

# Interim Core Map Documentation for Slender Orcutt Grass

## Version 1

**Review Completed:** April 2026

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

## Species Summary

The slender Orcutt grass (*Orcuttia tenuis*, Entity ID 583) is an endangered wetland plant (monocot). The U.S. Fish and Wildlife Service (FWS) has designated a critical habitat for the slender Orcutt grass. This species is found around vernal pools within grassland, shrub, or evergreen forest habitats. Pollination is thought to be predominately performed by wind. Additional information on the species is provided in **Appendix 1**.

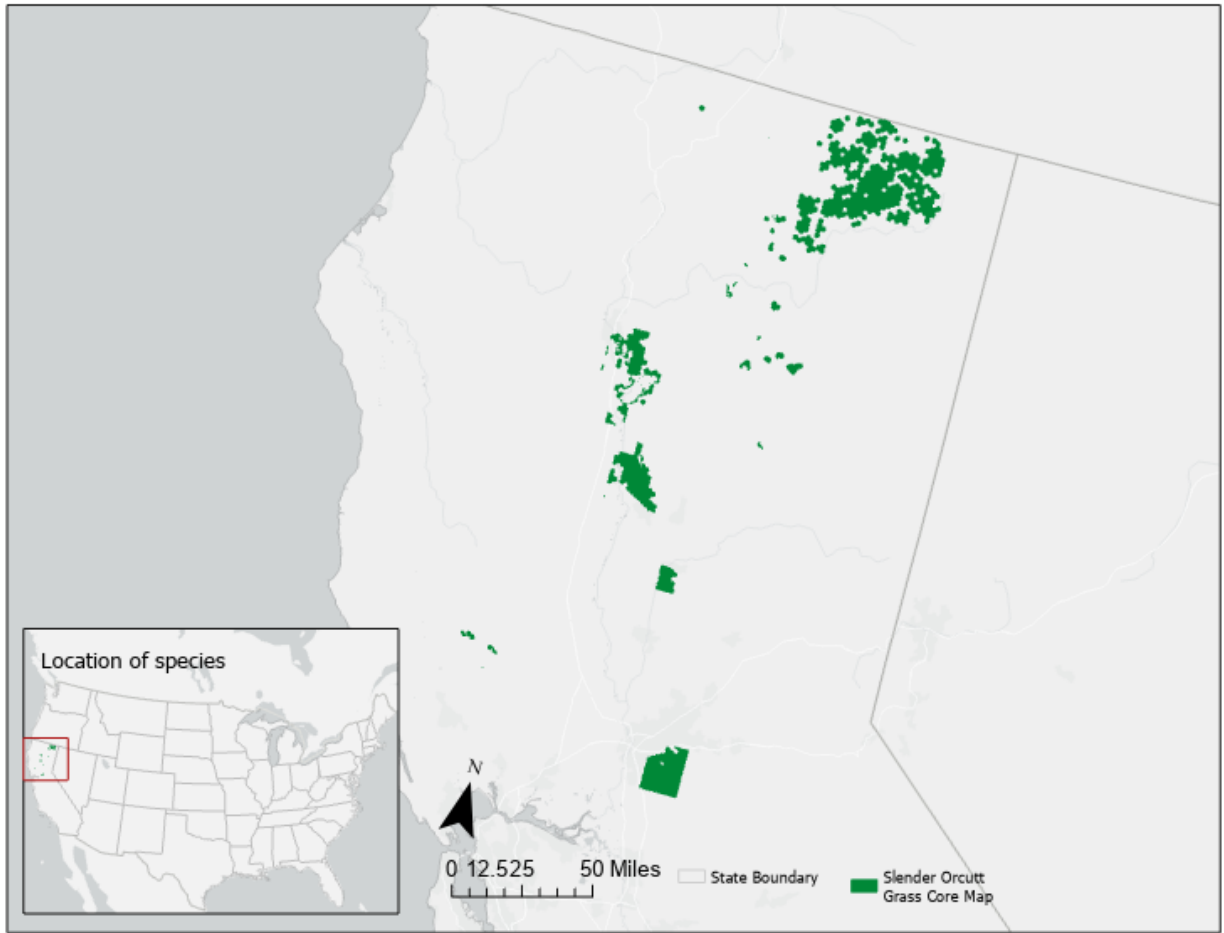
## Description of Core Map

The core map for the slender Orcutt grass is based on biological information. The core map is defined by areas of the FWS species range which overlap with vernal pool habitat as well as the FWS designated critical habitat to encapsulate areas where the slender Orcutt grass may occur.

**Figure 1** depicts the resulting interim core map for the slender Orcutt grass. The size of this core map is 1,008,058 acres. Landcover categories within the core map area are included in **Table 1**. Landcover is predominantly grassland/herbaceous and scrub/shrub.

The core map developed for the slender Orcutt grass is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the slender Orcutt grass. 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 "average" (3) best professional judgment classification to describe major uncertainties/limitations. The map is based on habitats associated with species needs as well as known locations described by 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 the slender Orcutt grass.**

**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)	0
Forestry	Evergreen Forest (42)	15
Forestry	Mixed Forest (43)	0
Agriculture	Pasture/Hay (81)	1
Agriculture	Cultivated Crops (82)	4
Mosquito adulticide, residential	Open space, developed (21)	2
Mosquito adulticide, residential	Developed, Low intensity (22)	1
Mosquito adulticide, residential	Developed, Medium intensity (23)	1
Mosquito adulticide, residential	Developed, High intensity (24)	0
Invasive species control	Woody Wetlands (90)	1
Invasive species control	Emergent Herbaceous Wetlands (95)	3
Invasive species control	Open water (11)	1
Invasive species control	Grassland/herbaceous (71)	31
Invasive species control	Scrub/shrub (52)	39
Invasive species control	Barren land (rock/sand/clay; 31)	0
<b>Total Acres</b>	<b>Interim Core Map Acres</b>	<b>~ 1,008,058</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 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 table of the 100 current extant locations all within the species range and critical habitat (**Figure A1-2 in Appendix 1**). Occurrences in iNaturalist, GBIF, and NatureServe did not support expanding the core map outside of vernal pools within the species range and critical habitat. **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://doi.org/10.5066/P9JZ7AO3>

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 slender Orcutt grass from FWS, as well as observation information available from various publicly available sources (including iNaturalist, NatureServe, and GBIF). The information compiled for the slender Orcutt grass is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- Occurrences and known locations of the slender Orcutt grass are within the described area;
- This species relies on vernal pool habitat.

For Step 2, EPA used the compiled information to identify the core map type. FWS known locations and vernal pool habitat were selected to define the species core map.

For step 3, EPA used the best available data sources to generate the core map. Data sources are discussed in the process document. For this core map, EPA used critical habitat and extant vernal pool distribution: California’s great valley data. **Appendix 2** provides more details on the Geographic Information System (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 Slender Orcutt Grass

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

- Five Year Review (2024) ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/12717.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/12717.pdf))
- Five Year Review (2009) ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/1556.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1556.pdf))
- Recovery Plan (2005) – Section II (pg79-86) ([https://ecos.fws.gov/docs/recovery\\_plan/Vernal%20Pool%20Ecosystem%20Final%20Recovery%20Plan.pdf](https://ecos.fws.gov/docs/recovery_plan/Vernal%20Pool%20Ecosystem%20Final%20Recovery%20Plan.pdf))
- Nature Serve (1997) ([https://explorer.natureserve.org/Taxon/ELEMENT\\_GLOBAL.2.155653/Orcuttia\\_tenuis](https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.155653/Orcuttia_tenuis))
- Critical Habitat Designation (2006) (<https://www.govinfo.gov/content/pkg/FR-2006-02-10/pdf/06-1080.pdf#page=1>)
- U.S. Fish & Wildlife Service (<https://www.fws.gov/species/slender-orcutt-grass-orcuttia-tenuis>)

### 2. Background information

- **Status:** Listed by the State of California as endangered in 1979
- **Resiliency, redundancy, and representation** (the 3Rs)
  - No SSA for this species – No resiliency, redundancy, or representation information.
- **Habitat**
  - The slender Orcutt grass occurs in vernal pools on remnant alluvial fans, high stream terraces, and recent basalt flows from the Modoc Plateau in northeastern California. It is primarily associated with the vernal pool habitat on Northern Volcanic Ashflow and Northern Volcanic Mudflow substrates (Five Year Review 2024).
  - Occurs across a wide range of elevations from 85 – 5,760 ft (Five Year Review 2024).
  - “Vegetation types in which the occupied pools occur are diverse, ranging from grassland and oak woodland to mixed conifer forests, *Artemisia cana* (silver sagebrush) flats, and sedge meadows (Recovery Plan 2005).”
- **Pollinator/reproduction**
  - Three distinct life stages (FWS):
    - 1) Aquatic stage— sprout growth between Nov-Jan as rain fills vernal pools,
    - 2) Terrestrial stage— flowering occurs in May-June as vernal pools dry,
    - 3) Seed stage— seed forms from June-Sept and remain dormant in soil for several years until vernal pools have enough water for seeds to sprout
  - “Thought to primarily be wind pollinated; however, some insect pollination may occur, including by native bees (*Halictidae* sp.)” (Five Year Review 2024).
- **Taxonomy**
  - Terrestrial/Aquatic plant, grass, family *Poaceae* (2005 Recovery Plan)
  - FWS Category: Flowering monocot plants (group 4)
- **Relevant Pesticide Use Sites**

- “Modeling of pesticide concentrations in vernal pool habitats in Merced County within the San Joaquin Valley of California shows that vernal pools are under a high risk of pesticide inputs via agricultural runoff from the surrounding landscape (Sinnathamby et al. 2020, p. 9).” Five Year Review (2024)
  - “The actual concentrations of pesticides in vernal pools are not well-known because of the difficulty of accurately sampling these highly seasonal habitats. However, higher concentrations are typically observed in pools directly adjacent to agricultural lands.” Five Year Review (2024)
  - “Best management practices for weed control states that “if endangered grasses such as Sacramento Orcutt Grass (*Orcuttia viscida*) are also present, a grass-specific herbicide should never be used.” Five Year Review (2024)
  - “There is also evidence that fungicides may inhibit germination of *Orcuttia* seeds, as demonstrated by Keeley (1988, p. 1088).” (Five Year Review 2024)
  - The three pesticides (clothianidin, imidacloprid, and thiamethoxam) are registered for use on a variety of agricultural crops and target insect species. The Slender Orcutt Grass is thought to be primarily wind pollinated, but insect pollination may occur, including bees. These 3 pesticides are highly toxic to bees and if there is a decline near Slender Orcutt Grass, there is a potential for this to adversely affect the species (Five Year Review 2024).
- **Recovery Criteria/Objectives (Recovery Plan 2005)**
    - Recovery Objectives:
      - “Ameliorate or eliminate the threats that caused the species to be listed as federally endangered or threatened, and to ameliorate any newly identified threats, in order to be able to delist or downlist these species.”
      - “Ameliorate or eliminate the threats that affect the species of concern and ameliorate any newly identified threats in order to conserve these species.”
      - “Promote natural ecosystem processes and functions by protecting and conserving intact vernal pools and vernal pool complexes.”
    - Recovery Criteria:
      - “Protection from further habitat loss, fragmentation, and incompatible uses of the habitat to protect and maintain the full range of genetic and geographic variation in each species;”
      - “Development and implementation of appropriate habitat management plans for each species and area identified for protection;”
      - “Achievement of self-sustaining populations as determined through species monitoring and status surveys;”
      - “Completion of research necessary to refine measures to ameliorate or eliminate threats, and incorporation of results into habitat protection, management, and species monitoring efforts; and”
      - “Establishment of regional recovery implementation working groups and development of outreach and education programs to ensure public support and participation in recovery efforts.”
    - Species Specific Recovery Criteria:
      - Protect 80% of occurrences

- “Reintroduction to vernal pool regions and soil types from which status surveys indicate the species has been extirpated.”
  - Collection for seed/cyst banking at each vernal pool region. Areas containing small populations or few occurrences and should be first sources for seed banking.
- **Recovery Actions (Five Year Review 2024)**
    - Preserve additional, known extant occurrences to reach recovery goals outline in 2005 Recovery Plan.
    - Develop or reinstate regional and/or state-level working groups for vernal pool species.
    - Develop and implement standardized population trend survey protocols to complete updated status surveys, especially for occurrences on private lands where trends have not been recently updated.
    - Develop management indicators for identifying potential problems and assessing ecosystem health as it pertains to vernal pool species and establish requirements for appropriate management of vernal pool landscapes.
    - Conduct coordinated research for slender Orcutt grass population status and population dynamics.
    - Conduct coordinated research on the impact certain threats and their management have on the slender Orcutt.

### 3. Description of Species Range

- Figure A1-1 depicts the FWS range. The range was last updated on 11/22/2022.



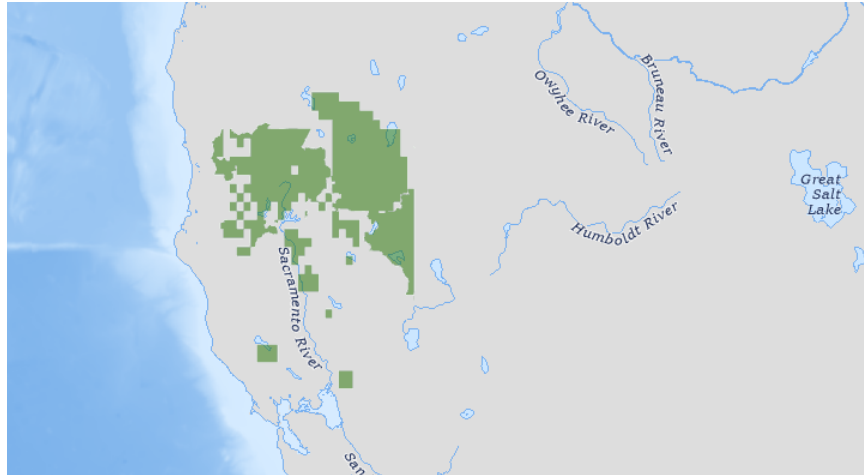


Figure A1-1. FWS range for the slender Orcutt grass. The total acreage is around 11,611,872 acres.

**4. Critical Habitat (2006 Critical Habitat Designation)**

- In a final rule of 70 FR 46924 on August 11, 2005, FWS designated the critical habitat for 4 vernal pool crustaceans and 11 vernal pool plants to be approximately 858,846 acres (ac) (347,563 hectares (ha)) across 34 counties in California and 1 county in southern Oregon.
- With that designation, the critical habitat area for the slender Orcutt grass was determined to be 94,213 acres (38,127 ha) in that region.
- Figure A1-2 depicts the critical habitat from FWS.

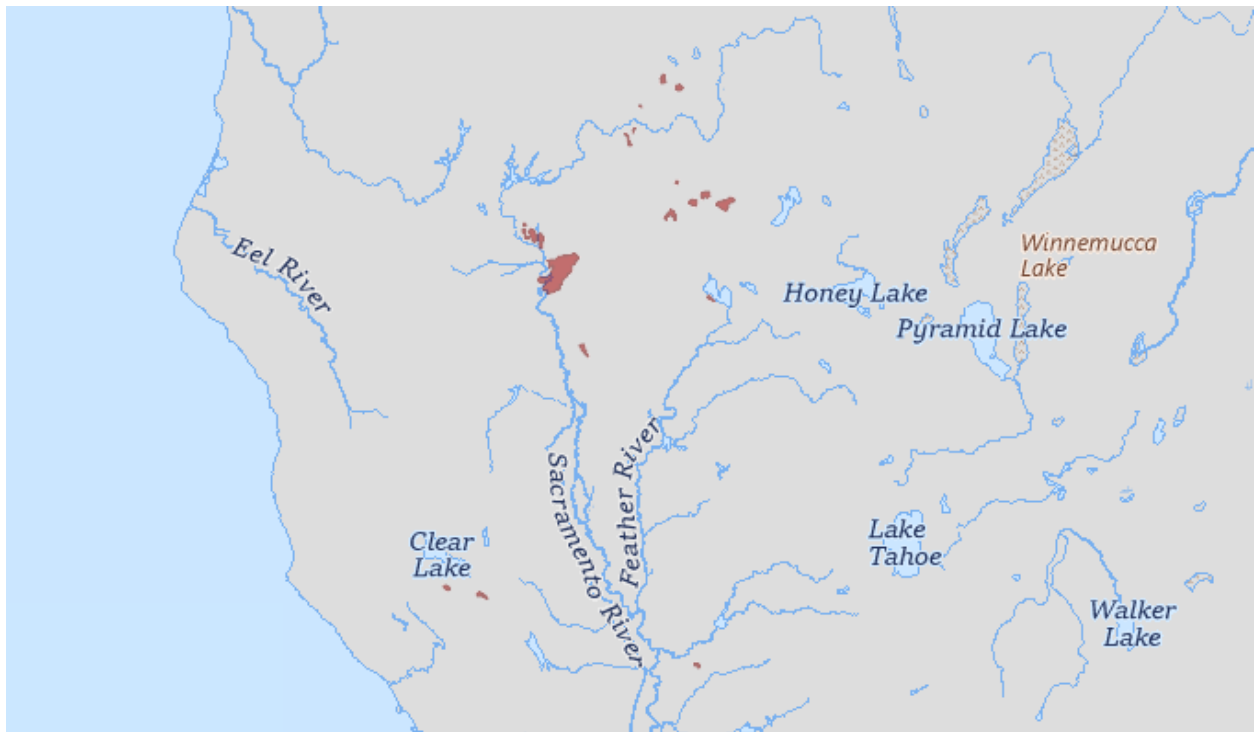


Figure A1-2. Critical Habitat spatial extents of the slender Orcutt grass from FWS. Searched on May 19, 2025.

**5. Known Locations**

- “At the time of listing, the Slender Orcutt Grass was known to occur from the Modoc Plateau in northeastern California, west to Lake County, and south through the Central Valley to Sacramento County.” (Five Year Review 2024)
- The slender Orcutt grass is found throughout the Modoc Plateau and Sacramento Valley in Modoc, Siskiyou, Shasta, Lassen, Plumas, Butte, Tehama, Lake and Sacramento Counties. (FWS)
- New occurrence from the 2024 Five Year Review are within the known extent of the species

**Table 2. The number of known slender Orcutt grass occurrences in each vernal pool region and recovery core area, with land ownership status (when known).**

Vernal Pool Region	Core Recovery Area	# of occurrences	Ownership (# of occurrences)
Lake-Napa	Boggs Lake-Clear Lake	2	Private (1); The Nature Conservancy (1)
Modoc Plateau	Northern Modoc Plateau	8	Modoc National Forest (8)
Modoc Plateau	Southern Modoc Plateau	2	Private (1); Lassen National Forest (1)
Modoc Plateau	Southwestern Modoc Plateau	7	Lassen National Forest (7)
Modoc Plateau	Western Modoc Plateau	7	Private (1); Bureau of Land Management (1); Lassen National Forest (5)
Modoc Plateau	Not Applicable	33	Private (4); Modoc National Forest (21); Lassen National Forest (7); unknown (1)
Northeastern Sacramento Valley	Dales	22	Private (5); The Nature Conservancy (9); California Department of Fish & Wildlife (2); Bureau of Land Management (6)
Northeastern Sacramento Valley	Palermo	2	Private (2)
Northeastern Sacramento Valley	Vina Plains	5	Private (1); The Nature Conservancy (3); Hamilton Ranch Mitigation Bank (1)
Northwestern Sacramento Valley	Millville Plains	2	Private (1); California Department of Fish & Wildlife (1)
Northwestern Sacramento Valley	Redding	7	Private (4); City of Redding (1); Bureau of Land Management (1); Wildlife Heritage Foundation (1)
Southeastern Sacramento Valley	Mather	3	Private (2); Sacramento Valley Conservancy (1)

- **Occurrences Included in Public Databases** (EPA queried iNaturalist, GBIF, and NatureServe)
  - iNaturalist (available [here](#)) had 20 research grade observations for this species, all of which appear to be within the species range; however, the positional accuracy of the points do not allow EPA to determine if these occurrences were within the critical habitat extents.
  - GBIF (available [here](#); filter for present occurrences in the USA) included 52 human observations from 2010-2025 (only 16 with coordinates) with all observations also

in iNaturalist or NatureServe. GBIF points largely coincide with the critical habitat but those that fall outside of the critical habitat extent may be accounted for by the resolution of the location data.

- Occurrences in NatureServe were consistent with other occurrence data and the critical habitat (linked [here](#)).

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

This core map was created based on biological information. Specifically, the core map is defined by the FWS species range refined by vernal pools overlapped with FWS critical habitat to encapsulate areas where the slender Orcutt grass may occur.

### 1. Dataset References and Software

- [NLCD Land Cover Database](#)
- Extant Vernal Pool Distribution: California's Great Valley, 2012<sup>3</sup>
- Software used: ArcGIS Pro 3.2
- FWS Species Range – last updated on 11/22/2022
- FWS Critical Habitat

### 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 FWS species range compared to FWS known locations. The core map was refined by clipping the vernal pool layer to the species range. This vernal pool/range layer was inclusive of majority of known locations. The locations outside the vernal pool/range layer could be accounted for by merging to the FWS critical habitat, except for seven (out of 100) locations. These points were either within the range of uncertainty or did not have a precise location. Therefore, the vernal pool/species range layer merged with critical habitat was used for final refinement to encompass known locations and areas of interest. Known locations were used only as a comparison to build the interim core map, and exact data points are not reported within the map.
  - Clip vernal pool data layer to species range
  - Merge with critical habitat

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<sup>3</sup> Carol W. Witham, Robert F. Holland, John Vollmar. 2012. Extant Vernal Pool Distribution: California's Great Valley. \\DROBO-FS\Public\VPMAPPING2012\2012RemapVernalPools\2012RemapVernalPoolsV2.mdb