

# Interim Core Map Documentation for the Lompoc Yerba Santa

## Version 1

**Review Completed:** April 2026

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

## Species Summary

The Lompoc yerba santa (*Eriodictyon capitatum*; entity ID 364) is an endangered perennial terrestrial plant and was federally listed as endangered in 2000. The U.S. Fish and Wildlife Service (FWS) designated a critical habitat for the Lompoc yerba santa in 2002. The species is endemic to west Santa Barbara County, California. The Lompoc yerba santa is found in chaparral and bishop pine forest, and in sage scrub and oak woodland. The primary constituent elements for its critical habitat are sandy, acidic soil, maritime chaparral, and bishop pine forests that intergrade with chaparral. The Lompoc yerba santa reproduces both sexually and asexually but is self-incompatible. Additional information on the species is in **Appendix 1**.

## Description of Core Map

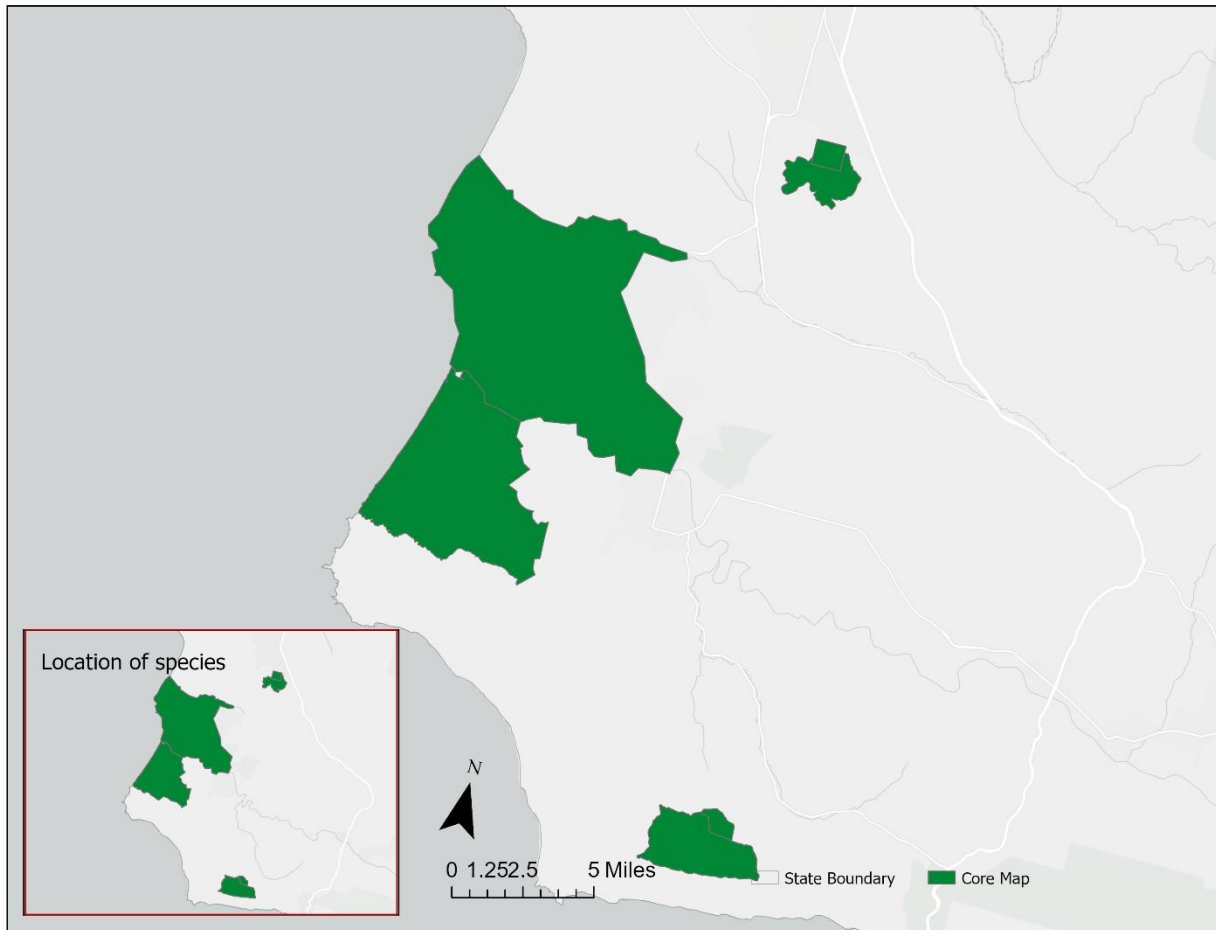
The core map for the Lompoc yerba santa is biological information type. Specifically, the core map includes the critical habitat and known occurrences outside of the critical habitat and range. Specific geographic borders and/or coordinates of the known locations are not provided in the FWS materials. Known location units were determined based on named locations and information and maps provided in the Lompoc yerba santa Five Year Review (2021). The critical habitat was designated in 2002 (Designation of Critical Habitat 2002), but additional occurrences have since been recognized (Five Year Review 2021). The Lompoc yerba santa is a habitat specialist with a small geographic range and a relatively small total population size (Five Year Review 2021). FWS recognizes eleven occurrences of the Lompoc yerba santa (Five Year Review, 2021) and this core map was developed to encompass the FWS known occurrences. The outer extent of the map is defined by the critical habitat (for occupied areas that are within the critical habitat) and locations of known occurrences that were recognized after the designation of the critical habitat. Development for known locations outside the critical habitat was based on information documented by FWS.

**Figure 1** depicts the resulting interim core map for the Lompoc yerba santa. The size of this core map is approximately 60,113 acres. Landcover categories within the core map area are included in **Table 1**. Land cover within the core map was assessed using the National Land Cover Database (NLCD).<sup>1</sup> Landcover in the core map is predominantly Scrub/shrub. Additional information on Geographic Information System (GIS) steps used is in **Appendix 2**.

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<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>

The core map developed for the Lompoc yerba santa is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the Lompoc yerba santa. 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 known locations of the species. 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 Lompoc yerba santa. The total acreage is approximately 60,113 acres.**

**Table 1. Percentage of Interim Core Map Represented by National Land Cover Database (NLCD)<sup>2</sup> 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)	8%
Forestry	Mixed Forest (43)	6%
Agriculture	Pasture/Hay (81)	1%
Agriculture	Cultivated Crops (82)	1%
Mosquito adulticide, residential	Developed Open Space (21)	7%
Mosquito adulticide, residential	Developed Low Intensity (22)	4%
Mosquito adulticide, residential	Developed Medium Intensity (23)	2%
Mosquito adulticide, residential	Developed High Intensity (24)	0%
Invasive species control	Woody Wetlands (90)	2%
Invasive species control	Emergent Herbaceous Wetlands (95)	3%
Invasive species control	Open Water (11)	2%
Invasive species control	Grassland/Herbaceous (71)	11%
Invasive species control	Shrub/Scrub (52)	52%
Invasive species control	Barren Land (31)	1%
Total Acres	Interim Core Map Acres	~ 60,113

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

EPA evaluated these four sets of data before selecting the type of and developing the core map. FWS appeared to have the most refined information on known occupied areas. There are 11 known occurrences described in FWS documentation for this species (Five Year Review 2021, **Figure A1-3** and **Figure A1-4** in **Appendix 1**). Occurrences in iNaturalist, GBIF, and NatureServe did not support further expanding the core map outside of the FWS range and known occurrences. **Appendix 1** includes more information on the available known location information.

<sup>2</sup> 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 FWS and their Designated Critical Habitats”<sup>3</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 Lompoc yerba santa from FWS, as well as observation information available from various publicly available sources (including iNaturalist, GBIF, and NatureServe). The information compiled for the Lompoc yerba santa is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- The range of the Lompoc yerba santa, last updated in 2018
- The critical habitat of the Lompoc yerba santa, designated in 2002
- The 11 known occurrences described in FWS documentation
- Additional occupied areas were discovered when developing the 2021 Five Year Review. (**Figure A1-3** and **Figure A1-4**)

For step 2, EPA used the compiled information to identify the core map type including species range, critical habitat and known location information. Known occurrences occur within, partially outside, or completely outside the critical habitat. The range includes 295,564 acres in the western portion of Santa Barbara County, California. The 11 FWS-identified extant populations are located within the range (**Figures A1-3 and A1-3**) but the range contains habitats where the species does not occur. Additionally, FWS notes that the extent of occurrence of the species is 167 square miles (106,880 acres). Therefore, EPA based the core map on both the critical habitat and known locations outside the critical habitat.

For step 3, EPA used the best available data sources to generate the core map. Data sources are discussed in detail in **Appendix 2**. For this core map, EPA used the known occurrence information provided in FWS documentation. The known occurrences were incorporated into the core map two ways: (1) developing spatial polygons using landmarks (roads, streams, rivers, etc.) named by FWS to develop borders, (2) developing a spatial polygon using distances from landmarks (towns, bodies of water, etc.) named by FWS to develop borders. See **Appendix 2** for methods used and rationale. **Appendix 2** provides more details on the GIS analysis and steps and rationale used to generate the core map

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<sup>3</sup> Dated 2024, available online at: <https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-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 Lompoc Yerba Santa

### 1. FWS Documentation (Citation used in this document)

- Lompoc Yerba Santa 5-year review (Five Year Review 2021) [https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/3616.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3616.pdf)
- Lompoc yerba santa (*Eriodictyon capitatum*) 5-Year Review (Five Year Review 2011)
- Designation of Critical Habitat for *Eriodictyon capitatum* (Lompoc yerba santa) and *Deinandra increscens* ssp. *villosa* (Gaviota tarplant) (Designation of Critical Habitat 2002) <https://www.govinfo.gov/content/pkg/FR-2002-11-07/pdf/02-27873.pdf#page=1>
- Final Rule for Endangered Status for Four Plants From South Central Coastal California (Final Rule: Endangered Status 2000) <https://www.govinfo.gov/link/fr/65/14888?link-type=pdf>
- There is no FWS Recovery Plan or Species Status Assessment for the Lompoc yerba santa at the time of Core Map Development.

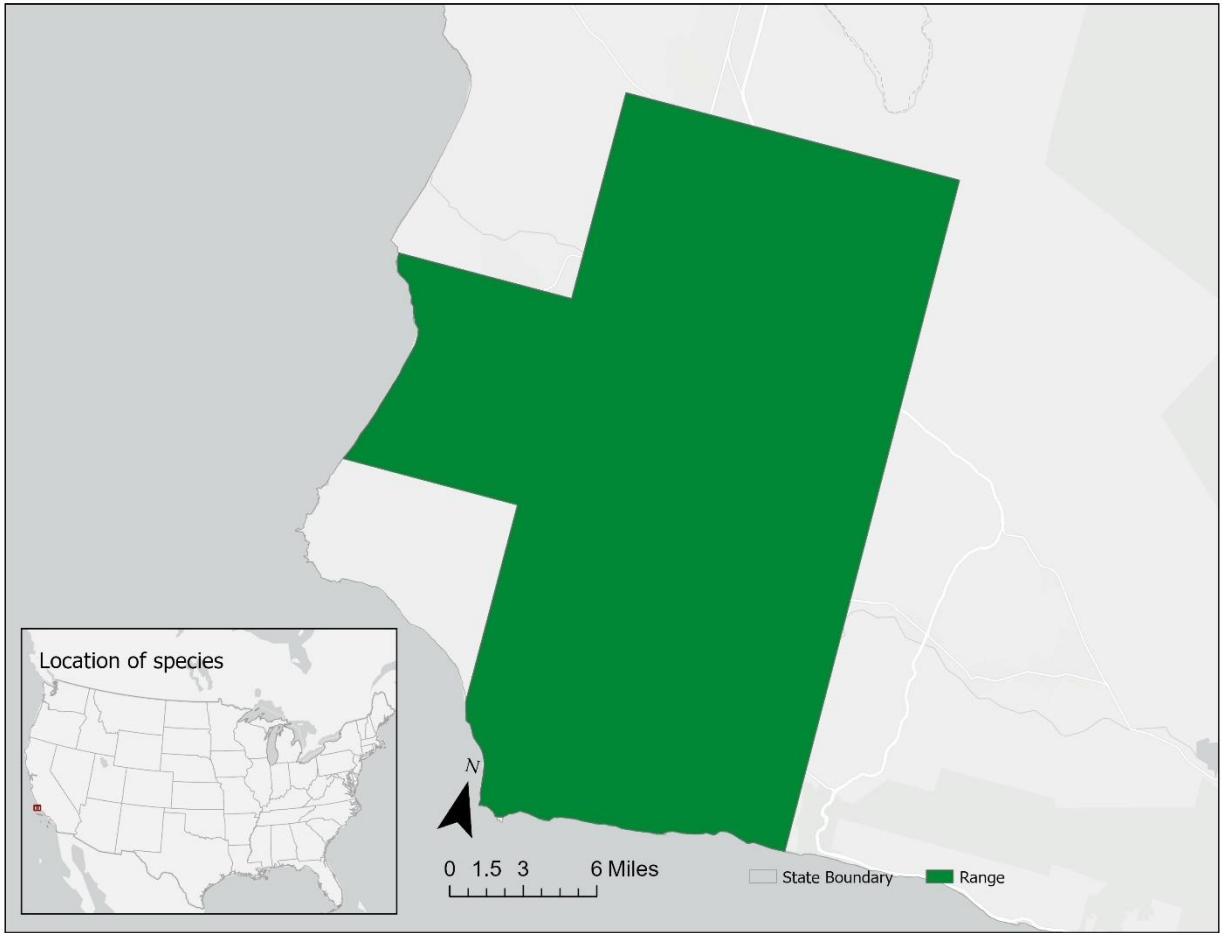
### 2. Background information

- **Status:** Federally listed as endangered in 2000
- **Resiliency, redundancy, and representation** (the 3Rs)
  - No species status assessment or specific reference to the 3Rs
- **Habitat (Five Year Review 2021)**
  - Endemic to west Santa Barbara County, California
  - Occurs in Mediterranean climate with mild, wet winters and moderately warm, dry summers, and it is strongly influenced by the prevailing westerly oceanic winds
  - chaparral and bishop pine forest, and in sage scrub and oak woodland. Most occurrences are in sandy soil, and parts of two occurrences are in shale.
  - early successional, pioneer and edge species, exhibiting opportunistic resprouting by ramets (genetically identical stems derived from one progenitor), sometimes in response to disturbance
  - grow roadside, along trails, on exposed ridge tops, on slopes and in a canyon bottom, in open areas, at edge of dense vegetation, and in dense vegetation
  - “The primary constituent elements for its critical habitat are: sandy, acidic soil; and maritime chaparral, and bishop pine forests that intergrade with chaparral” (Designation of Critical Habitat 2002).
- **Diet** (Five Year Review 2021).
  - The species is a plant that requires sunlight.
- **Reproduction**
  - The Lompoc yerba santa reproduces both sexually and asexually but is self-incompatible (Five Year Review 2021).
- **Taxonomy**
  - Terrestrial Plant
  - One of 11 species (plus additional subspecies and varieties) in the genus *Eriodictyon* (family *Namaceae*, Five Year Review 2021).
- **Relevant Pesticide Use Sites**
  - The use of pesticides is not described in FWS documentation.

- FWS documentation describes invasive plant species as a threat to the species (Five Year Review 2021 and 2011), which suggests potential for herbicide use.
- **Recovery Criteria/Objectives**
  - There is no recovery plan for this species
  - Recovery actions described in Five Year Review (2021):
    - “Implement management actions to reduce threats and benefit the occurrences of Lompoc yerba santa.
    - Conserve and protect habitat in vicinity of and near existing occurrences, with particular attention to maritime chaparral on Burton Mesa, Vandenberg Space Force Base.
    - Conduct searches for additional locations of Lompoc yerba santa, including use of helicopters and drones for searching large expanses of potential habitat and potential habitat in difficult terrain. Priority should be given to searching in vicinities of occurrences 12 (Jack and Laura Dangermond Preserve) and 13 (Upper LaSalle Canyon, Vandenberg Space Force Base).
    - Collect tissue samples from occurrence 12 for genetic analyses.
    - Continue seed collection for seed banking. In coordination with Santa Barbara Botanic Garden and contingent upon results of previous sampling, multicolonal locations should be visited to determine if seed production is occurring, in particular at occurrences 2, 13 and 14 as a matter of urgency (these three occurrences are on Vandenberg Space Force Base).
    - Collect and cultivate cuttings and seeds to develop protocols for propagation and outplanting for long-term restoration success. In consideration of the threat of climate change with severe drought and increased temperatures, the methods employed for outplanting in arid lands by Abella et al. (2012, entire), Abella et al. (2015, entire), Abella (2017, entire) and Abella et al. (2020, entire) should be considered.
    - Study genetic diversity and reproductive biology, pollinator network and potential network disruption, potential barriers to recruitment, and the species’ relationship with fire.
    - Introduce the Lompoc yerba santa into living collections at botanic gardens.”

### 3. Description of Species Range

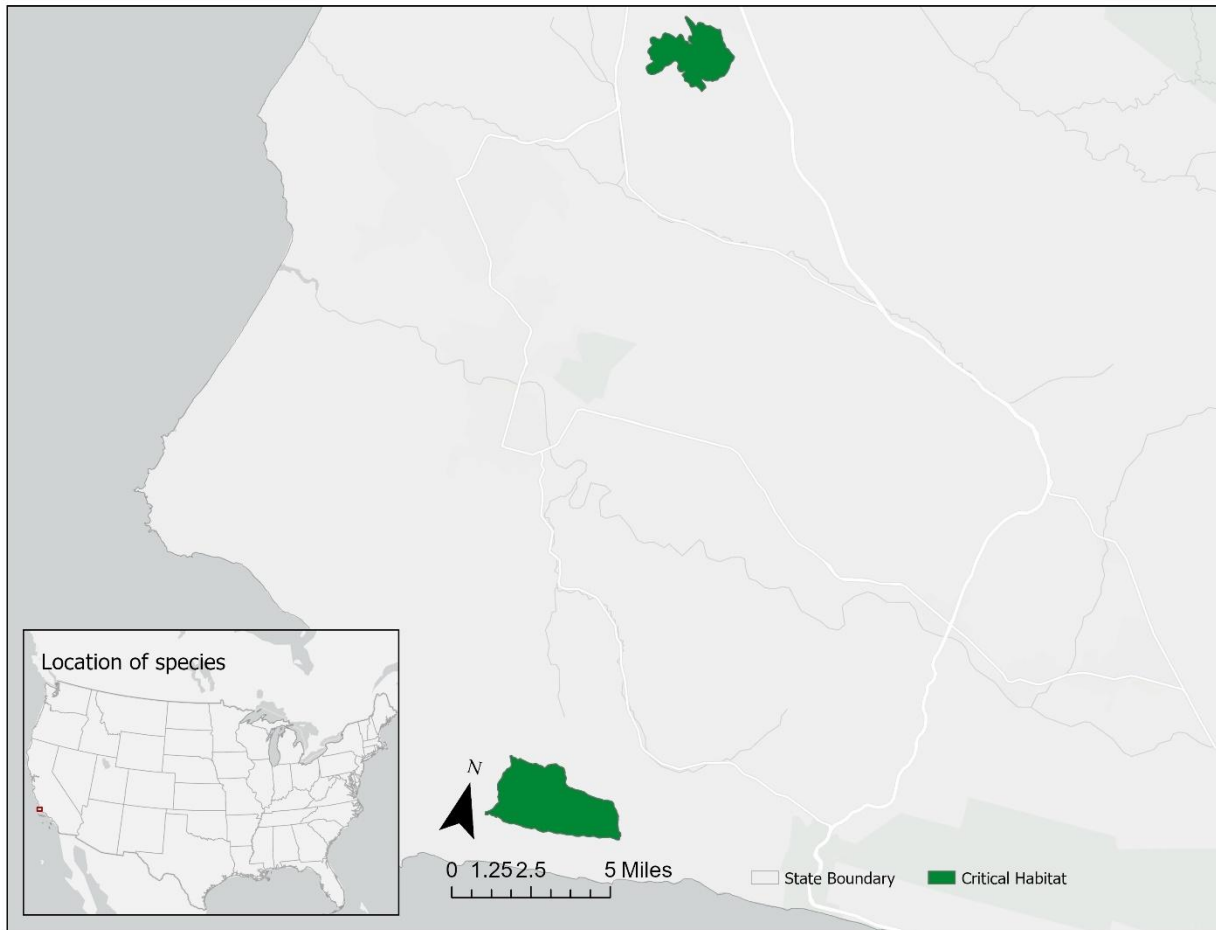
- **Figure A1-1** depicts the FWS range. The range was last updated on 3/21/2018. The total acreage of the range is approximately 295,564 acres.
- “[The] Lompoc yerba santa is a habitat specialist with a small geographic range (433 km<sup>2</sup> /167 mi<sup>2</sup> extent of occurrence in 2021), and a relatively small total population size.” (Five Year Review 2021)



**Figure A1-1. FWS range for the Lompoc yerba santa. The total acreage of the range is approximately 295,564 acres.**

**4. Critical Habitat:**

- Critical habitat was established for this species in 2002 and is in western Santa Barbara County, CA.
- Figure A1-2 depicts the FWS designated critical habitat.
- The critical habitat includes two spatial units that contain locations occupied by the species when the critical habitat was designated.
- The physical and biological features (primary constituent elements) identified as essential to conservation of the species and considered by FWS when developing the critical habitat FWS are:
  - Soils with a large component of sand and that tend to be acidic; and
  - Plant communities that support associated species, including maritime chaparral, particularly where the following associated species are found:
    - *Dendromecon rigida* (bush poppy)
    - *Quercus berberidifolia* (California scrub oak)
    - *Quercus parvula* (Santa Cruz Island oak)
    - *Ceanothus cuneatus* (buck brush)
    - and in southern bishop pine forests that intergrade with chaparral *Arctostaphylos* spp. (manzanita) and *Salvia mellifera* (black sage)



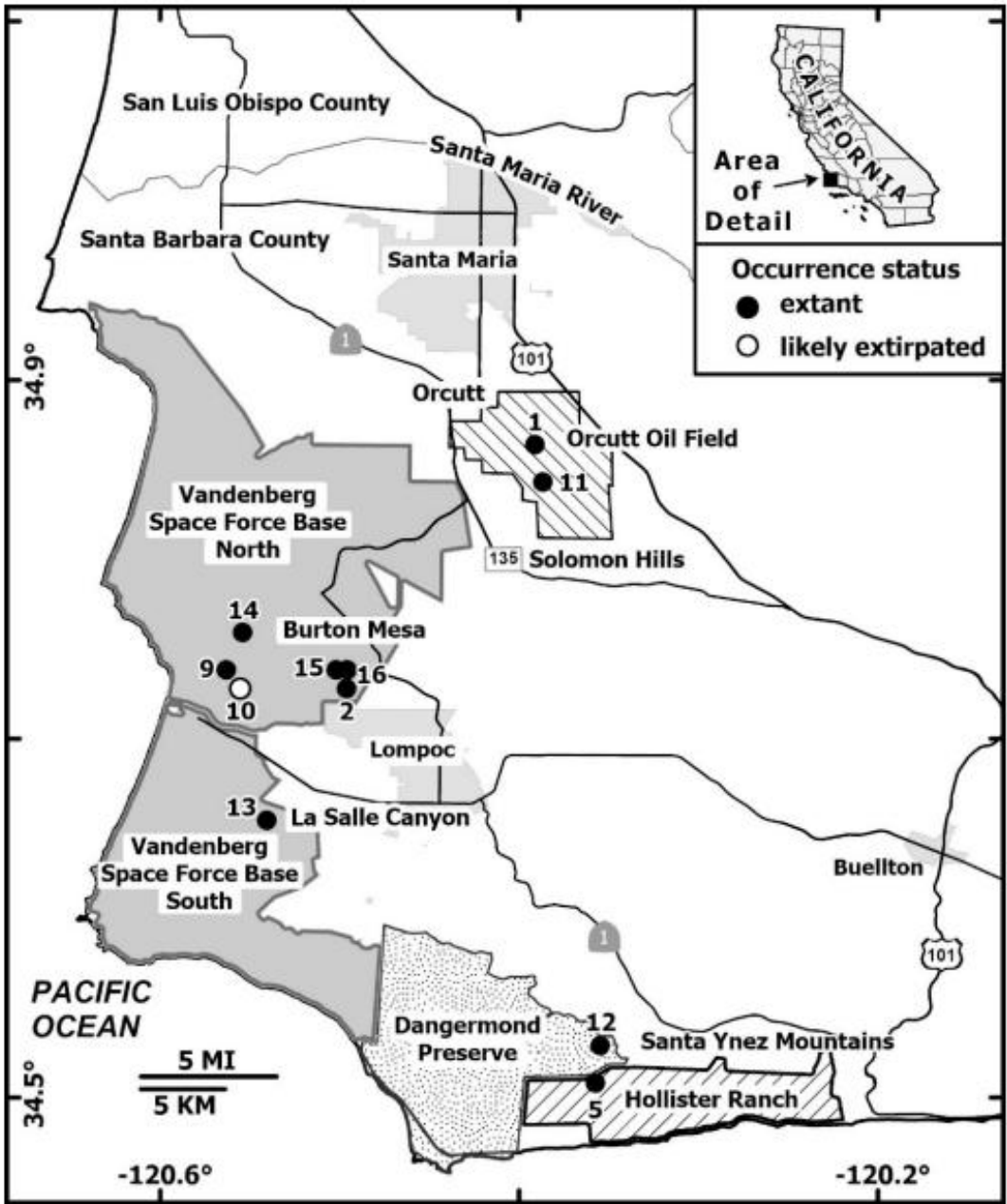
**Figure A1-2. FWS critical habitat for the Lompoc yerba santa. The total acreage of the range is approximately 6,401 acres.**

## 5. Known Locations

- **Known Locations Described in FWS Documentation:**
  - When the critical habitat was designated for the Lompoc yerba santa in 2002, there were four locations known to be occupied by the species (Designation of Critical Habitat 2002).
    - Two occurrences were on the Vandenberg Air Force Base (East Group and West Group)
    - Oil fields south of Orcutt, referred to as the Solomon Hills location (comprised of one group)
  - Six occurrences were recognized in 2011 (Five Year Review 2011)
    - One of these occurrences (occurrence 11, see **Figure A1-5**) was identified since the designation of critical habitat in 2002.
    - The new occurrence was part of the Solomon Hills occurrence area.
  - FWS now recognizes 11 occurrences (Five year Review 2021).
    - Of the 11 known occurrences, 10 are presumed extant (Five Year Review 2021)

- The occurrences are grouped into four geographic locations based on landscape features
  - Solomon Hills (2 occurrences),
    - Includes occurrences 1 and 11
    - These occurrences are associated/ proximal the northern critical habitat unit for Lompoc yerba santa.
      - Occurrence 11 was not identified until 2007, after the designation of the critical habitat 2002 (see **Figure A1-5**)
      - Because the exact location of the occurrence is unknown, it is unknown if this population is within the extent of the critical habitat.
    - Both occurrences are in the Orcutt Oil Field on private properties (Five Year Review 2021)
    - 1.0–1.9 mi south of Orcutt and 11.2–12.3 mi inland east from the Pacific Ocean (Five Year Review 2021)
  - Burton Mesa (6 occurrences),
    - Includes occurrences 2, 9, 10, 14, 15 and 16
    - Occurrence 10 is likely to be extirpated (Five Year Review 2021). Occurrences 2, 9 and 10 were recognized when the species was listed (Five Year Review 2011). Occurrences 14, 15, and 16 were identified in 2021 (Five Year Review 2021).
    - This geographic population is 2.6–8.9 km/1.6 mi–5.5 mi inland east from the Pacific Ocean (Five Year Review 2021)
    - On north base of Vandenberg Space Force Base in west Santa Barbara County (Five Year Review 2021)
    - North of Santa Ynez River, west of State Highway 1, south of San Antonio Creek
    - These occurrences are not included in the critical habitat
  - LaSalle Canyon (1 occurrence),
    - Includes occurrence 13
    - This population was identified in 2021 (Five Year Review 2021), and not included in the critical habitat
    - In upper La Salle Canyon on south base of Vandenberg Space Force Base in west Santa Barbara County
    - 4.5 mi inland east of the Pacific Ocean, and 3.7 mi west of Lompoc (Five Year Review 2021).
    - South of Santa Ynez River, west of State Highway 1, north of Cañada Honda Creek (Five Year Review 2021).
    - There are two colonies with a total count of 281 stems/258 ramets in 2018 (Five Year Review 2021).
  - and Santa Ynez Mountains (2 occurrences)
    - Includes occurrences 5 and 13
    - These occurrences are associated/ proximal the southern critical habitat unit for Lompoc yerba santa.

- Occurrence 13 was not identified until 2019, after the designation of the critical habitat 2002 (see **Table A1-1**)
    - Because the exact location of occurrence 13 is unknown, it is unknown if this population is within the extent of the critical habitat.
  - at west end of the Santa Ynez Mountains in southwest Santa Barbara County (Five Year Review 2021)
  - south of Jalama Creek, 2.3–3.9 mi inland north of the Pacific Ocean and 2.1 mi southwest of State Highway 1 (Five Year Review 2021)
  - Both occurrences are on private properties: occurrence 5 on Hollister Ranch with multiple landowners, occurrence 12 on Jack and Laura Dangermond Preserve owned by The Nature Conservancy (Five Year Review 2021).
  - The two occurrences are separated by 1.3 miles (Five Year Review 2021).
- **Figure A1-3.** is a map of the FWS known populations of the Lompoc yerba santa and **Figure A1-4** summarizes status information for the 11 populations, both extracted and reproduced from 2021 Five Year Review.



**Figure 1.** Geographic distribution of the 11 known occurrences of Lompoc yerba santa (*Eriodictyon capitatum*), endemic to west Santa Barbara County, California. We recognize four geographic populations, which from north to south are Solomon Hills (2 occurrences), Burton Mesa (6 occurrences), LaSalle Canyon (1 occurrence), and Santa Ynez Mountains (2 occurrences).

**Figure A1-3:** Locations of 11 known occurrences of the Lompoc yerba santa, reproduced from Five-year Review 2021

**Table 1.** Summary of current status of the 11 known occurrences of Lompoc yerba santa (*Eriodictyon capitatum*) in west Santa Barbara County, California. Occurrences 12, 13, 14, 15 and 16 are new.

Occurrence	Location	Landowner	Protected Managed		Year last observed	Status in 2021	Threats in 2021
1	Orcutt Oil Field in Solomon Hills	Pacific Coast Energy Company	N	N	>7,000 ramets in 2018	presumed extant	development, oil production and oil spills, dense vegetation, vehicles running over plants, road maintenance, altered fire regime/fire management practices, climate change effects
2	Vandenberg Space Force Base (north base)	U.S. Space Force	N	partially	unknown number in 2019, 9,794 stems in part in 2015	presumed extant	military activities, development, dense vegetation, lack of management, invasive species, erosion, unicolonism and/or low genetic diversity, low seed production, low number of plants (some locations), altered fire regime/fire management practices, climate change effects
5	Hollister Ranch	multiple private	N	N	observed in 2019, 100+ stems in 1986	presumed extant	development, dense vegetation, lack of management, vehicles running over plants, road maintenance, altered fire regime/fire management practices, climate change effects
9	Vandenberg Space Force Base (north base)	U.S. Space Force	N	partially	743 stems/316 ramets in 2019	presumed extant	military activities, unicolonism and/or low genetic diversity, low seed production, development, road maintenance, invasive species, altered fire regime/fire management practices, climate change effects
10	Vandenberg Space Force Base (north base)	U.S. Space Force	N	partially	several shrubs in 1987, not found in 2021	likely extirpated	low number of plants, military activities, development, invasive species, altered fire regime/fire management practices, climate change effects
11	Orcutt Oil Field in Solomon Hills	Pacific Coast Energy Company	N	N	unknown number in 2015, 100-135 individual plants in 2011	presumed extant	development, oil production and oil spills, dense vegetation, vehicles running over plants, road maintenance, altered fire regime/fire management practices, climate change effects
12	Jack and Laura Dangermond Preserve	The Nature Conservancy	Y	N	2 individuals in 2014	presumed extant	low number of plants, dense vegetation, lack of management, vehicles running over plants, road maintenance, altered fire regime/fire management practices, climate change effects
13	Vandenberg Space Force Base (south base)	U.S. Space Force	N	partially	281 stems/258 ramets in 2018	presumed extant	military activities, potentially competitive native species, lack of management, altered fire regime/fire management practices, climate change effects
14	Vandenberg Space Force Base (north base)	U.S. Space Force	N	partially	70 individuals/78 ramets in 2019	presumed extant, MQ-9 Wing Beddown project may destroy	military activities, development, low number of plants, dense vegetation, lack of management, altered fire regime/fire management practices, climate change effects
15	Vandenberg Space Force Base (north base)	U.S. Space Force	N	partially	5 stems/4 ramets in 2015	presumed extant	low number of plants, military activities, dense vegetation, lack of management, altered fire regime/fire management practices, climate change effects, invasive species
16	Vandenberg Space Force Base (north base)	U.S. Space Force	N	partially	unknown number in 2019, 28 ramets in 2015	presumed extant	low number of plants, military activities, development, lack of management, altered fire regime/fire management practices, climate change effects

**Figure A1-4:** Summary of 11 known occurrences of the Lompoc yerba santa, reproduced from Five year Review 2021

Table 1: Occurrence records for *Eriodictyon capitatum* collated from the CNDDDB (2010) and the Consortium (2010).

CNDDDB # <sup>1</sup>	Name (owner)	Current Trend	Year Collected/Observed	Pop Size/Year Surveyed	Reference
<b>Solomon Hills area</b>					
1 (includes former #4)	Orcutt Oil Field, Solomon Hills (private)	Extant	Hoffmann (1932) Tilforth UC839 (1973)	Common (1973) >500 (1986) Common (1993)	CNDDDB 2010
11	Orcutt Oil Field, Solomon Hills (private)	Extant	Vogler & Boinay (2007)	20-30 plants (2007)	CNDDDB 2010
<b>West Burton Mesa area</b>					
2 (includes former #3)	Pine Canyon, Vandenberg Air Force Base (DOD) <sup>2</sup> (type locality)	Extant	Hoffmann SBBG #65158 (1932)	68 stems (1982)	CNDDDB 2010
9	Burton Mesa, 35 <sup>th</sup> x California St, Vandenberg Air Force Base (DOD) <sup>2</sup>	Presumed extant	Smith (1982)	>100 stems (1982) <500 plants (1987)	CNDDDB 2010
10	Burton Mesa, 35 <sup>th</sup> x New Mexico St, Vandenberg Air Force Base (DOD) <sup>2</sup>	Presumed extant	Griffiths CDA#105381 (1987)	Several shrubs (1987)	CNDDDB 2010
<b>Santa Ynez Mountains area</b>					
5 (includes former 6,7,8)	Hollister Ranch, Santa Ynez Mountains (private)	Presumed extant	Tucker SBBG# 6086 (1941)	Many (1986)	CNDDDB 2010

<sup>1</sup> CNDDDB # = element occurrence number assigned by the California Natural Diversity Database (CNDDDB 2010)

<sup>2</sup> DOD = Department of Defense

Figure A1-5: Summary of 6 known occurrences of the Lompoc yerba santa in 2011, reproduced from the 2011 Five Year Review

Table A1-1: Summary of FWS Known Occurrences and Information Used by EPA to Develop Core Map

Geographic Group Name	Occurrences Number	FWS Document where Occurrence first Recognized (Designation of Critical Habitat 2002, Five Year Review 2011, Five Year Review 2021)	Information Used to Create Core Map Element (Five Year Review 2021)
Solomon Hills	1	Designation of Critical Habitat 2002	<ul style="list-style-type: none"> <li>- Occuring on the Orcutt Oil Field</li> <li>- 1.0 –1.9 mi south of Orcutt</li> <li>- 11.2–12.3 mi inland east from the Pacific Ocean</li> <li>- Near the northern critical habitat unit for the species</li> </ul>
Solomon Hills	11	Five Year Review 2011 (Observed / Collected by Vogler & Boinay (2007))	<ul style="list-style-type: none"> <li>- Occuring on the Orcutt Oil Field</li> <li>- 1.0 –1.9 mi south of Orcutt</li> <li>- 11.2–12.3 mi inland east from the Pacific Ocean</li> <li>- Near the northern critical habitat unit for the species</li> </ul>
Burton Mesa	2	Designation of Critical Habitat 2002	<ul style="list-style-type: none"> <li>- On the north base of Vandenberg Space Force Base in west Santa Barbara County</li> </ul>

Geographic Group Name	Occurrences Number	FWS Document where Occurrence first Recognized (Designation of Critical Habitat 2002, Five Year Review 2011, Five Year Review 2021)	Information Used to Create Core Map Element (Five Year Review 2021)
			<ul style="list-style-type: none"> <li>- North of Santa Ynez River, west of State Highway 1, south of San Antonio Creek</li> </ul>
Burton Mesa	9	Designation of Critical Habitat 2002	<ul style="list-style-type: none"> <li>- On the north base of Vandenberg Space Force Base in west Santa Barbara County</li> <li>- North of Santa Ynez River, west of State Highway 1, south of San Antonio Creek</li> </ul>
Burton Mesa	10	Designation of Critical Habitat 2002	<ul style="list-style-type: none"> <li>- On the north base of Vandenberg Space Force Base in west Santa Barbara County</li> <li>- North of Santa Ynez River, west of State Highway 1, south of San Antonio Creek</li> </ul>
Burton Mesa	14	Designation of Critical Habitat 2002	<ul style="list-style-type: none"> <li>- On the north base of Vandenberg Space Force Base in west Santa Barbara County</li> <li>- North of Santa Ynez River, west of State Highway 1, south of San Antonio Creek</li> </ul>
Burton Mesa	15	Designation of Critical Habitat 2002	<ul style="list-style-type: none"> <li>- On the north base of Vandenberg Space Force Base in west Santa Barbara County</li> <li>- North of Santa Ynez River, west of State Highway 1, south of San Antonio Creek</li> </ul>
La Salle Canyon	13	Five Year Review 2021	<ul style="list-style-type: none"> <li>- In upper La Salle Canyon on south base of Vandenberg Space Force Base in west Santa Barbara County</li> <li>- 4.5 mi inland east of the Pacific Ocean, and 3.7 mi west of Lompoc</li> <li>- South of Santa Ynez River, west of State Highway 1, north of Cañada Honda Creek.</li> <li>- There are two colonies with a total count of 281 stems/258 ramets in 2018</li> </ul>

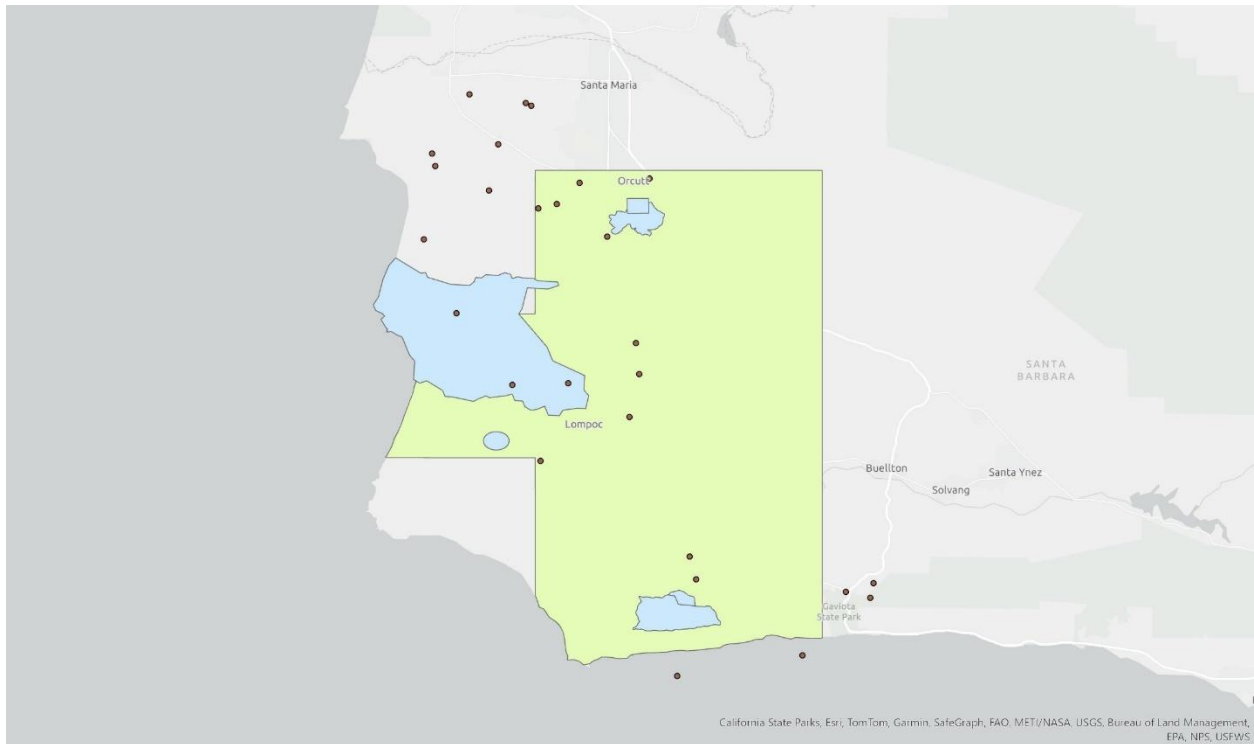
Geographic Group Name	Occurrences Number	FWS Document where Occurrence first Recognized (Designation of Critical Habitat 2002, Five Year Review 2011, Five Year Review 2021)	Information Used to Create Core Map Element (Five Year Review 2021)
Santa Ynez Mountains	5	Five Year Review 2011	<ul style="list-style-type: none"> <li>• at west end of the Santa Ynez Mountains in southwest Santa Barbara County</li> <li>• south of Jalama Creek, 2.3–3.9 mi inland north of the Pacific Ocean and 2.1 mi southwest of State Highway 1</li> <li>• Both occurrences are on private properties: occurrence 5 on Hollister Ranch with multiple landowners, occurrence 12 on Jack and Laura Dangermond Preserve owned by The Nature Conservancy.</li> <li>• The two occurrences are separated by 1.3 mi.</li> </ul>
Santa Ynez Mountains	12	Five Year Review 2021 (discovered in 2019 by CNDD)	<ul style="list-style-type: none"> <li>• at west end of the Santa Ynez Mountains in southwest Santa Barbara County</li> <li>• south of Jalama Creek, 2.3–3.9 mi inland north of the Pacific Ocean and 2.1 mi southwest of State Highway 1</li> <li>• Both occurrences are on private properties: occurrence 5 on Hollister Ranch with multiple landowners, occurrence 12 on Jack and Laura Dangermond Preserve owned by The Nature Conservancy.</li> <li>• The two occurrences are separated by 1.3 mi.</li> </ul>

- **Occurrences Included in Public Databases:**

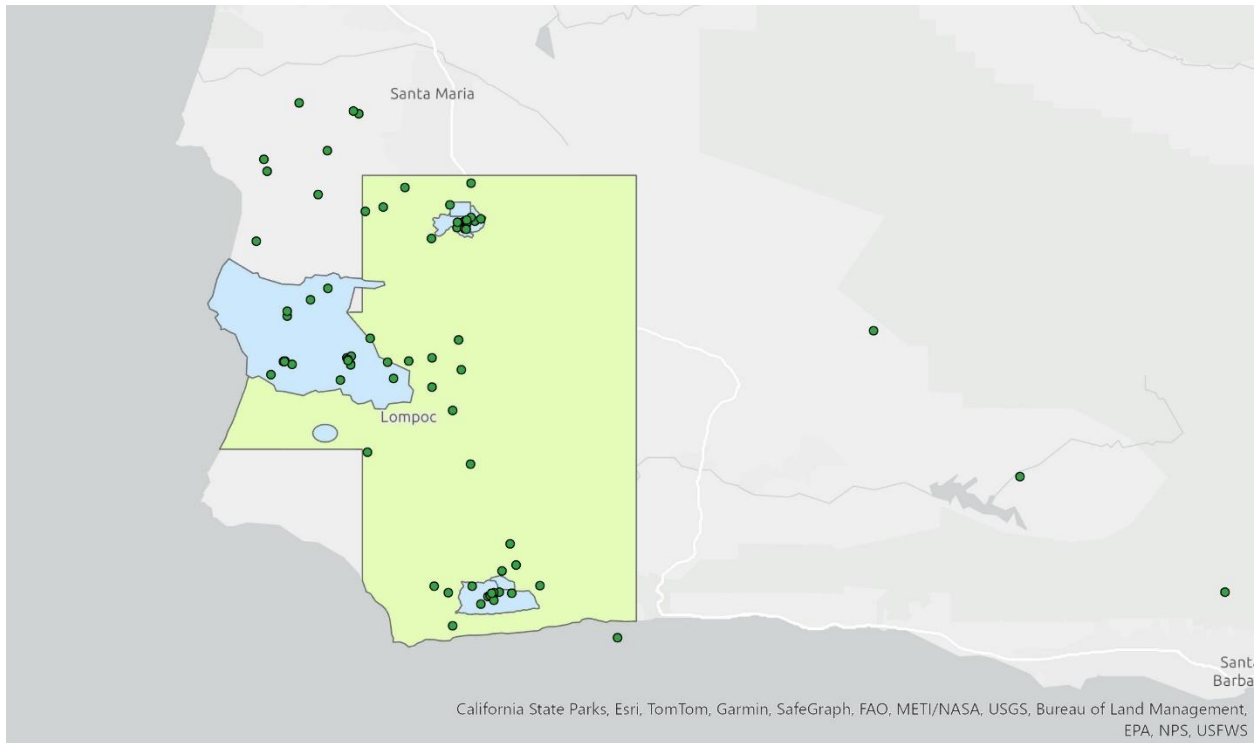
- EPA queried iNaturalist, GBIF, and NatureServe.
- iNaturalist (available [here](#)) included 33 research grade observations from July 2017-May 2025. The coordinates of these observations were obscured due to the species status, so the coarse locations of the observations were reviewed. The observations are in the general vicinity of the range, but most appear to fall outside the core map. Several observations also occur outside of the range. Given that the coordinates considered are obscured and not the true location of the observation, EPA did not expand the core map to include these

observations. However, these observations should be considered when this core map is reviewed by FWS.

- GBIF (available [here](#)) included 109 occurrences with geographic coordinates. Most of the coordinates were within the range. A few coordinates were proximal to the range but not within the range. One observation appears to have erroneous coordinates, located near the west coast of Africa (not pictured). Among the coordinates that are proximal to the range (**Figure A1-7**) several occur outside the range. The GBIF data includes duplicates of observations recorded in the iNaturalist dataset. Because the coordinates were obscured, EPA did not expand the core map to include these observations. However, these observations should be considered when this core map is reviewed by FWS.
- NatureServe (available [here](#)) was searched but no occurrences with georeferenced data were available.



**Figure A1-6:** Obscured coordinates of observations of with the Lompoc yerba santa from iNaturalist (red points), with the Lompoc yerba santa range (green) and core map (blue).



**Figure A1-7:** Obscured coordinates of observations of with the Lompoc yerba santa from GBIF (green points), with the Lompoc yerba santa range (green) and core map (blue).

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

This core map was created based on biological information and critical habitat. EPA created buffers or hand-drawn spatial areas based on FWS documentation of population areas. EPA merged these spatial areas with the species critical habitat.

### 1. Dataset References and Software

- Software used: ArcGIS online and ArcGIS Pro
- FWS Species Range – last updated on 3/21/2028 (used for reference only) and accessed from [FWS ECOS](#)
- FWS Species Critical Habitat – designated on 11/07/2002 and accessed from [FWS ECOS](#)
- National Land Cover Database (NLCD)<sup>4</sup> (used for reference only)
- CAL FIRE California Land Ownership data (available [here](#)) last updated 3/5/2025
  - California Multi-Source Land Ownership, including state and federal land ownership from federal data, California Protected Areas Database and other sources.
- EPA WATERS GeoViewer 2.0 selected stream paths (San Antonio Creek, Santa Ynez River, Cañada Honda Creek, Jalama Creek) accessed from [here](#) using the Upstream/ Downstream V4 tool.

### 2. Core Map Development

- Lompoc yerba santa critical habitat was imported as a layer and named “Critical Habitat.”
- EPA used descriptive information provided by FWS in their Five Year Review (2021) and captured in **Table A1-1** of this document to develop spatial polygons that capture the location of the extant Lompoc yerba santa occurrences
- Development of Solomon Hills polygon (occurrences 1 and 11):
  - Information used: occurring on the Orcutt Oil Field, 1.0 –1.9 mi south of Orcutt and 11.2–12.3 mi inland east from the Pacific Ocean (Five Year Review 2021).
  - EPA plotted the Town of Orcutt at approximate location: 34.865, -120.436
  - Created a 1-mile (north to south) X 1.9-mile (east to west) rectangle using the sketch tool.
    - The top border of the square was plotted 1 mile south of the Orcutt coordinates and the bottom border of the square was plotted 1.9 miles south of the Orcutt coordinates.
  - The east and west borders of the square were established by measuring 11.2 miles (west border) and 12.3 miles (east border) from the approximated shoreline of the Pacific Ocean.
  - **Figure A2-1** displays the overlap of the critical habitat (northern unit) and the polygon developed for the Solomon Hills occurrences.
- Development of Burton Mesa polygon (occurrences 2, 9, 10, 14, 15 and 16):
  - Information used: On north base of Vandenberg Space Force Base in west Santa Barbara County, North of Santa Ynez River, west of State Highway 1, south of San Antonio Creek
  - Used EPA WATERS GeoViewer 2.0<sup>5</sup> to identify San Antonio Creek by filtering “Surface Water Features” stream attribute table by GNIS Name = San Antonio Creek

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<sup>4</sup> Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, <https://doi.org/10.5066/P9JZ7AO3>

<sup>5</sup> <https://www.epa.gov/waterdata/waters-geoviewer>

- Upstream/ Downstream Search using Stream Selection Type: Upstream Main Path Only, Starting point at the mouth of the river meets the Pacific Ocean, maximum distance 15 Km (which is where it intersects Highway 1), attribute handling: Separated.
    - Exported the “Streams selected” result as a .geoJSON titled “San Antonio Creek.geoJSON” and added it as a layer to ArcGIS (using ESRI Json to feature tool<sup>7</sup>)
  - Used EPA WATERS GeoViewer 2.0<sup>6</sup> to identify Santa Ynez River by filtering “Surface Water Features” attribute table by GNIS Name = Santa Ynez River
    - Upstream/ Downstream Search using Stream Selection Type: Upstream Main Path Only, Starting point at the mouth of the river meets the Pacific Ocean, maximum distance 16 Km (which is where it intersects Highway 1), attribute handling: Separated.
    - Exported the streams selected output as a GeoJSON titled “Santa Ynez River.GeoJSON”
    - Imported the “Santa Ynez River.GeoJSON” to ArcGIS map (using ESRI Json to feature tool<sup>7</sup>)
  - **Figure A2-2** displays the water bodies and Highway 1 in EPA Waters GeoViewer2.0
  - **Figure A2-3** displays the location of the intersection of each of the water bodies (Santa Ynez River and San Antonio Creek) with Highway 1
  - Created a hand-drawn polygon outlined by the Santa Ynez River, San Antonio Creek, Highway 1 and the Pacific Ocean using the Sketch polygon tool.
  - **Figure A2-4** displays Burton Mesa polygon.
- Development of La Salle Canyon polygon (occurrence 13):
  - Information used: In upper La Salle Canyon on south base of Vandenberg Space Force Base in west Santa Barbara County, 4.5 mi inland east of the Pacific Ocean, and 3.7 mi west of Lompoc, south of Santa Ynez River, west of State Highway 1, north of Cañada Honda Creek.
    - There was uncertainty regarding the location of the occurrence. It was unclear where “3.7 mi west of Lompoc” was measured, given that the occurrence is also within the Vandenberg Space Force Base property (**Figure A2-5**).
    - Given that the uncertainty, EPA included all the Vandenberg Space Force Base property south of Santa Ynez River and north of Cañada Honda Creek.
  - EPA imported the Cal Fire CAL FIRE California Landownership data and used the select by attribute tool to select where “Own\_Agency” equals “Department of Defense.” EPA identified the parcel for the Vandenberg Space Force Base (FID = 16394).
    - EPA selected this parcel and created a new layer from the selection named “Vandenberg Space Force Base”
  - Used EPA Waters GeoViewer 2.0<sup>8</sup> to identify Cañada Honda Creek by filtering “Surface Water Features” attribute table by GNIS Name = Cañada Honda Creek
    - Used the Upstream / Downstream Search Function with the following criteria: Upstream Main Path only, starting point was selected at the mouth of the creek and the Pacific Ocean, maximum distance of 16 Km, No Linked Data, Attribute Handling Separated, Show Selected Streams.

<sup>6</sup> <https://www.epa.gov/waterdata/waters-geoviewer>

<sup>7</sup> <https://pro.arcgis.com/en/pro-app/latest/tool-reference/conversion/json-to-features.htm>

<sup>8</sup> <https://www.epa.gov/waterdata/waters-geoviewer>

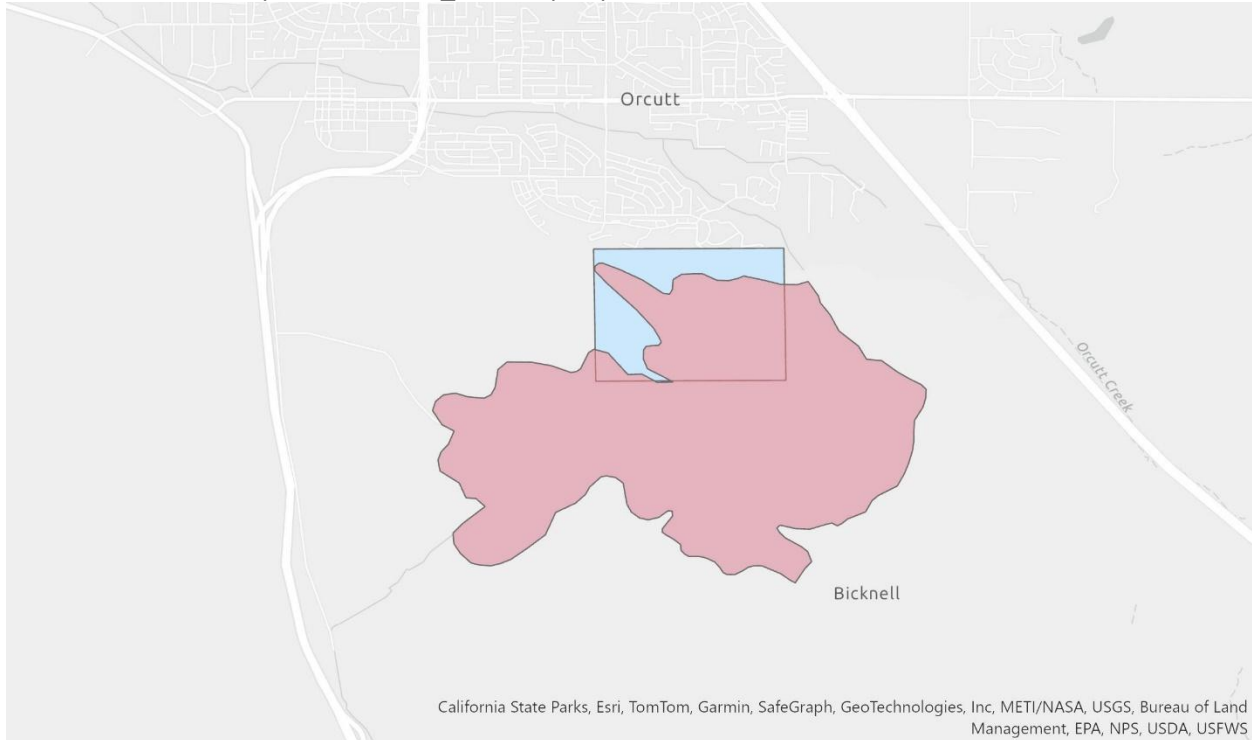
- Exported the streams selected output as a GeoJSON titled “Cañada Honda Creek.GeoJSON”
    - Imported the “Cañada Honda Creek.GeoJSON” to ArcGIS (using ESRI Json to feature tool<sup>7</sup>)
  - EPA used the Split tool in the Modify / Split tool to split “Vandenberg Space Force Base” using “Cañada Honda Creek”
  - The “Santa Ynez River.GeoJSON” did not fully transect the “Vandenberg Space Force Base” to use the split tool, so EPA created a graphics polygon that followed the path of “Santa Ynez River.GeoJSON” and included the remainder of “Vandenberg Space Force Base” area north of the river.
    - EPA used the ESRI graphics to feature tool to convert the graphics layer to a feature layer named “clipit.”
    - EPA used the pairwise erase tool with “Vandenberg Space Force Base” as the input feature and “clipit” as the erase feature.
    - The resulting layer was named “La Salle Canyon”
- Development of Santa Ynez Mountains polygon (occurrences 5 and 12):
  - Information used: at west end of the Santa Ynez Mountains in southwest Santa Barbara County, south of Jalama Creek, 2.3–3.9 mi inland north of the Pacific Ocean and 2.1 mi southwest of State Highway 1, both occurrences are on private properties (occurrence 5 on Hollister Ranch with multiple landowners, occurrence 12 on Jack and Laura Dangermond Preserve owned by The Nature Conservancy), the two occurrences are separated by 1.3 mi.
    - Given that occurrence 5 was included in the critical habitat and the critical habitat is included in this core map, EPA only made additions to the core map to reflect information for occurrence 12.
    - The only portion of the critical habitat polygon that is 2.1 miles southwest of Highway 1 is not south Jalama Creek (**Figure A2-6**), which suggests that occurrence 12 (identified after critical habitat was developed) is not within the critical habitat
    - More specifically, the occurrence is likely north of the critical habitat, but south of Jamala Creek.
  - Used EPA Waters GeoViewer 2.0<sup>9</sup> to identify Jalama Creek by filtering “Surface Water Features” attribute table by GNIS Name = Jalama Creek
    - Used the Upstream / Downstream Search Function with the following criteria: Upstream with Tributaries, starting point was selected at the mouth of the creek, maximum distance of 75 Km, No Linked Data, Attribute Handling Separated, Show Selected Streams.
    - Exported the streams selected Output as a GeoJSON titled “Jalama Creek.GeoJSON”
    - Added the “Jalama Creek.GeoJSON” to ArcGIS (using ESRI Json to feature tool<sup>7</sup>)
  - EPA used the sketch tool to create a Santa Ynez Mountains polygon that is south of the Jalama Creek and north of the southern critical habitat polygon to ensure occurrence 12 is captured by the core map (**Figure A2-7**).
  - EPA used select by attribute tool for the Cal Fire CAL FIRE California Landownership [data](#) and where “Own\_Agency” is equal to the “The Nature Conservancy” using a definition query. EPA then identified the relevant parcel (FID = 44708) and created a new layer

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<sup>9</sup> <https://www.epa.gov/waterdata/waters-geoviewer>

from the selection (named "NatureConservencySantaBarbara").

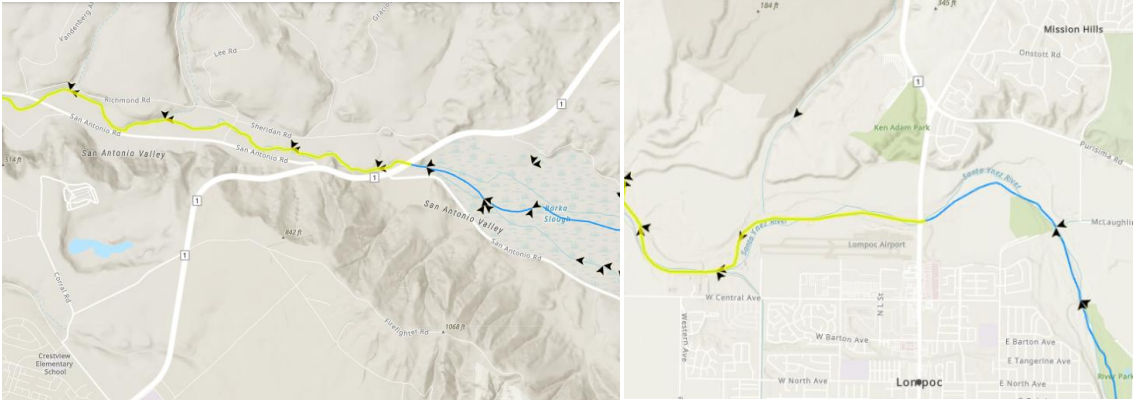
- Some of the sketched polygon falls outside The Nature Conservancy property line (**Figure A2-8**)
- EPA used the ESRI Pairwise Clip tool to clip the hand-drawn polygon using the "NatureConservencySantaBarbara" as the clip feature to remove areas not within Nature Conservancy land ownership (**Figure A2-8**).
- EPA used the merge tool to merge all sketched polygons containing known location polygon units (Santa Ynez Mountains, La Salle Canyon, Burton Mesa, and Solomon Hills) and the critical habitat
  - "LompocYerbaSanta\_CoreMap.shp"



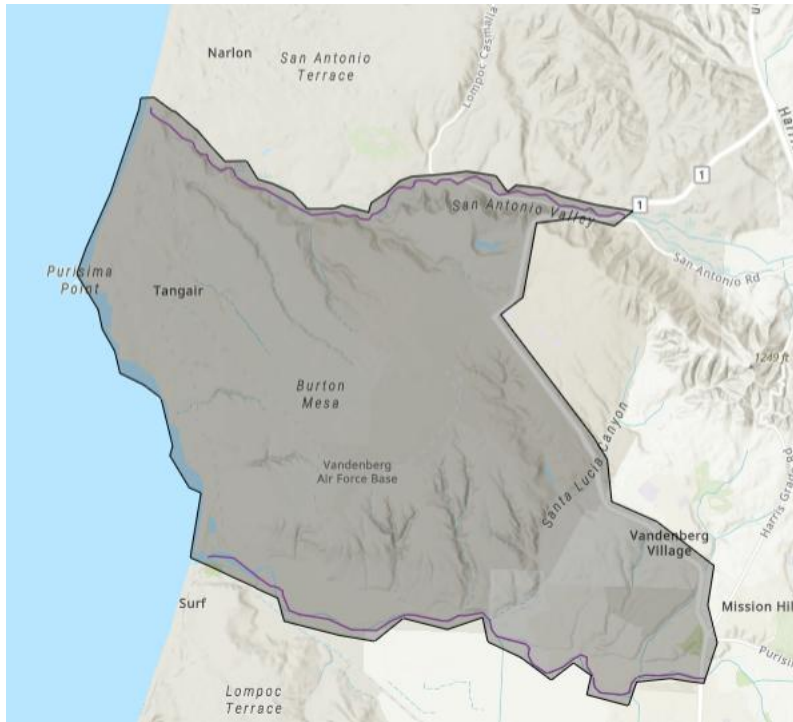
**Figure A2-1: Overlap of Solomon Hills polygon developed by EPA (blue) and northern critical habitat unit for the Lompoc yerba santa.**



**Figure A2-2: Santa Ynez River, State Highway 1 (road to the east) and San Antonio Creek outlined using EPA Waters 2.0 For Burton Mesa (occurrences 2, 9, 10, 14, 15 and 16) geographic location unit.**



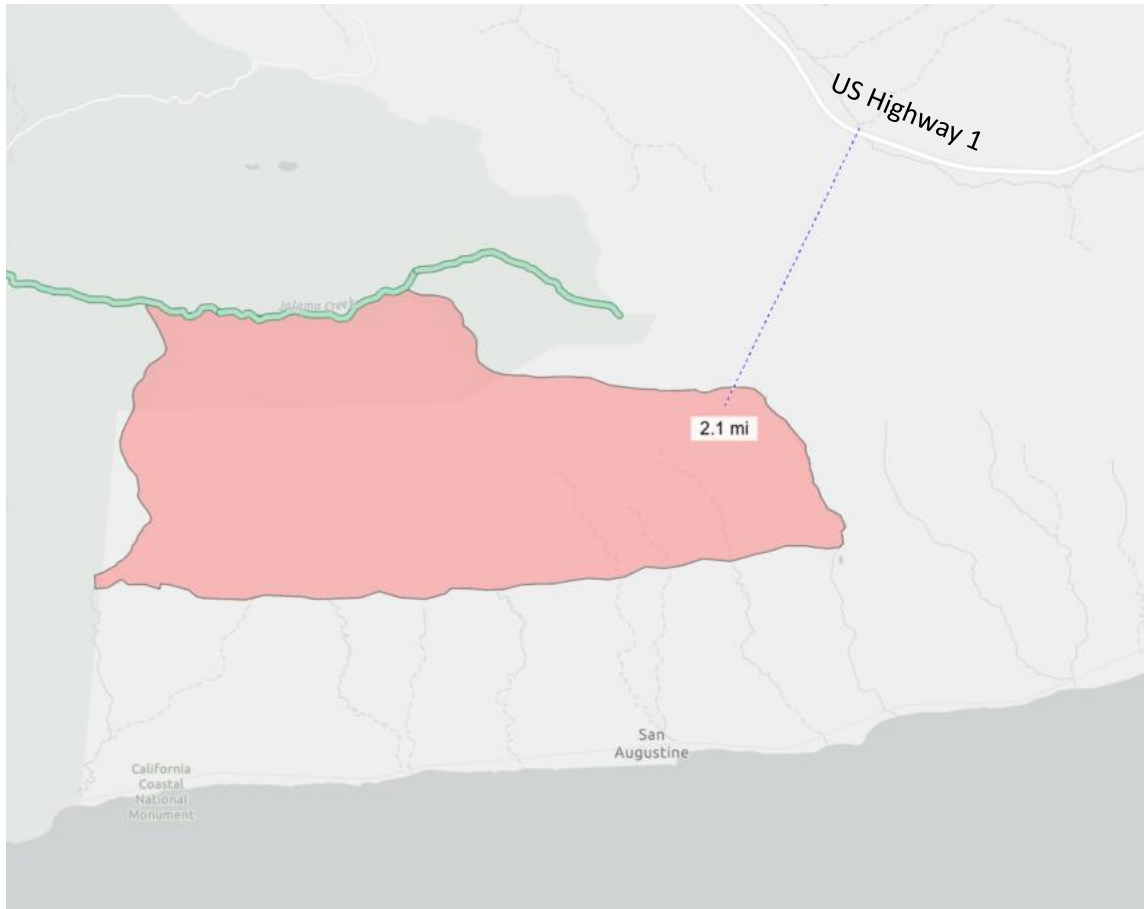
**Figure A2-3: Intersections of State Highway 1 and San Antonio Creek (left) and Santa Ynez River (right) within EPA WATERS GeoViewer 2.0 Platform. Yellow is the portion of the waterway exported from EPA WATERS GeoViewer**



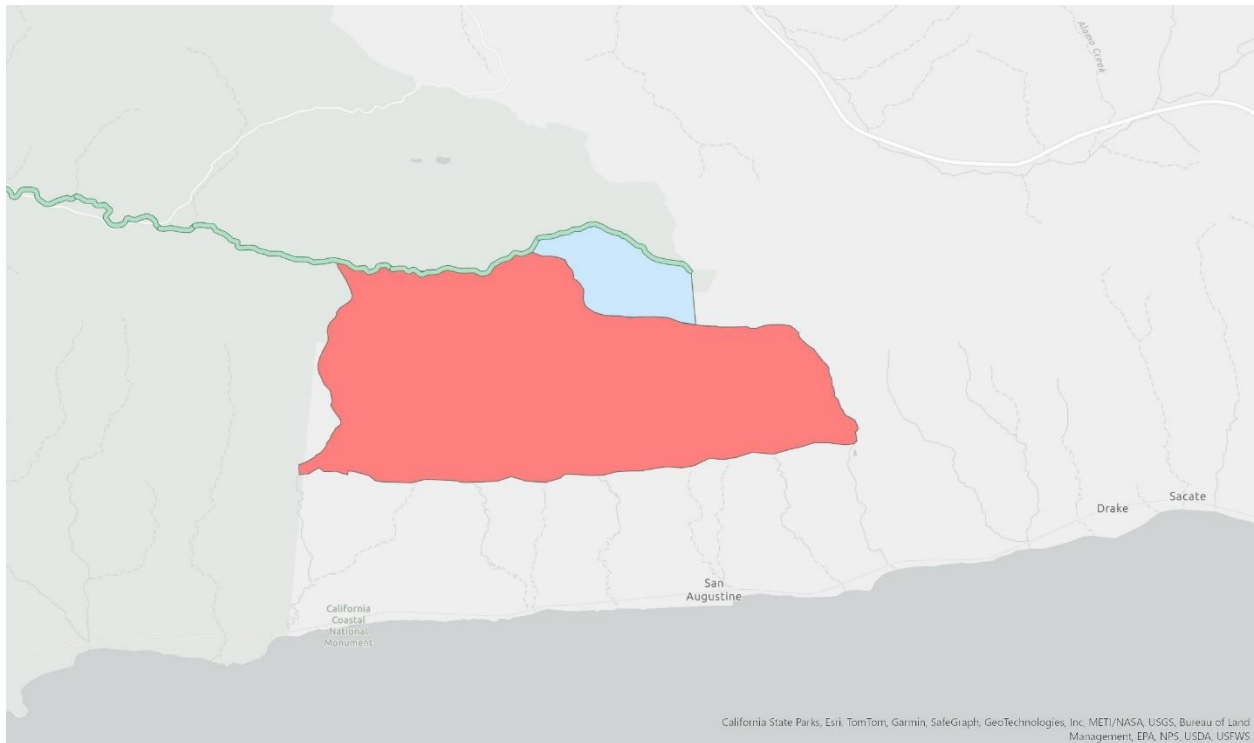
**Figure A2-4: Burton Mesa polygon (gray) for Lompoc yerba santa occurrences 2, 9, 10, 14, 15 and 16 with EPA WATERS streamlines for Santa Ynez River and San Antonia Creek (purple)**



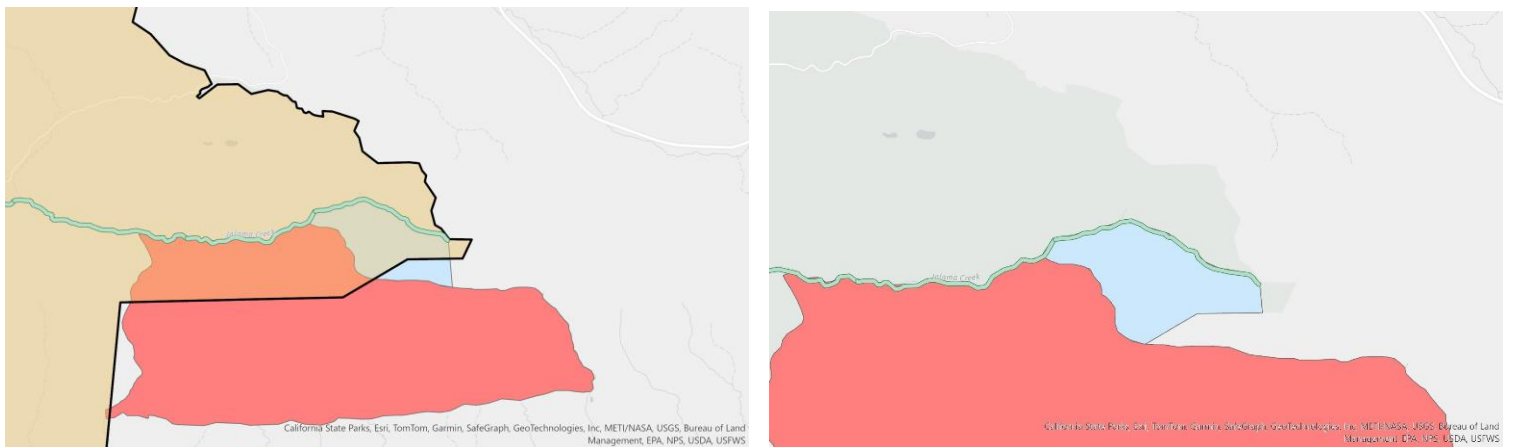
**Figure A2-5: La Salle Canyon Santa population polygon development with FWS-identified landmarks: Ynez River (green), Cañada Honda Creek (blue), Vandenberg Space Force Base (orange) and approximate distance to Lompoc.**



**Figure A2-6: Evaluation of landmarks (Jamala creek = green line) included in FWS documentation for Santa Ynez Mountains population of Lompoc yerba santa. Measuring 2.1 miles southwest of State Highway 1 and critical habitat (red).**



**Figure A2-7: Southern critical habitat unit for the Lompoc yerba santa (red), Jamala creek (green) and core map polygon unit added to include occurrence 5 (blue)**



**Figure A2-8: Left: Nature Conservancy land parcel (orange), critical habitat (red) and sketched polygon for Santa Ynez Mountains occurrence 12 (blue). Right: critical habitat (red) and sketched polygon for Santa Ynez Mountains occurrence 12 (blue) after clipping areas outside the Nature Conservancy parcel.**