

# Interim Core Map Documentation for the Scotts Valley Spineflower

## Version 1

**Review Completed:** April 2026

**Core Map Developer:** EPA's Office of Pesticide Programs (OPP)

## Species Summary

The Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*, Entity ID 1378) is an endangered terrestrial plant (dicot) endemic to the Purisima sandstone and Sant Cruz mudstone in Scotts Valley in the Sant Cruz Mountains, California. The U.S. Fish and Wildlife Service (FWS) has designated a critical habitat for the Scotts Valley spineflower. This species is typically found on gently sloping to nearly level fine-textured, shallow soils of the Bonnydoon series over outcrops of Santa Cruz mudstone and Purisima sandstone. The Scotts Valley spineflower occurs with other small annual herbs in patches (wildflowers fields) within a more extensive annual grassland habitat. Pollination for this species is by insects and self-pollination may occur at the end of the day when the flower closes. Currently, the Scotts Valley spineflower is found in only five properties in Scotts Valley, Santa Cruz County, California. Additional information on the species is provided in **Appendix 1**.

## Description of Core Map

The core map for the Scotts Valley spineflower is biological information type based on critical habitat with modifications to account for other known locations.

**Figure 1** depicts the resulting interim core map for the Scotts Valley spineflower.

The core map developed for the Scotts Valley spineflower is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the Scotts Valley spineflower. 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 an "limited" (2) best professional judgment classification because it consists of the species' designated critical habitat with some modifications. The core map is based on known locations described by FWS appended to the species' critical habitat (**Figure A1-2 in Appendix 1**). 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 Scotts Valley spineflower.**

**Table 1. Percentage of Interim Core Map Represented by 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)	0%
Forestry	Evergreen Forest (42)	13%
Forestry	Mixed Forest (43)	21%
Agriculture	Pasture/Hay (81)	0%
Agriculture	Cultivated Crops (82)	0%
Mosquito adulticide, residential	Open space, developed (21)	17%
Mosquito adulticide, residential	Developed, Low intensity (22)	6%
Mosquito adulticide, residential	Developed, Medium intensity (23)	3%
Mosquito adulticide, residential	Developed, High intensity (24)	0%
Invasive species control	Woody Wetlands (90)	0%
Invasive species control	Emergent Herbaceous Wetlands (95)	1%
Invasive species control	Open water (11)	0%
Invasive species control	Grassland/herbaceous (71)	36%
Invasive species control	Scrub/shrub (52)	2%
Invasive species control	Barren land (rock/sand/clay; 31)	0%
<b>Total Acres</b>	<b>Interim Core Map Acres</b>	<b>355</b>

## 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 the Global Biodiversity Information Facility (GBIF)

EPA evaluated these four sets of data before selecting the type of and developing the core map. FWS appeared to have the finest resolution of the location information, providing a map that depicted the current known locations all within about 1.0 mile of each other in Scotts Valley, Santa Cruz County, California (**Figure A1-2 in Appendix 1**). Occurrences in iNaturalist, GBIF, and NatureServe did not support expanding the core map outside of this radius. **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

<sup>1</sup> Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, <https://www.usgs.gov/data/national-land-cover-database-nlcd-2021-products>

Habitats”<sup>2</sup> (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 Scotts Valley spineflower from FWS, as well as observation information available from various publicly available sources (including iNaturalist, NatureServe, and GBIF). The information compiled for the Scotts Valley spineflower is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- Occurrences and known locations of the Scotts Valley spineflower are on five properties within about 1 mile of each other (Salvation Army property, Scotts Valley High School Ecological Preserve, Polo Ranch, Glenwood Open Space Preserve, and the Sandraya Way development site)
- The species’ preferred microhabitats of “wildflower fields” that are found within larger annual grasslands, were once contiguous but are now separated by development and infrastructure
- The critical habitat developed by FWS contained most of the area containing known occurrences.

For step 2, EPA used the compiled information to identify the core map type including species critical habitat and known location information. The extant populations are in five properties (Salvation Army property, Scotts Valley High School Ecological Preserve, Polo Ranch, Glenwood Open Space Preserve and the Sandraya Way development site) that are mostly captured by the species’ critical habitat. Therefore, EPA based the core map on the critical habitat, adding a few small regions to the boundaries that have known occurrences identified by FWS. The entire range of the species was not used as the core map because the range contains areas where the species does not occur.

For step 3, EPA used the best available data sources to generate the core map. Data sources are discussed in the process document. **Appendix 2** provides more details on the GIS analysis and data used to generate the core map.

## 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.

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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>

## Appendix 1. Information Compiled for the Scotts Valley Spineflower

### 1. Recent FWS documents/links and other data sources

- Five Year Review: Summary and Evaluation (2024) ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/16512.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/16512.pdf))
- Endangered and Threatened Wildlife and Plants; Critical Habitat Designation for *Chorizanthe robusta* var. *hartwegii* (Scotts Valley Spineflower) (2002) (<https://www.govinfo.gov/content/pkg/FR-2002-05-29/pdf/02-13063.pdf#page=1>)
- Recovery Plan - Amendment 1 (2019) ([https://ecos.fws.gov/docs/recovery\\_plan/Recovery%20Plan%20Amendment\\_ScottsValleySpineflower.pdf](https://ecos.fws.gov/docs/recovery_plan/Recovery%20Plan%20Amendment_ScottsValleySpineflower.pdf))
- Recovery Plan (1998) ([https://ecos.fws.gov/docs/recovery\\_plan/980928a.pdf](https://ecos.fws.gov/docs/recovery_plan/980928a.pdf))

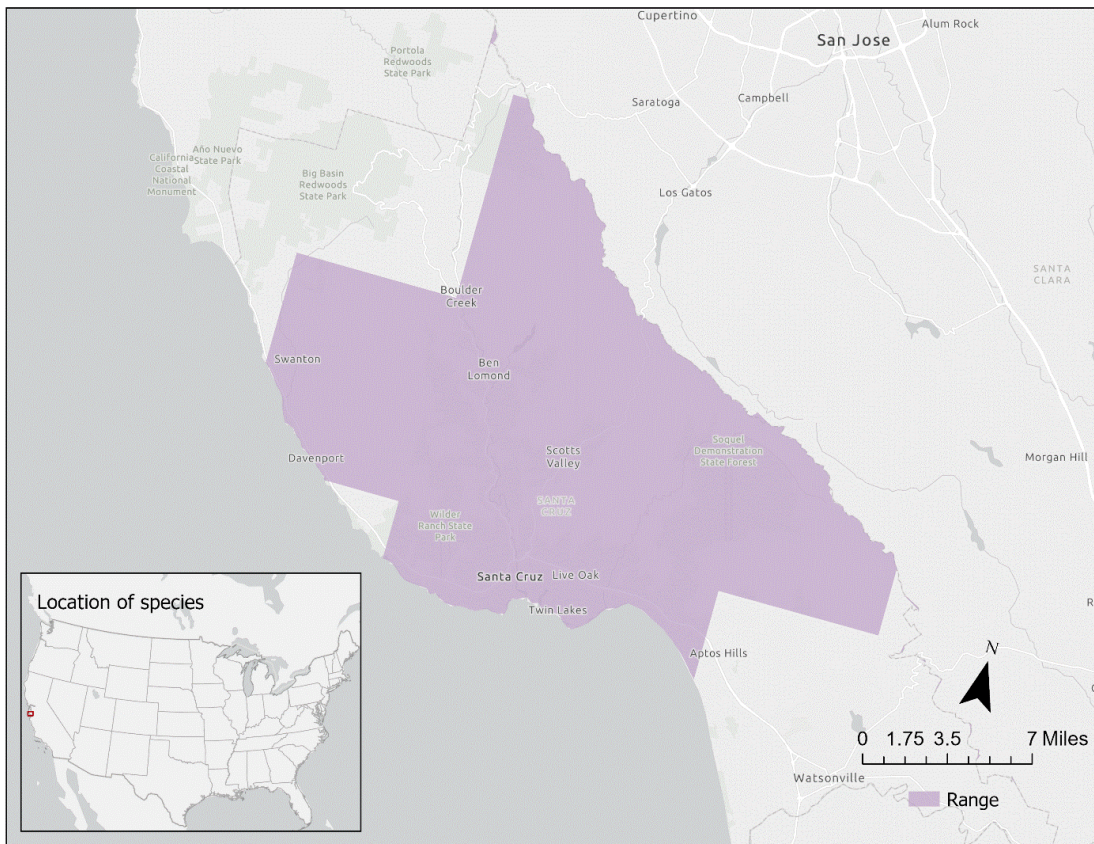
### 2. Background information

- **Status:** Federally listed as endangered in 1994
- **Resiliency, redundancy, and representation** (the 3Rs)  
The 3Rs were not found in any of the documents consulted.
- **Habitat**
  - Wildflower habitats characterized by thin soils in the Bonnydoon series that have developed over outcrops of Sant Cruz mudstone and Purisima sandstone (5-year review 2024).
  - Thinly vegetated areas with shallow soil over bedrock sandstone (5-year review 2024).
- **Pollinator/reproduction**
  - Flowering occurs from April to June (Critical Habitat Designation 2002).
  - Pollinators include leaf cutter bees, butterflies, flies, wasps, ants, and small beetles (Critical Habitat Designation 2002).
  - In other annual species of *Chorizanthe* self-fertilization occurs, if no cross population occurs after 1-2 days, when the flower closes at the end of the day (Critical Habitat Designation 2002).
- **Taxonomy**
  - Annual terrestrial Plant
- **Relevant Pesticide Use Sites**
  - Inadvertent application of herbicides and pesticides that could affect the plant and pollinators (Critical Habitat Designation 2002).
- **Recovery Criteria/Objectives (5-year Review 2024)**
  - All four parcels of private land that support the Scotts Valley spineflower have permanent conservation easements or have been acquired.
  - Conservation measures for the Scotts Valley spineflower are included in a Habitat Conservation Plan with the City of Scotts Valley.
  - Population numbers are stable or increasing.

- Threats are reduced or eliminated so that populations can persist without significant human intervention or perpetual endowments are secured for management necessary to maintain the continued existence of the species.
  - An ex-situ seedbank is maintained in a Center for Plant Conservation-affiliated botanic garden. An ex-situ seedbank would provide assurance that a population could be reseeded, should long-term drought – or other stochastic events – make it necessary.
  - All existing populations are stable or increasing in the wild for at least 10 years.
- **Recovery Actions (Recovery Plan 1998)**
    - Protection through acquisition of habitat or establishment of conservation easements
    - Habitat Conservation Plan with the City of Scotts Valley that minimizes disturbance from urban development
    - Conduct research focusing on habitat requirements for long-term survival

### 3. Description of Species Range

- **Figure A1-1** depicts the FWS range. The range was last updated on 3/21/2018. The total acreage of the range is around 182,793 acres.



**Figure A1-1. FWS range for the Scotts Valley spineflower. The total acreage of the range is around 182,793 acres.**

#### 4. Critical Habitat

- FWS has designated a critical habitat for this species.  
<https://www.govinfo.gov/content/pkg/FR-2002-05-29/pdf/02-13063.pdf#page=1>

#### 5. Known Locations

- Known locations described in FWS Five-year review document (2024)
  - Currently found in five locations, Salvation Army, Scotts Valley High School Ecological Preserve, Glenwood Open Space Reserve, Polo Ranch, and Sandraya Way Development.
  - **Figure A1-2** depicts the currently known locations from FWS.

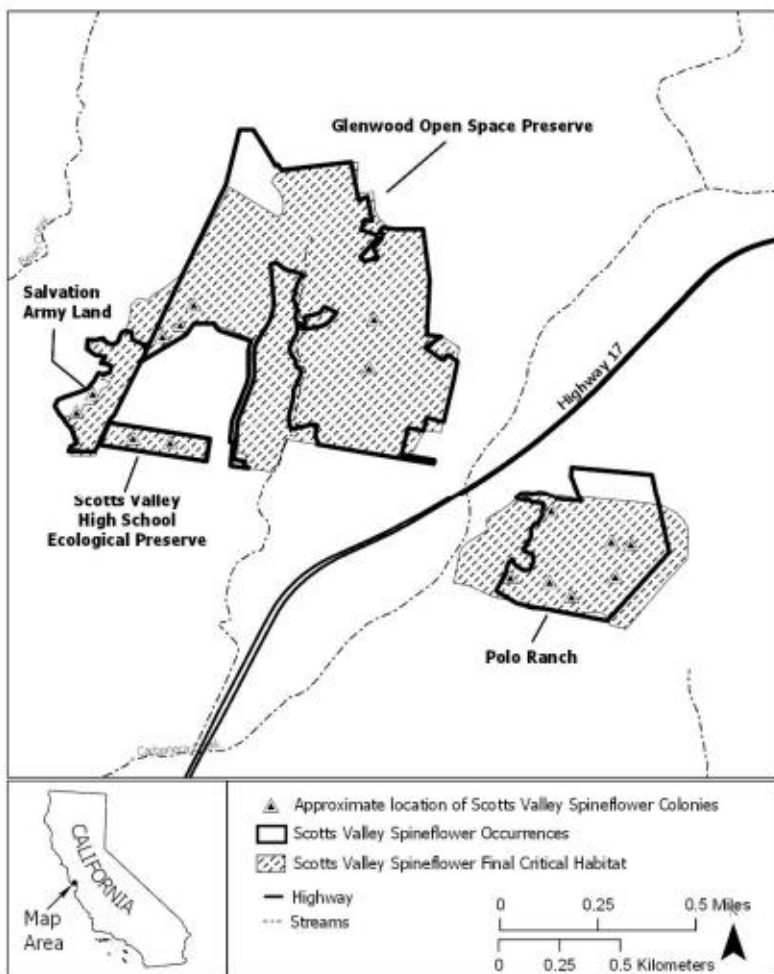


Figure A1-2. Known location information from FWS. Map reproduced from FWS 5-year review (2019).

- **Occurrences Included in Public Databases**
  - EPA queried iNaturalist, GBIF, and NatureServe.
  - iNaturalist (available [here](#)) had 29 research grade observations for this species.
  - GBIF (available [here](#)) included 29 human observations (from 2010-2025).
  - Occurrences in NatureServe (linked [here](#)).

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

This core map was created based on biological information, including critical habitat and occupied location. EPA used the critical habitat released by FWS in 2002 for developing this core map.

### 1. Dataset References and Software

- Software used: ArcGIS Pro 3.5.2
- FWS Species Range – last updated on 3/21/2018
- ESRI Basemaps
- Google Maps (<https://www.google.com/maps>)

### 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 started with the critical habitat published by FWS in 2002 to set the minimum extent of the core map.
- The critical habitat shapefile was copied into a new Core Map feature class.
- Three modifications were made to the critical habitat as described below. The expansions increased the core map (354 acres) by about 66 acres compared to the critical habitat (288 acres) (**Figure A1-3**).

#### *Sandraya Development Area*

1. The Sandraya development area mentioned in the 2024 FWS 5-year review was located via Google maps (centered on Sandraya Heights Rd.). A new polygon was created for the Sandraya development area and added to the Core Map feature class. The polygon was drawn to include an area of new development south of the road (visible as bare ground and trees, **Figure A1-4**) northward to the southern edge of Scotts Valley High School. The polygon is bounded to the east by Glenwood Drive and to the west by dense trees that are just beyond the bare ground visible in Google maps.

#### *Known Occurrences (5-year review 2019)*

To capture the full extent of the known occurrences (dark outline in **Figure A1-2**), the vertices of the Core Map were expanded in two regions.

2. In the Polo Ranch region, vertices of the polygon were stretched northward to mimic the outline of area with occurrences area as shown in **Figure A1-2**.
3. In the Glenwood Preserve region, additional occurrences area was added to the north-western corner. A roughly triangular shape was added that included a developed grassy area between Canham Rd. and Summerhill Dr. and a section of trees and trails immediately west of Glenwood Dr.



Figure A1-3. Satellite view showing recently developed areas in brown (Google).



Figure A1-4. Critical habitat (light green) with expanded interim core map (dark green).