Interim Core Map Documentation for Hairy Orcutt Grass

Version 1
Review Completed: April 2026
Core Map Developer: U.S. Environmental Protection Agency(EPA), Office of Pesticide Programs

Species Summary

The hairy Orcutt grass (*Lesquerella perforate or Paysonia perforata,* Entity ID 582) is an endangered wetland plant (monocot). The U.S. Fish and Wildlife Service (FWS) has designated a critical habitat for the hairy Orcutt grass. This species is found around vernal pools within annual grasslands. Pollination is thought to be predominately performed by wind. Additional information on the species is provided in **Appendix 1**.

Description of Core Map

The interim core map for the hairy Orcutt grass is based on biological information. The core map is defined by vernal pool habitat within the species' range, which is supported by the known locations data described by FWS.

Figure 1 depicts the resulting interim core map for the hairy Orcutt grass. The size of this core map is approximately 107,415 acres. Landcover categories within the core map area are included in **Table 1**. Landcover is predominantly grassland/herbaceous.

The core map developed for the hairy Orcutt grass is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the hairy 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 suitable habitat and corroborated by 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.

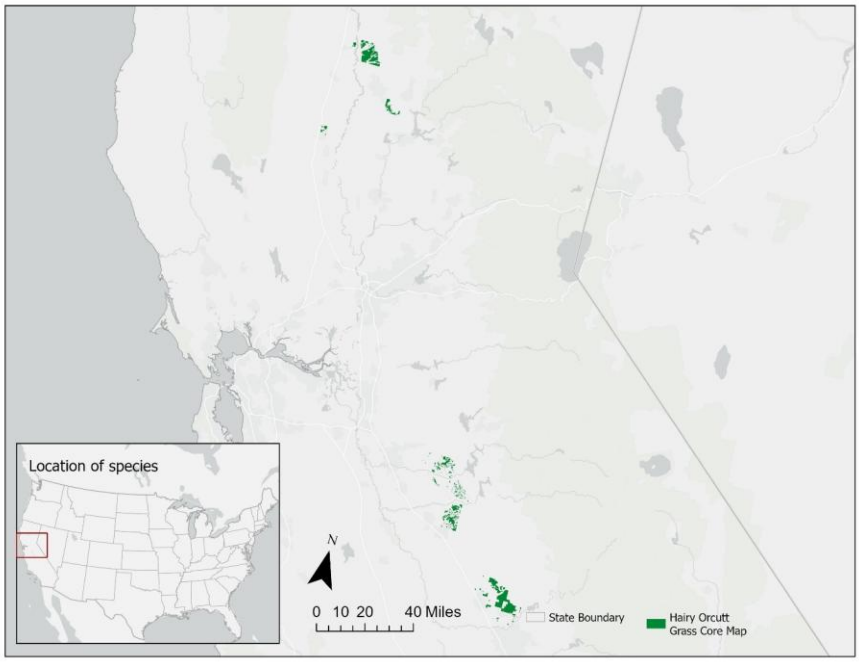

Figure 1. Interim core map for the hairy Orcutt grass.

Table 1. Percentage of Interim Core Map Represented by NLCD[1] 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)	<1
Forestry	Evergreen Forest (42)	<1
Forestry	Mixed Forest (43)	0
Agriculture	Pasture/Hay (81)	<1
Agriculture	Cultivated Crops (82)	1
Mosquito adulticide, residential	Open space, developed (21)	1
Mosquito adulticide, residential	Developed, Low intensity (22)	<1
Mosquito adulticide, residential	Developed, Medium intensity (23)	<1
Mosquito adulticide, residential	Developed, High intensity (24)	<1
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)	93
Invasive species control	Scrub/shrub (52)	1
Invasive species control	Barren land (rock/sand/clay; 31)	<1
Total Acres	**Interim Core Map Acres**	**107,415 acres**

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 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.

[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 four 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 hairy 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 hairy Orcutt grass is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- Occurrence locations of the hairy Orcutt grass
- This species relies on vernal pool habitat

For Step 2, EPA used the compiled information to identify the core map type. FWS' descriptions of this species locations in addition to vernal pool habitats are the best available information to serve as the basis of this 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 known locations 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.

[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 Hairy 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/15984.pdf
   - Five Year Review (2009) https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1476.pdf
   - Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (2005) https://ecos.fws.gov/docs/recovery_plan/Vernal%20Pool%20Ecosystem%20Final%20Recovery%20Plan.pdf
   - Habitat Designation (2006) https://www.govinfo.gov/content/pkg/FR-2006-02-10/pdf/06-1080.pdf#page=1

2. **Background information**
   - **Status**: Federally listed as endangered in 1997
   - **Resiliency, redundancy, and representation** (the 3Rs)

     Resiliency: No SSA for this species – no resiliency information.

     Redundancy: No SSA for this species – no redundancy information.

     Representation: No SSA for this species – no representation information.

     - **Habitat**
       - "This species is found on high or low stream terraces and alluvial fans." Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (2005) p. 76
       - "It occurs in Northern Basalt Flow, Northern Claypan, and Northern Hardpan vernal pools within annual grasslands. The median size of occupied pools measured in the late 1980s was 1.7 hectares (4.2 acres), with a range of 0.34 to 250 hectares (0.8 to 617.5 acres)." Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (2005) p. 76
       - "This species is found on both acidic and saline-alkaline soils, in pools with an iron-silica cemented hardpan or claypan." Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (2005) p. 76
       - "This species is known from elevations of 26 meters (85 feet) in Glenn County to 123 meters (405 feet) in Madera County." Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (2005) p. 76

     - **Pollinator/reproduction**
       - "The overall importance of pollinating insects for the hairy Orcutt grass is poorly understood. Orcutt grasses are thought to primarily be wind pollinated; however, some insect pollination may occur, including by native bees (Halictidae sp.), which have been observed gathering pollen from hairy Orcutt plants (Griggs 1974, as cited in Stone et al. 1988, p. 16)." Five Year Review (2024)

- **Taxonomy**
  - Terrestrial/Aquatic plant, grass, family (Poaceae)
  - FWS Category: Flowing monocot plants (group 4)

- **Relevant Pesticide Use Sites**
  - Specific pesticide use sites are not described in FWS documents; however, potential impacts to potential pollinators of this species from exposures to insecticides are discussed (Five Year Review, 2024).

- **Recovery Criteria/Objectives (2006 recovery plan)**
  - The recovery plan contained multiple vernal pool species. The criteria are common to the downlisting/delisting of most of the listed species.
  - Recovery Criteria (Recovery Plan 2005)
  - 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
  - Establishment of regional recovery implementation working groups and development of outreach and education programs to ensure public support and participation in recovery efforts.

- **Recovery Actions (from 2006 recovery plan)**
  - Protection of vernal pool habitat from destruction or modification by development or agriculture, especially within Madera, Merced, and Turlock core areas
  - Systemic, range wide surveys for the hairy Orcutt grass should be completed at vernal pools that have been previously occupied. Repeating the work of Witham (2013) would provide essential information to evaluate the recovery of the species.
  - Reintroductions or introductions of the hairy Orcutt grass into previously occupied or suitable habitat should be considered to enhance existing populations and increase the redundancy of the species.
  - Genetic research to refine our understanding of the genomics of the Orcuttieae tribe and more specifically to investigate the genetic relatedness of the hairy and Sacramento (Orcuttia viscida) Orcutt grasses. The hairy Orcutt grass occurs in a disjunct linear distribution from Tehama to Madera Counties. Sacramento Orcutt grass, a narrow endemic known only from Sacramento County, occurs about halfway between the farthest extents of the hairy Orcutt grass range. Additionally, phylogeographic studies are warranted to help determine if the four clusters of the species constitute four unique populations or if there are multiple populations within these clusters.

3. Description of Species Range

- Figure A1-1 depicts the FWS range. The range was last updated on 1/27/2018.

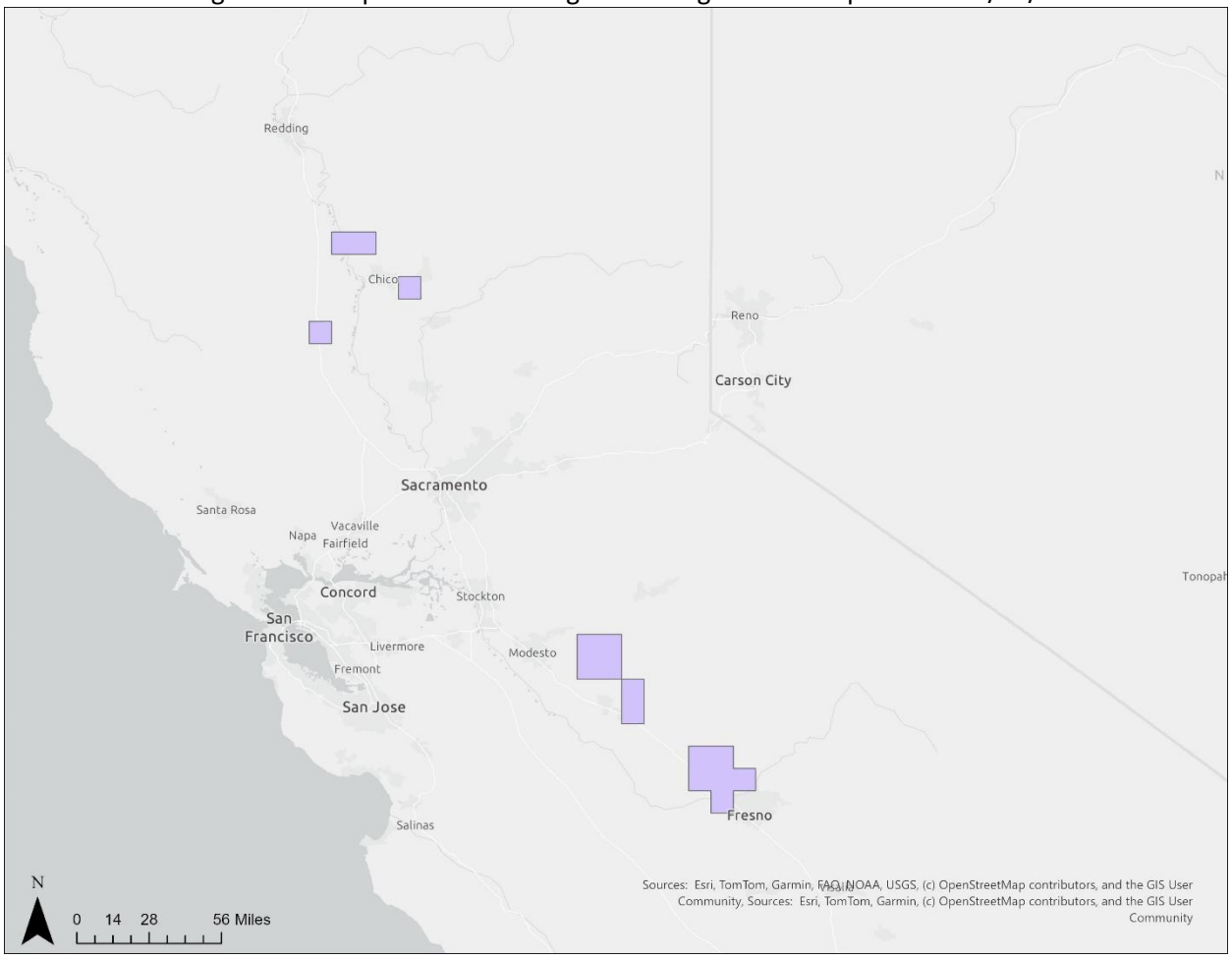

Figure A1-1. FWS range for the hairy Orcutt grass. The total acreage of the range is around 373,000 acres.

4. Critical Habitat

- FWS has designated a critical habitat for this species.

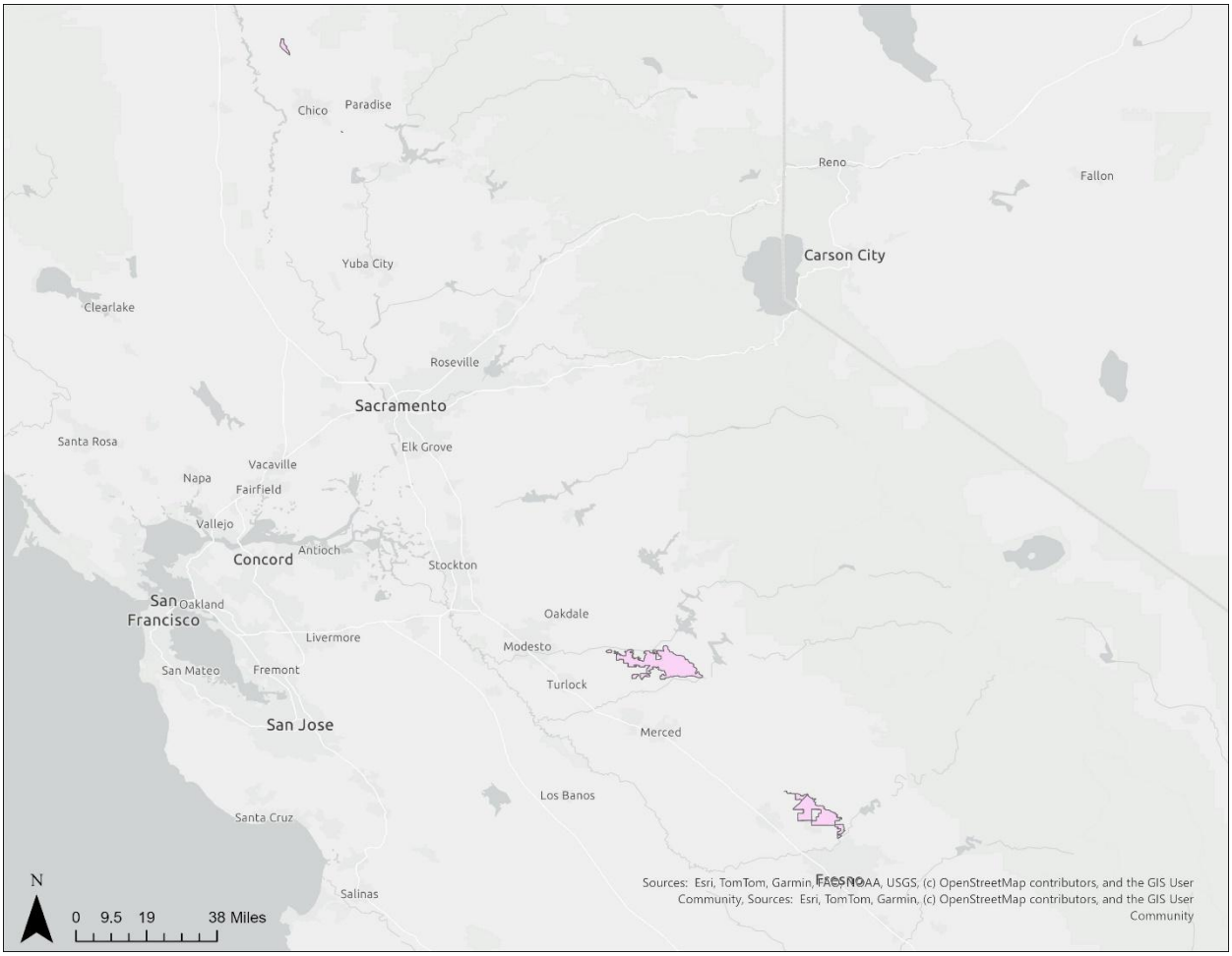

Figure A1-2. FWS critical habitat for the hairy Orcutt grass.

5. Known Locations

- Known Locations Described in FWS Recovery Documents.
    - The hairy Orcutt grass has been found in the Northeastern Sacramento Valley, Southern Sierra Foothills, and Solano-Colusa Vernal Pool Regions. The Diversity Database occurrences of the hairy Orcutt grass are generally clumped in four locations in Tehama, Glenn, Stanislaus, and Madera Counties, with two more isolated occurrences in Merced County. FWS used known locations from California Natural Diversity Database when describing occurrences.

- **Occurrences Included in Public Databases**
  EPA queried iNaturalist, GBIF, and NatureServe.

  iNaturalist (available here) had 3 research grade observations for this species, all fall within the species range.

  GBIF (available here) had 35 human observations (from 1937-2023). All observations are also included in iNaturalist or NatureServe.

Occurrences in NatureServe were consistent with other occurrence data (linked here).

Collectively, the occurrence data did not support expanding the outer boundary of the core map beyond its range.

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

This core map was created based on biological information, including occupied location and species habitat.

1. **Dataset References and Software**

- NLCD Land Cover 2021[3]
  - 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 US
- Extant Vernal Pool Distribution: California's Great Valley, 2012[5]
- Software used: ArcGIS Pro 3.2
- FWS Species Range – last updated on 10/15/2015

2. **Datasets Used in Core Map Development**

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

California Natural Diversity Database known locations were cross-referenced, but this data was not used for core map refinement.

3. **Core Map Development**

- EPA started with the FWS species range. EPA then used the vernal pool layer[5] and found that the known locations fell within the vernal pool layer all within the FWS range, so subsequently the vernal pool layer was used for final refinement to encompass known locations and areas of interest.
  - Clip vernal pool data layer to species range and critical habitat
  - 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
  - Core map file name is "Hairy Orcutt Grass Core Map.shp"

[3] Housman, I.W.; Schleeweis, K.; Heyer, J.P.; Ruefenacht, 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

[5] Carol W. Witham, Robert F. Holland, John Vollmar. 2012. Extant Vernal Pool Distribution: California's Great Valley. \\DROBO-FS\Public\VPMAPPING2012\2012RemapVernalPools\2012RemapVernalPoolsV2.mdb