2013 and 2022, which, when obscuring of coordinates is accounted for, are consistent with the species range. GBIF's occurrence data had three known sightings, and all are copies from iNaturalist. NatureServe included one documented area which was consistent with the species range. **Appendix 1** includes more information on the available 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 Habitats²” (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 Ventura marsh milk-vetch from FWS, as well as observation information available from various publicly available sources (including iNaturalist and GBIF). The information compiled for the species is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- FWS designated critical habitats which include the majority of FWS known populations of the species

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

- The two occupied introduction sites that are not within the critical habitat designation

For step 2, EPA used the compiled information to identify the core map type. EPA compared known location data to the critical habitat and found that known locations are consistent with the species' critical habitat aside from a few locations that occur outside the critical habitats. Because the critical habitat and the two introduction sites include all occurrence data identified by FWS and other sources, and that these are spatially granular, EPA selected the union of the two occupied introduction sites and the critical habitats to use as the species core map.

For step 3, EPA used the designated critical habitat and the manually drawn maps of the two occupied introductions sites. EPA downloaded the critical habitat from FWS' ECOS (<https://ecos.fws.gov/ecp/species/1160>). The details of how the core map is drawn are discussed below.

Critical Habitat Sites

- Downloaded species critical habitat from FWS ECOs webpage (FCH_Astragalus_pycnostachyus_var_lanosissimus_20040520).
- Imported "FCH_Astragalus_pycnostachyus_var_lanosissimus_20040520" from downloaded shapefiles.
- Imported "National Hydrography Dataset Plus Version 2.1" from EPA server to show water ways since species occurs near bodies of water.
- Calculated area of critical habitat using "Summarize Within" function.

Coal Oil Point Reserve (COPR) & North Campus Open Space (NCOS) Sites

- The two sites are adjacent to each other with COPR being south of NCOS.
- Could not find any map/source that officially delineates the boundaries, so the maps are manually drawn based on information in the FWS SSA using the geojson.io online tool.
- Maps are drawn to include both officially designated restoration areas plus neighboring open space areas that are very similar in habitat (Devereux Lagoon and adjacent areas within Ellwood Mesa) and some known tributaries in those same adjacent areas.

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 the Ventura Marsh Milk-vetch

1. Recent FWS Documents/Links
 - [Recovery Plan](#) (2023)
 - [Recovery Plan Implementation Strategy](#) (2023)
 - [Species Status Assessment](#) (2020)
 - [5 Year Review](#) (2020)
 - [5 Year Review](#) (2010)
 - [Designation of Critical Habitat](#) (2004)
2. Background Information
 - Status - Federally listed as endangered in 2001
 - Resiliency – Moderate, this indicates that some habitat conditions that are not suitable for the species but enough that are suitable to allow the persistence of plants or germination of seed. (SSA 2020)
 - Redundancy – Low, There are two extant populations with high resiliency and four populations with moderate resiliency; reproductive individuals are only present at four of these six populations. (SSA 2020)
 - Representation – low, this species was rediscovered and low numbers lead to a genetic bottleneck where the genetic diversity is established and constrained by a small founding population. (SSA 2020)
 - Habitat, Life History, and Ecology (Source: 2010 5-year review and 2020 SSA)
 - This species historically occurred within dynamic alluvial habitats and adjacent wetlands and transitional habitats. Some populations have been actively restored in dune, coastal sage scrub, and willow scrub vegetation communities, and both are in close association with a high water table, although neither population is considered natural. The one natural population inhabits palustrine/lacustrine wetland margins within coastal dune systems and transitional areas between wetlands and uplands adjacent to salt marshes and coastal lagoons with freshwater marsh areas appearing to be preferred over coastal marsh areas.
 - Taxonomy
 - Terrestrial plant; FWS plant group 9.
 - Essential Physical Biological Features (PBFs) for Designated Critical Habitat:
 - Vegetation cover of at least 50 percent but not exceeding 75 percent, consisting primarily of known associated native species, including but not limited to, *Baccharis salicifolia*, *Baccharis pilularis*, *Salix lasiolepis*, *Lotus scoparius*, and *Ericameria ericoides*;
 - Low densities of nonnative annual plants and shrubs;
 - The presence of a high water table, either fresh or brackish, as evidenced by the presence of channels, sloughs, or depressions that may support stands of *Salix lasiolepis*, *Typha* spp., and *Scirpus* spp.;
 - Soils that are fine-grained, composed primarily of sand with some clay and silt, yet are well-drained; and
 - Soils that do not exhibit a white crystalline crust that would indicate saline or alkaline conditions.
 - Relevant Pesticide Use Sites in FWS Documents

- 2010 5 year review mentions urban/suburban uses and pollinator community impacts.
- Relevant Recovery Criteria and Actions
 - Abundance within each of six sites is an average of 100 or more reproductive individuals per site with a stable or increasing trend based on a minimum of 10 years of data. Funding and resources are available so that if a population drops below 25 reproductive individuals in any single year, supplemental seed or seedlings may be planted, or artificial disturbance applied.
 - The six sites are managed such that the functions of disturbance, colonization, and succession allow for successful Ventura marsh milk-vetch population persistence, including site plant species composition comprised of at least 50% appropriate native species, with native species vegetative cover being greater than non-native species vegetative cover. Details of suitable habitat conditions are described in the SSA (Service 2020, pp. 12-20).
 - Management at all sites is assured in perpetuity and is shown to be effective by stable or increasing populations based on a minimum of 10 years of data.
 - Ex situ recovery seed banks are established and maintained over time with sufficient seed so that stored seed may be used for recovery efforts while not exhausting the seed supply and decreasing seed bank genetic diversity. At a minimum, seed should be stored within a long-term storage facility such as the National Laboratory for Genetic Resources Preservation in Fort Collins, Colorado, as well as in at least two institutions approved by the Center for Plant Conservation with the capability to test viability and germination as needed. New accessions are added to each institution as new sites are established, and seed is added so that the most recent accession is no more than 15 years old.
- 3. Description of the species range
 - Species range include several patches around Los Angeles, CA. The blocked areas are unspecific polygons centered where the species has been found.



Figure A1-1. Figure of range map for the Ventura marsh milk-vetch from ECOS – 251,438 acres

4. Critical Habitat

- The critical habitat designation for *Astragalus pycnostachyus* var. *lanosissimus* includes three critical habitat units in Santa Barbara and Ventura Counties, California. This species critical habitat encompasses approximately 420 acres (ac) (170 hectares (ha)).



Figure A1-2. Figure of the Ventura marsh milk-vetch's designated critical habitat.

5. Known Locations

- Public Source 1: FWS considers there to be six extant populations (the North Shore site, and five introduction sites). Three historical introductions have failed, do not have suitable habitat, and are considered extirpated. We only consider populations that currently have, or are likely to have, suitable habitat and a viable seedbank as extant. Reintroduction sites where habitat was found to not be suitable and where a seed bank is unlikely to persist, or where germination potential and survival is low, are considered extirpated.

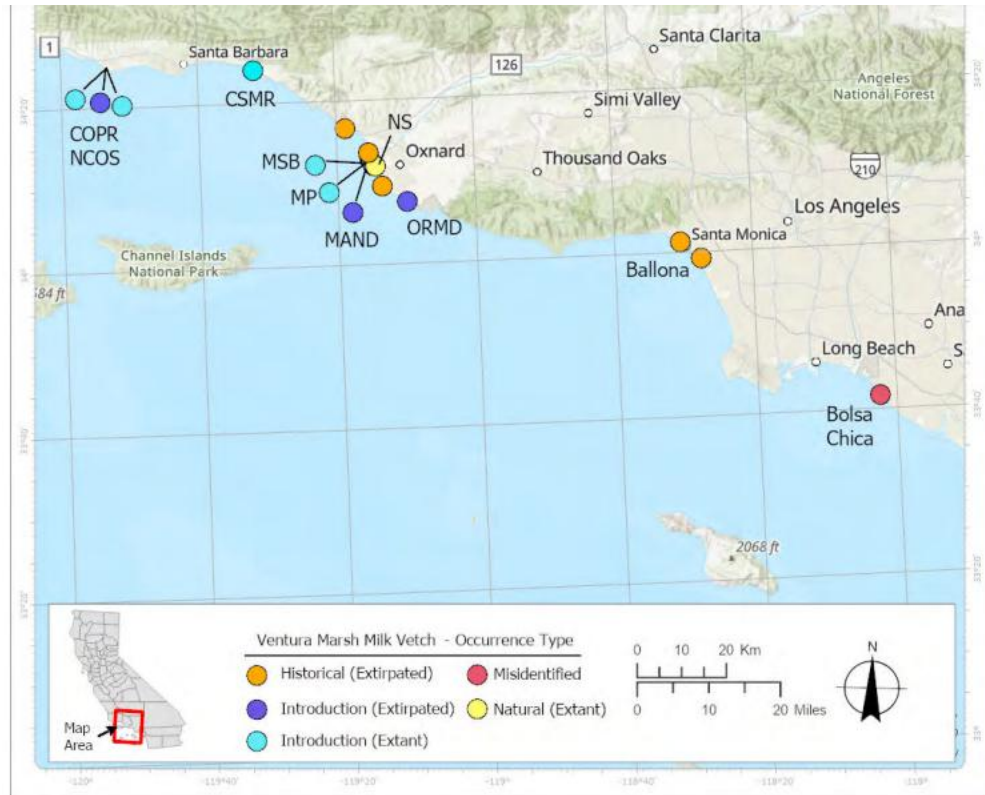


Figure 3. Distribution of historical, introduced, natural, and misidentified populations of *Astragalus pycnostachyus* var. *lanosissimus*. COPR (Coal Oil Point Reserve), NCOS (North Campus Open Space), CSMR (Carpinteria Salt Marsh Reserve), MSB (McGrath State Beach), MP (McGrath Parcel), ORMD (Ormond Beach), NS (North Shore).

Figure A1-3. Distribution of historical, introduced, natural, and misidentified populations of Ventura marsh milk-vetch.

- Public Source 2: iNaturalist <https://www.inaturalist.org/> observations include five research grade observations since 2013. The positions of these points are intentionally obscured which implies that even though their points appear outside of the species range, they are still interpreted as being consistent with the range as defined by FWS.
- Public Source 3: GBIF <https://www.gbif.org/> Identified 3 known sightings of this species, all of which are copies from iNaturalist.
- Public Source 4: NatureServe https://explorer.natureserve.org/pro/Map?taxonUniqueId=ELEMENT_GLOBAL.2.13499 returned one occurrence area which is consistent with species range.

Collectively, the public occurrence information did not support expanding or further refining the core map.

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

This core map was created based on biological information, specifically occupied location and species critical habitat. Known locations data was compared to the critical habitat sites. Whenever known locations occurred outside of the critical habitat, such areas are then appended to the critical habitat sites to develop the interim core map.

1. Dataset References and Software

- NLCD Tree Canopy Cover 2021³
 - 30 m raster dataset that contains percent tree canopy estimates, as a continuous variable, for each pixel across all land covers and types for the conterminous U.S.
- Software used: ArcGIS Pro 3.2 and R v4.4.2
- FWS Critical Habitat – last updated on 5/20/2004
- FWS known locations/species reintroduction sites – Species SSA (2020)

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

- I. Import and Process Critical habitat file
 - Download species critical habitat from FWS ECOs webpage (FCH_Astragalus_pycnostachyus_var_lanosissimus_20040520).
 - Import "FCH_Astragalus_pycnostachyus_var_lanosissimus_20040520" from downloaded shapefiles.
 - Import "National Hydrography Dataset Plus Version 2.1" from EPA server to show waterways since this species occurs near bodies of water.
 - Calculated area of PULA using "Summarize Within" function.
 - Exported as a shape file.
- II. Manually draw and add reintroduction sites: Coal Oil Point Reserve and North Campus Open Space
 - Use geojson.io to manually draw the boundary for the two reintroduction sites.
 - Boundary should include anywhere that is consistent with species habitat which includes areas that can be characterized as an alluvial habitat, adjacent (seasonal) wetlands, transitional habitats, restored dune, coastal sage scrub, and willow scrub vegetation communities.
 - Export drawn polygon as a .geojson file
 - Import the drawn reintroduction sites and the critical habitat file into geospatial software (R in this case).
 - Combine files into one shapefile and export.

³ Housman, I.W.; Schleeweis, K.; Heyer, J.P.; Rufenacht, B.; Bender, S.; Megown, K.; Goetz, W.; Bogle, S. 2023. National Land Cover Database Tree Canopy Cover Methods v2021.4. GTAC-10268-RPT1. Salt Lake City, UT: U.S. Department of Agriculture, Forest Service, Geospatial Technology and Applications Center. 26 p