Interim Core Map Documentation for the California Tiger Salamander

Version 1

Review Completed: April 2026

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

Species Summary

The California tiger salamander (*Ambystoma californiense; Entity ID 203, 4773, 8395)* is an amphibian endemic to the Santa Rosa Plain, the San Joaquin-Sacramento River valleys and bordering foothills, and the coastal valleys of Central California south to Santa Barbara. They are listed as three distinct population segments (DPS), one of which is threatened (Central California DPS) and two of which are endangered (Sonoma County DPS and Santa Barbara DPS). The U.S. Fish and Wildlife Service (FWS) has designated critical habitat for the species. Additional information is provided in **Appendix 1**.

Description of Core Map

The core map for the California tiger salamander is based on critical habitat. EPA did not find evidence that any key areas for this species exist outside of the designated critical habitat. **Figure 1** depicts the interim core map for the California tiger salamander (green areas on map), which includes the critical habitat for all DPS. The core map represents approximately 257,663 acres. Land cover categories within the core map area are included in **Table 1.** This is broken out more specifically by DPS in **Tables 2-4.** Landcover within the core map is predominantly shrub/scrub, grassland/herbaceous, and forest which is consistent with the habitat of this species. Agricultural areas are also located within the critical habitat.

The core map developed for the California tiger salamander is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the California tiger salamander. 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 expert feedback from FWS. This interim core map has a "limited" (2) best professional judgment classification because it consists of the species' critical habitat without additions or subtractions. However, EPA did limit the core map only to designated critical habitat based on interpretation of FWS documentation. This core map does not replace or revise any range or designated critical habitat developed by FWS for this species.

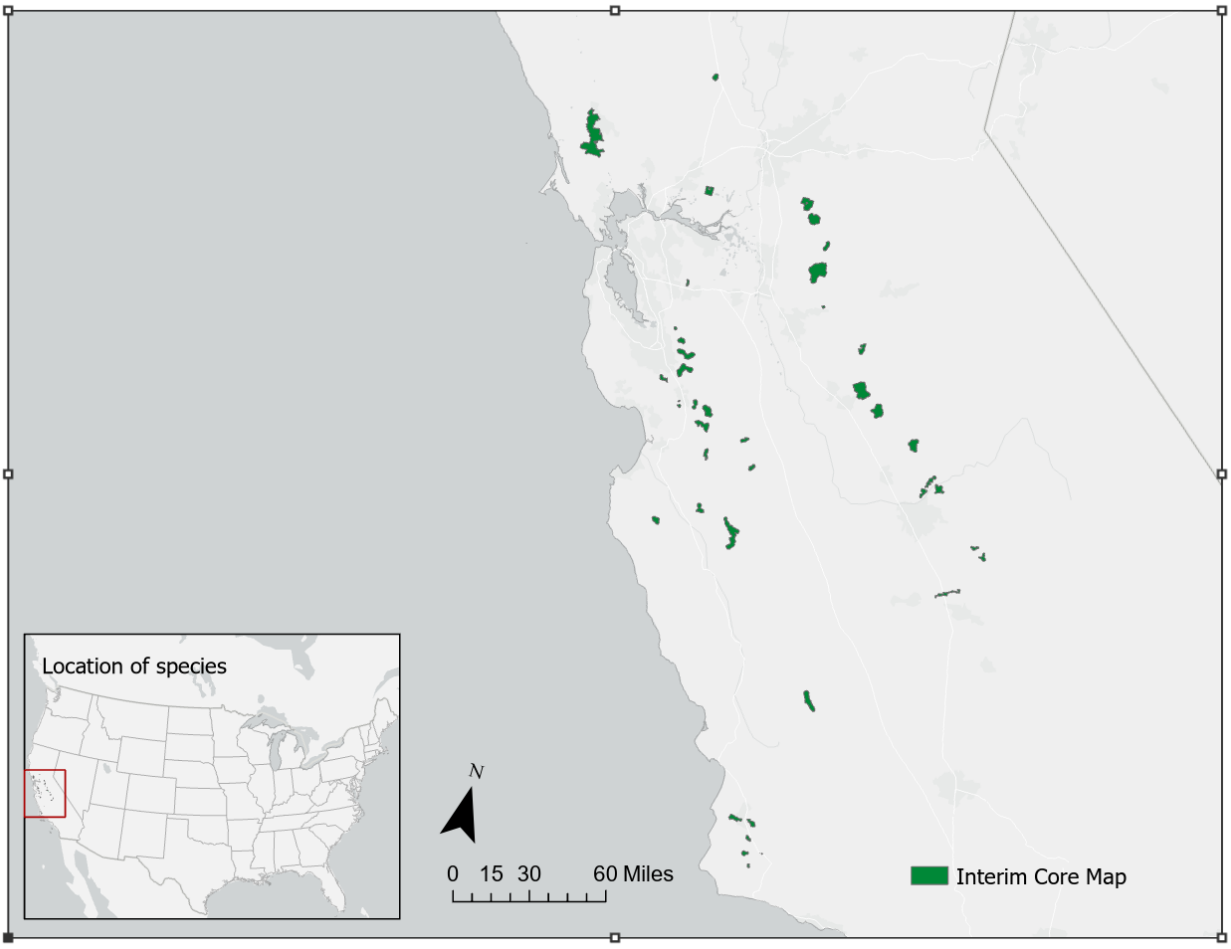

Figure 1. Interim core map for the California tiger salamander, with all four distinct population segments (DPS) shown together.

Figure 2. Interim core map for the California tiger salamander Sonoma County DPS, Entity ID 203.

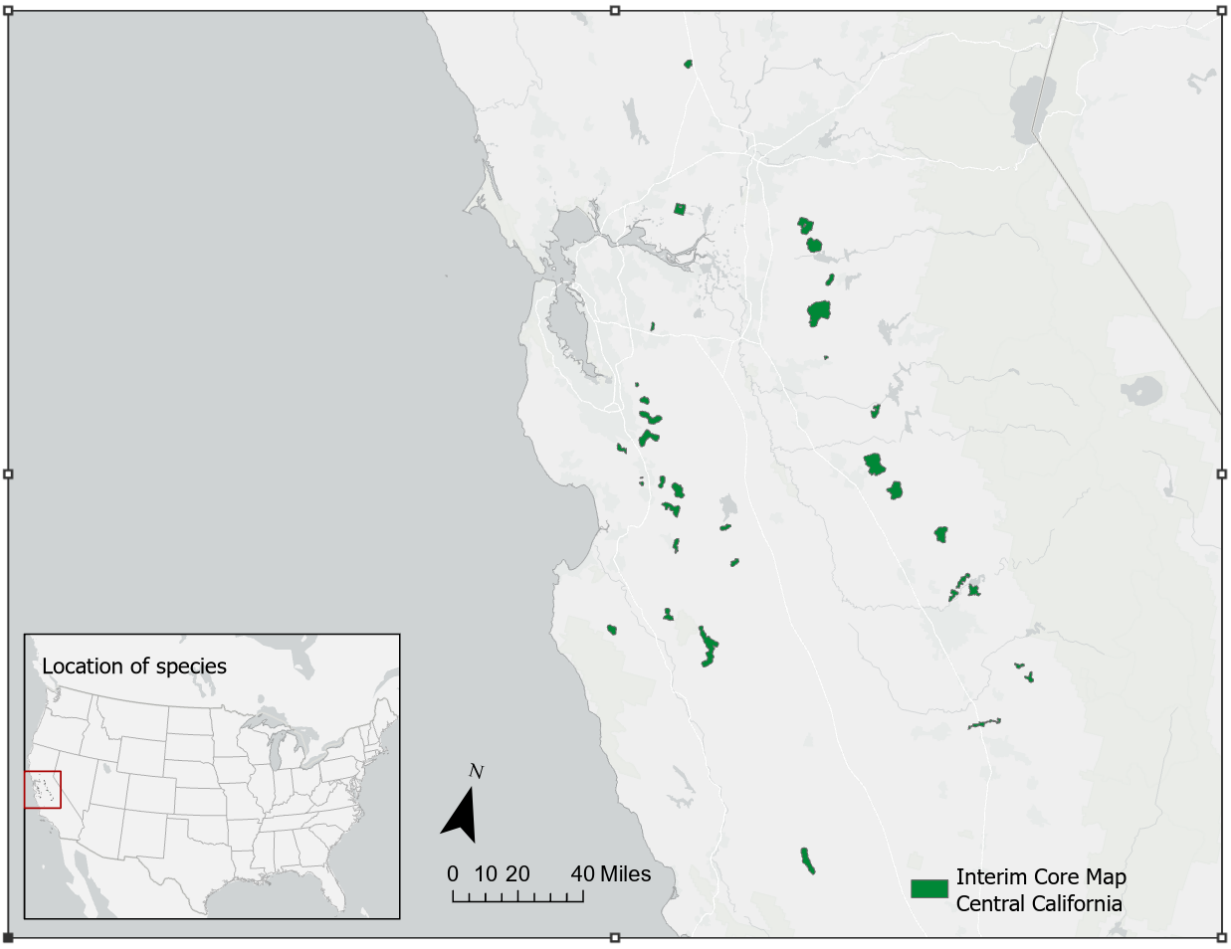

Figure 3. Interim core map for the California tiger salamander Central California DPS, Entity ID 4773.

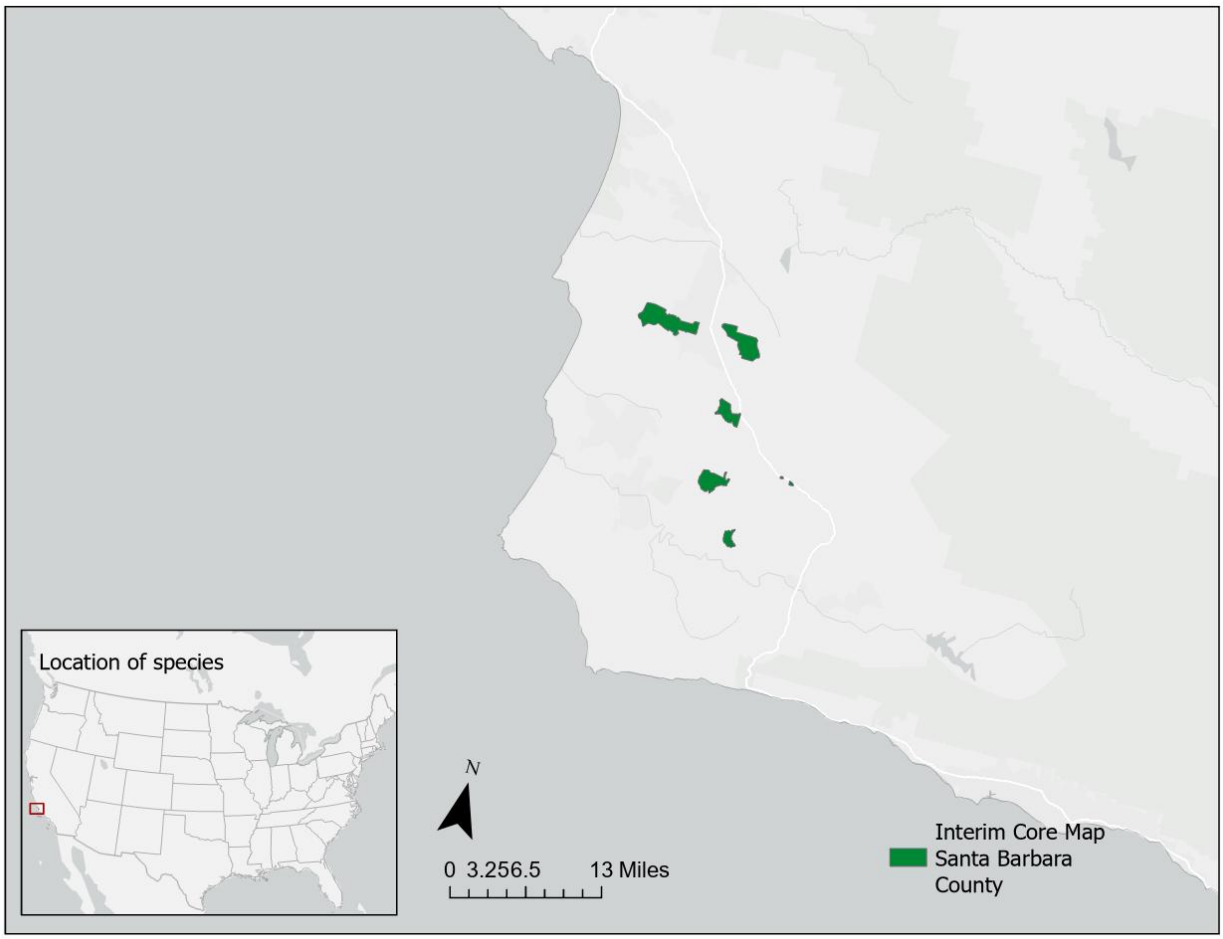

Figure 4. Interim core map for the California tiger salamander Santa Barbara DPS, Entity ID 8395.

Table 1. Percentage of overall Interim Core Map Represented by National Land Cover Database (NLCD)[1] 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)	10%
Forestry	Mixed Forest (43)	8%
Agriculture	Pasture/Hay (81)	1%
Agriculture	Cultivated Crops (82)	2%
Mosquito adulticide, residential	Developed Open Space (21)	3%
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)	0%
Invasive species control	Emergent Herbaceous Wetlands (95)	0%
Invasive species control	Open Water (11)	5%

Example pesticide use sites/types	NLCD Class/Value	% Area
Invasive species control	Grassland/Herbaceous (71)	26%
Invasive species control	Shrub/Scrub (52)	41%
Invasive species control	Barren Land (31)	1%
Total Acres	**Interim Core Map Acres**	**~257,663 acres**

Table 2. Percentage of Sonoma County DPS Interim Core Map Represented by NLCD[1] 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)	0%
Forestry	Mixed Forest (43)	0%
Agriculture	Pasture/Hay (81)	14%
Agriculture	Cultivated Crops (82)	12%
Mosquito adulticide, residential	Developed Open Space (21)	11%
Mosquito adulticide, residential	Developed Low Intensity (22)	10%
Mosquito adulticide, residential	Developed Medium Intensity (23)	6%
Mosquito adulticide, residential	Developed High Intensity (24)	3%
Invasive species control	Woody Wetlands (90)	0%
Invasive species control	Emergent Herbaceous Wetlands (95)	0%
Invasive species control	Open Water (11)	0%
Invasive species control	Grassland/Herbaceous (71)	42%
Invasive species control	Shrub/Scrub (52)	1%
Invasive species control	Barren Land (31)	0%
Total Acres	**Interim Core Map Acres**	**~47,418 acres**

Table 3. Percentage of Central California DPS Interim Core Map Represented by NLCD[1] 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)	4%
Forestry	Mixed Forest (43)	3%
Agriculture	Pasture/Hay (81)	0%
Agriculture	Cultivated Crops (82)	17%
Mosquito adulticide, residential	Developed Open Space (21)	3%
Mosquito adulticide, residential	Developed Low Intensity (22)	1%
Mosquito adulticide, residential	Developed Medium Intensity (23)	0%
Mosquito adulticide, residential	Developed High Intensity (24)	0%
Invasive species control	Woody Wetlands (90)	0%
Invasive species control	Emergent Herbaceous Wetlands (95)	0%
Invasive species control	Open Water (11)	2%
Invasive species control	Grassland/Herbaceous (71)	46%
Invasive species control	Shrub/Scrub (52)	22%
Invasive species control	Barren Land (31)	0%
Total Acres	**Interim Core Map Acres**	**~199,069 acres**

Table 4. Percentage of Santa Barbara County DPS Interim Core Map Represented by NLCD[1] 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)	3%
Forestry	Mixed Forest (43)	1%
Agriculture	Pasture/Hay (81)	5%
Agriculture	Cultivated Crops (82)	17%
Mosquito adulticide, residential	Developed Open Space (21)	2%
Mosquito adulticide, residential	Developed Low Intensity (22)	1%
Mosquito adulticide, residential	Developed Medium Intensity (23)	0%
Mosquito adulticide, residential	Developed High Intensity (24)	0%
Invasive species control	Woody Wetlands (90)	0%
Invasive species control	Emergent Herbaceous Wetlands (95)	0%
Invasive species control	Open Water (11)	0%
Invasive species control	Grassland/Herbaceous (71)	41%
Invasive species control	Shrub/Scrub (52)	29%
Invasive species control	Barren Land (31)	0%
Total Acres	**Interim Core Map Acres**	**~11,175 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. Occurrences in FWS documents, iNaturalist, GBIF, and NatureServe did not support expanding the core map. **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 Habitats"[2] (referred to as "the process"). This core map was developed by EPA and was developed 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 California tiger salamander from FWS as well as observational information available from various publicly available sources (discussed in previous section). The information compiled for the California tiger salamander is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- Current existing populations occur in locations consistent with the critical habitat
- The species' critical habitat is highly refined

For step 2, EPA used the compiled information to identify the core map type, including the species range, critical habitat, and known location information. EPA compared known location data to the range and critical habitat and found that the FWS known locations of currently existing (extant) populations are consistent with the location of the designated critical habitat. The species range follows geopolitical boundaries (i.e., counties) and is not likely limited to the areas containing habitat of the species. The range is also much larger than the areas where known locations occur. Based on this information, EPA used the designated critical habitat as the core map.

For step 3, EPA used the designated critical habitat provided by FWS for the California tiger salamander. EPA downloaded the critical habitat from FWS's ECOS (Species Profile for California tiger Salamander(Ambystoma californiense).

Discussion of Approaches and Data that were Considered but not Included in the Core Map

EPA did not explore approaches other than those described in this documentation.

Appendix 1. Information compiled for species

1. **Recent FWS documents**
   - Determination of Threatened Status for the California tiger salamander 2004 04-17236.pdf
   - Recovery Plan for Santa Rosa Plain 2016 (Sonoma County DPS) 06012016_Final Santa Rosa_RP_signed_1.pdf
   - Recovery Plan for Central California DPS 2017 SB CTS Final RP Signed_1.pdf
   - Recovery Plan for Santa Barbara County DPS 2016 SB CTS Final RP Signed_1.pdf
   - Five Year Review for Sonoma County DPS 2021 Sonoma_California_tiger_salamander_5Year_Review_June_2021.pdf
   - Five Year Review for Central California DPS 2023 2023 Central California Tiger Salamander 5-Year Review
   - Five Year Review for Santa Barbara County DPS 2022 3762.pdf

2. **Background information**
   - Status
     - Federally listed as threatened (Central California DPS) on August 4, 2004, and endangered (Sonoma County DPS and Santa Barbara County DPS) on July 22, 2002, and January 19, 2000.
   - Resiliency, redundancy, and representation (the 3Rs)
     - There is no information on resiliency, redundancy and representation for the Sonoma DPS.
     - "The recovery priority number for the Central California tiger salamander is 9C. This number indicates that the taxon is a DPS that faces a moderate degree of threat, has a high potential for recovery, and is in conflict with development projects, such as conversion to agriculture or urban development." (Recovery Plan for Central California DPS 2017)
     - "The recovery priority number for the Santa Barbara County California tiger salamander is 3C, indicating a high potential for recovery and a high degree of threat in conflict with development." (Recovery Plan for Santa Barbara County DPS 2016)

3. **Habitat, Life History, and Ecology**
   - Habitat:
     - "The Sonoma County California tiger salamander inhabits vernal pools and seasonal ponds, associated grassland, and oak savannah plant communities below 200 feet (60 meters) (Service 2003). Sonoma County California tiger salamanders spend the majority of their lives underground in small mammal burrows in uplands, while ephemeral ponds play a critical role because they are necessary for breeding." (Recovery Plan for Sonoma County 2016)
     - "The Central California tiger salamander primarily inhabits annual grasslands and open woodlands (Stebbins 1985; Shaffer et al. 2013). The Central California tiger salamander requires upland habitat that is occupied by small burrowing mammals such as California ground squirrel (Otospermophilus beecheyi) and Botta's pocket gopher (Thommomys bottae) that create underground burrow systems utilized by the salamanders throughout the year (Shaffer et al. 1993; Seymour and Westphal 1994; Loredo et al. 1996; Pittman 2005). Upland habitats surrounding known Central California tiger

salamander breeding pools are usually dominated by grassland, oak savanna, or oak woodland (CNDDB 2015). Large tracts of upland habitat, preferably with multiple breeding ponds, are necessary for the Central California tiger salamander to persist." (Recovery Plan for Central California DPS, 2017)

- "Historically, the Santa Barbara County California tiger salamander inhabited low-elevation (generally under 1,500 feet (475 meters)) seasonal ponds and associated grassland, oak savannah, and coastal scrub plant communities of the Santa Maria, Los Alamos, and Santa Rita Valleys in the northwestern area of Santa Barbara County (Shaffer et al. 1993, Sweet 1993). Seasonal ponds, such as vernal pools (seasonal, shallow wetlands that alternate between dry and wet periods) and sag ponds (ponds located in depressions formed at a strike-slip fault), are typically used by California tiger salamanders for breeding. California tiger salamanders are rarely found in streams or rivers. Natural breeding ponds inundate for variable periods from winter to spring but may be completely dry for most of the summer and fall. Bedrock or hard clay layers, which help retain water, typically lie beneath these ponds. These ponds range in size from small pools to shallow lakes; preferred ponds have depths ranging between approximately 15.75 to 31.5 inches (40 to 80 centimeters) (Cook et al. 2005)." (Recovery Plan for Santa Barbara County 2016)

- Life History and Ecology:
  - "Like other members of the family Ambystomatidae, California tiger salamanders spend the majority of their lives underground in small mammal burrows. California tiger salamanders may also use landscape features such as leaf litter or desiccation cracks in the soil for upland refugia. Such refugia provide protection from the sun and wind associated with a dry California climate, which can otherwise desiccate (dry out) and kill amphibians in upland terrain." (Recovery Plan for Santa Barbara County, 2016)
  - "Little is known about the fossorial (i.e., underground) behavior of California tiger salamanders as they are difficult to observe while underground, though most evidence suggests that California tiger salamanders remain active. Trenham (2001) recorded underground movements within burrow systems, and other researchers have used fiber optic or infrared scopes to observe active California tiger salamanders underground (Semonsen 1998)." (Recovery Plan for Santa Barbara County, 2016)
  - "Winter rain events trigger California tiger salamanders to emerge from refugia and seek breeding ponds (Storer 1925). After mating, females attach their eggs to submerged twigs, grass stems, vegetation, or debris (Storer 1925; Twitty 1941). California tiger salamander eggs hatch into larvae within 10 to 28 days, (Petranka 1998; Hansen and Tremper 1993), with observed differences likely related to water temperatures. Requiring a relatively short period to complete development of the aquatic larvae as compared to other salamanders, California tiger salamanders require ponds with continuous inundation periods for 70-90 days (Shaffer and Trenham 2004). The larval developmental period can be prolonged in colder weather, commonly in excess of 4 months (Trenham et al. 2000). After the larval developmental period, they emerge as terrestrial metamorphic salamanders, between approximately May and August (Trenham et al. 2000)." (Recovery Plan for Santa Barbara County 2016)
  - "Lifetime reproductive success of California tiger salamanders is typically low because they require an extended amount of time before they reach sexual maturity (4 to 5 years) (Trenham et al. 2000). Less than 50 percent of first-time breeding California tiger salamanders typically survive to breed more than once (Trenham et al. 2000).

Metamorphs also have low survivorship—in some populations, less than 5 percent survive to breed (Trenham 1998). Thus, isolated metapopulations can decline substantially from unusual, randomly occurring, natural." (Recovery Plan for Santa Barbara County, 2016)

- Taxonomy
    - FWS Category: Amphibian

4. **Relevant Pesticide Use Sites**
    - FWS reported that "sources of chemical pollution which may adversely affect California tiger salamanders include pesticides used in agricultural, landscaping, roadside maintenance, and rodent and vector control activities, as well as hydrocarbons and other pollutants in stormwater runoff residential and urban lawn and garden care as well as industrial facilities." (Determination of Threatened Status for California tiger salamander, 2004)

5. **Relevant Recovery Criteria and Actions**
    - Sonoma County DPS (Five Year Review for Sonoma County DPS 2021)
        - "Recovery criteria for downlisting the Sonoma County California tiger salamander focus on protection of habitat within the core range of the species. This will be met when at least three viable metapopulations are protected within each of the three core areas (A/1) and each core area contains, at a minimum, a 308-acre centralized wetland/upland complex in fully preserved status (A/2). In addition, contiguous, functional upland habitat must be present around each preserved 5 complex, must be substantially unfragmented (i.e., constituting no less than 50% of adjoining area extending 2.09 km (1.3 mi) from the center of the pool complex), must be partially preserved (A/2), and must be in suitable land use categories to sustain California tiger salamander populations in perpetuity (A/4)."
        - "The rest of the downlisting criteria are dependent on the preservation and protection of land and cannot be met unless criteria A/1, A/2, and A/4 have been achieved. Additional criteria include species and habitat management on protected land, including: breeding habitat (A/3); reducing small mammal eradication efforts (A/5); grazing (A/6); diseases (C/1); non-native species and invasives (C/2 and C/3); contaminants (E/1); mosquito abatement efforts (E/3); roadway mortality (E/4); and reducing hybridization with non-native salamanders (E/5). Additional criteria include: meeting or exceeding ponding criteria (A/7); buffering populations from contaminants (E/2); assessing road mortality (E/4); and maintaining a minimum viable population (estimated abundance of 5,409 individuals) within the three core areas."
    - Central California DPS (Five Year Review for Central California DPS, 2023)
        - "Recovery criteria for delisting the Central California tiger salamander include measures to ensure protection of aquatic and upland habitat within each management unit (criteria A/1–A/4, E/5) to increase resilience to stochastic events (E/6), and sufficient funding for management and monitoring of the protected habitat (E/4). Delisting may be warranted when these recovery criteria have been met in a sufficient number of metapopulation areas where the California tiger salamander is no longer a threatened species. Criteria also include measures to ensure that management of these preserved areas reduce mortality by addressing non-habitat related threats, including: non-native and hybrid tiger salamanders (E/1), competition and predation from other non-native species (C/3), disease (C/1 and C/2), contaminants (E/2), and road mortality (E/3). In

addition, each preserve must have at least a minimum effective population size of 132 individuals over a 26-year period and meet the preserve requirements detailed in the recovery plan (E/6)."

- Santa Barbara County DPS (Five Year Review for Santa Barbara County DPS 2022)
    - "At least four functional breeding ponds are in fully preserved status per metapopulation area."
    - "A minimum of 623 acres (252 hectares) of functional upland habitat around each preserved pond is in fully preserved status."
    - "Adjacent to the fully preserved ponds and fully preserved upland habitat, a minimum of 1,628 acres (659 hectares) of additional contiguous, functional upland habitat is present, which is at least 50 percent unfragmented and partially preserved."
    - "Effective population size (Ne) in the metapopulation shows an overall positive trend across 10 years."
    - "Management is implemented to maintain the preserved ponds free of non-native predators and competitors (e.g., bullfrogs and fish)."
    - "Risk of introduction and spread of non-native genotypes is reduced to a level that does not inhibit normal recruitment and protects genetic diversity within and among metapopulations."
- Recovery Actions (Recovery Plan for Central California DPS 2017)
    1. An action to prevent extinction or to prevent a species from declining irreversibly
    2. An action to prevent a significant decline of the species population/habitat quality or some other significant negative impact short of extinction
    3. All other actions necessary to provide for full recovery of the species

6. **Range**
    - **Figure A1-1** depicts the FWS range for all California tiger salamander DPS. The total acreage of the range is around 12,035,250 acres. **Figures A1-2, A1-3, and A1-4** depict the ranges for each DPS.

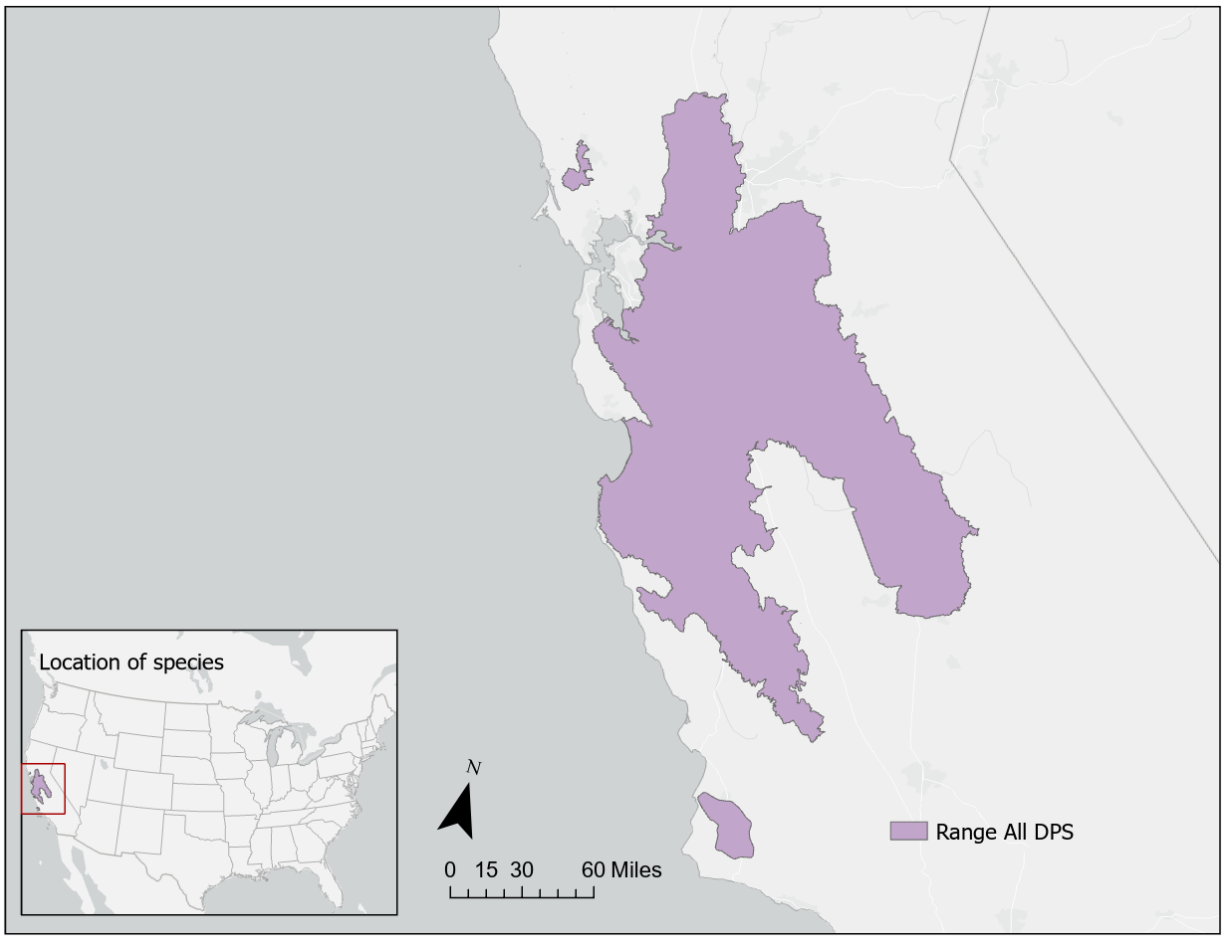

Figure A1-1. Species range of the California tiger salamander, showing all DPS together.

- **Sonoma County DPS:** last updated 9/4/2024, total 73,448 acres (**Figure A1-2**).

Figure A1-2. Species range of the California tiger salamander, Sonoma County DPS only.

- **Central California:** last updated 9/4/2024, total 11,733,094 acres (**Figure A1-3)**.

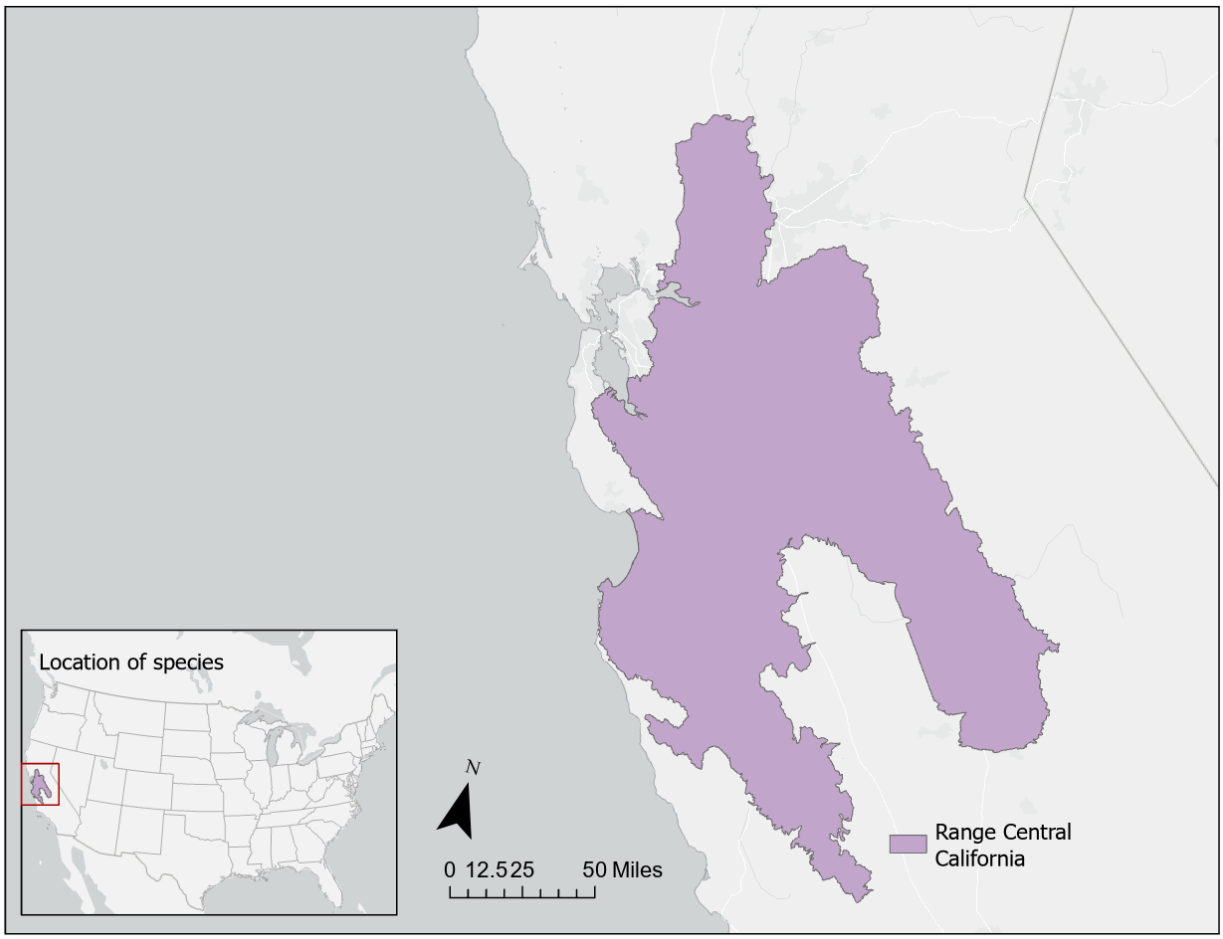

Figure A1-3. Species range of the California tiger salamander, Central California DPS only.

- **Santa Barbara DPS:** last updated 10/27/2022, total 228,708 acres (**Figure A1-4**).

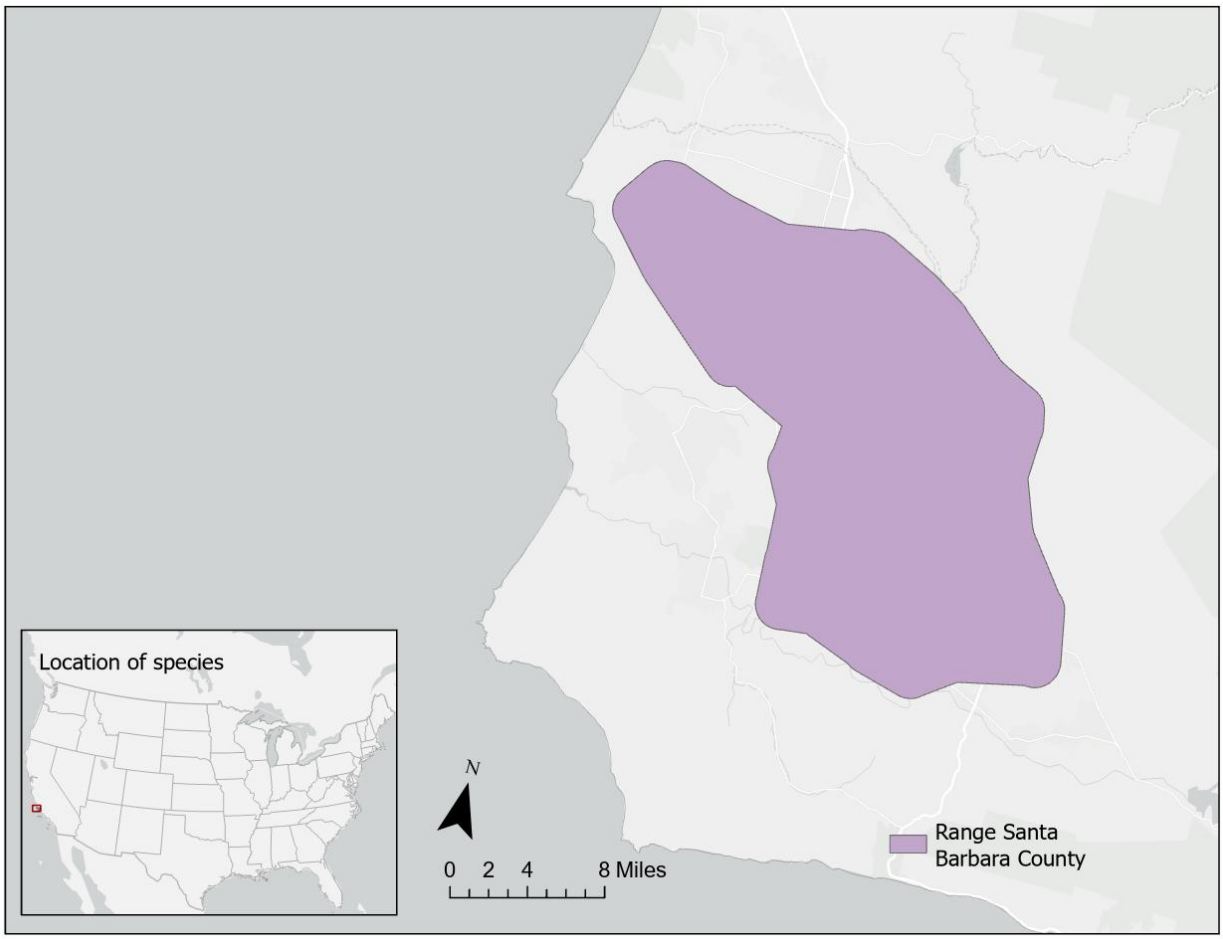

Figure A1-4. Species range of the California tiger salamander, Santa Barbara County DPS only.

7. **Critical Habitat**
    - **Figure A1-5** depicts the critical habitat for all California tiger salamander DPS. The total acreage of the critical habitat is around 257,663 acres. **Figures A1-6, A1-7, and A1-8** depict the critical habitats for each DPS.

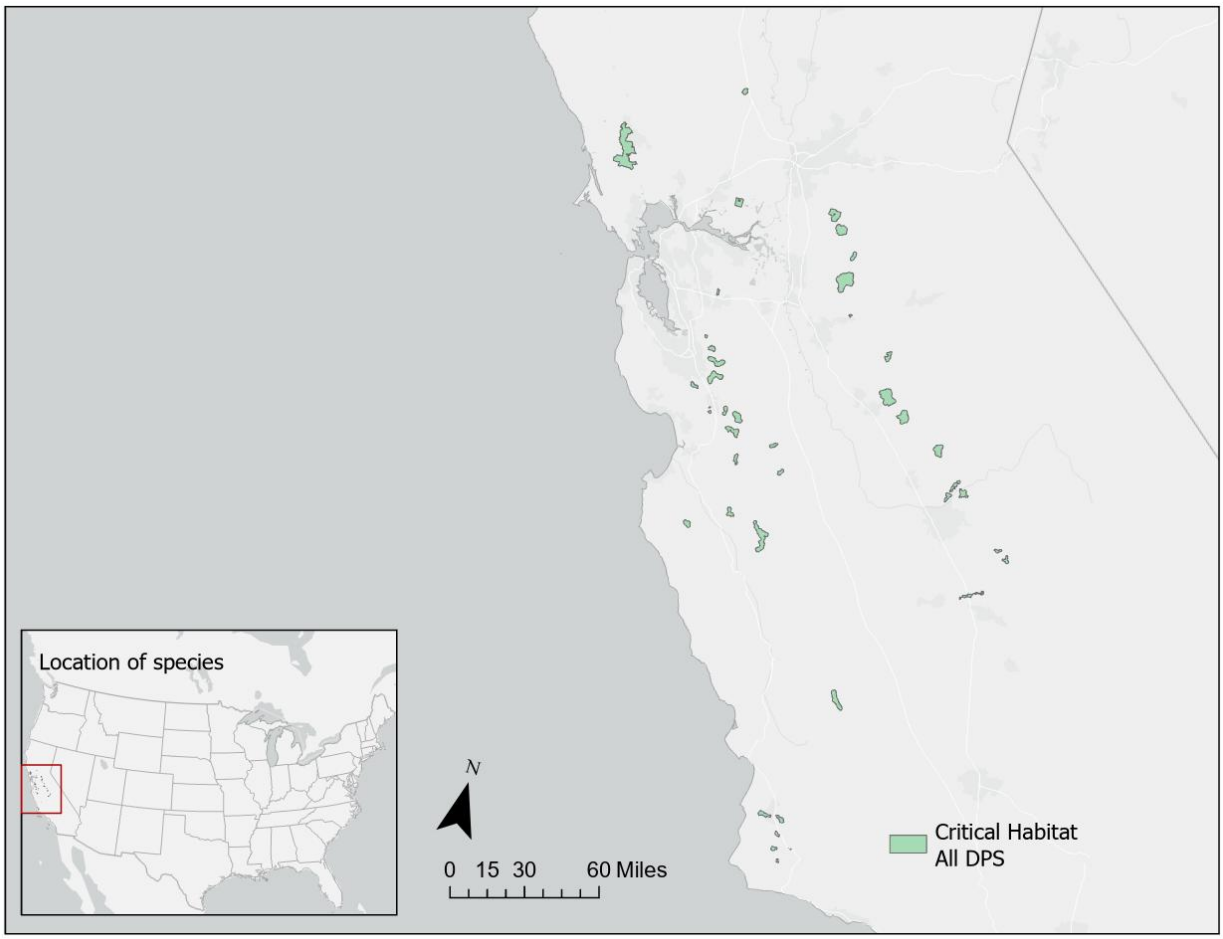

Figure A1-5. Critical habitat of the California tiger salamander, showing all DPS together.

- **Sonoma County DPS:** designated 8/31/2011, total acreage is about 47,418 acres (**Figure A1-6**)

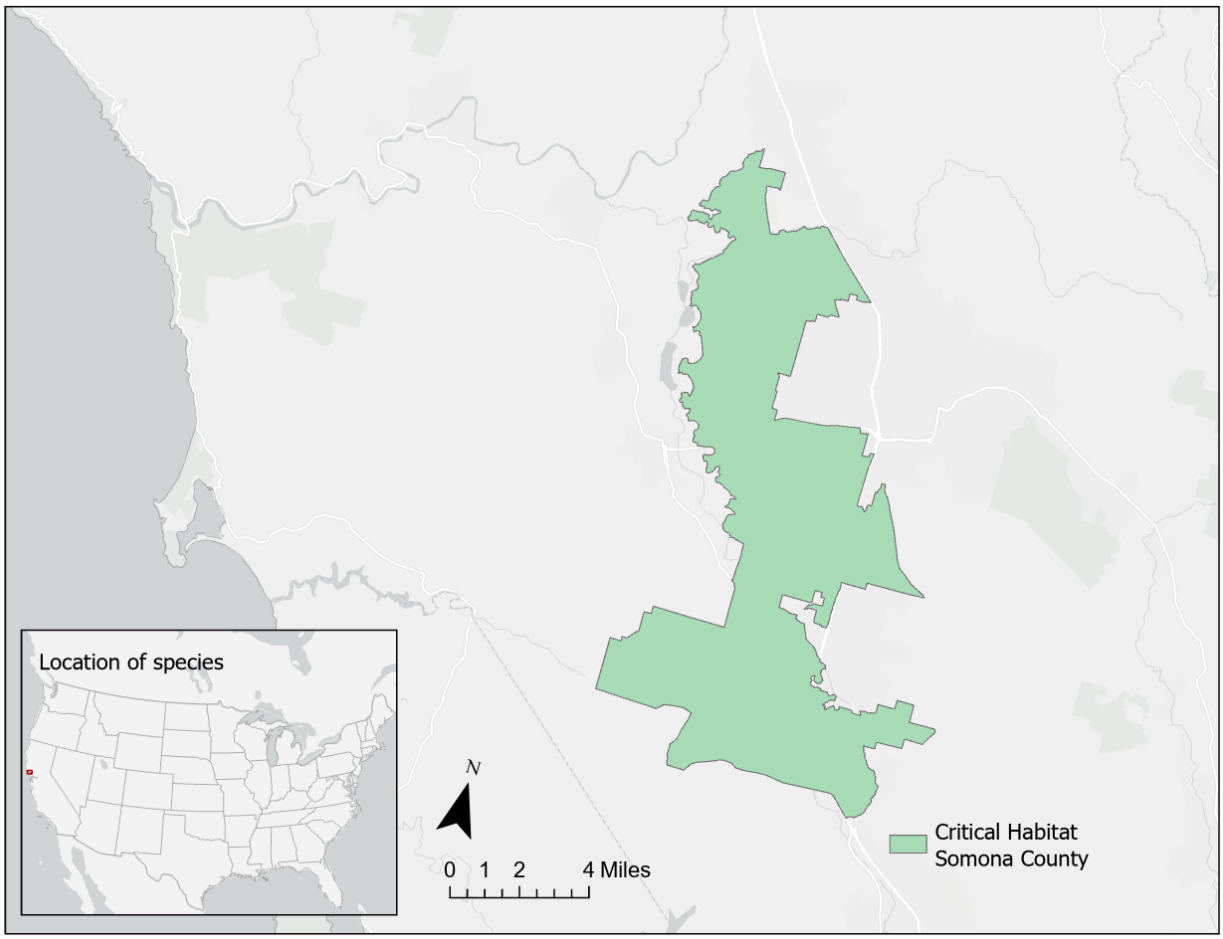

Figure A1-6. Critical habitat of the California tiger salamander, Sonoma County DPS only.

- **Central California DPS:** designated 8/23/2005, total acreage is about 199,069 acres (**Figure A1-7**)

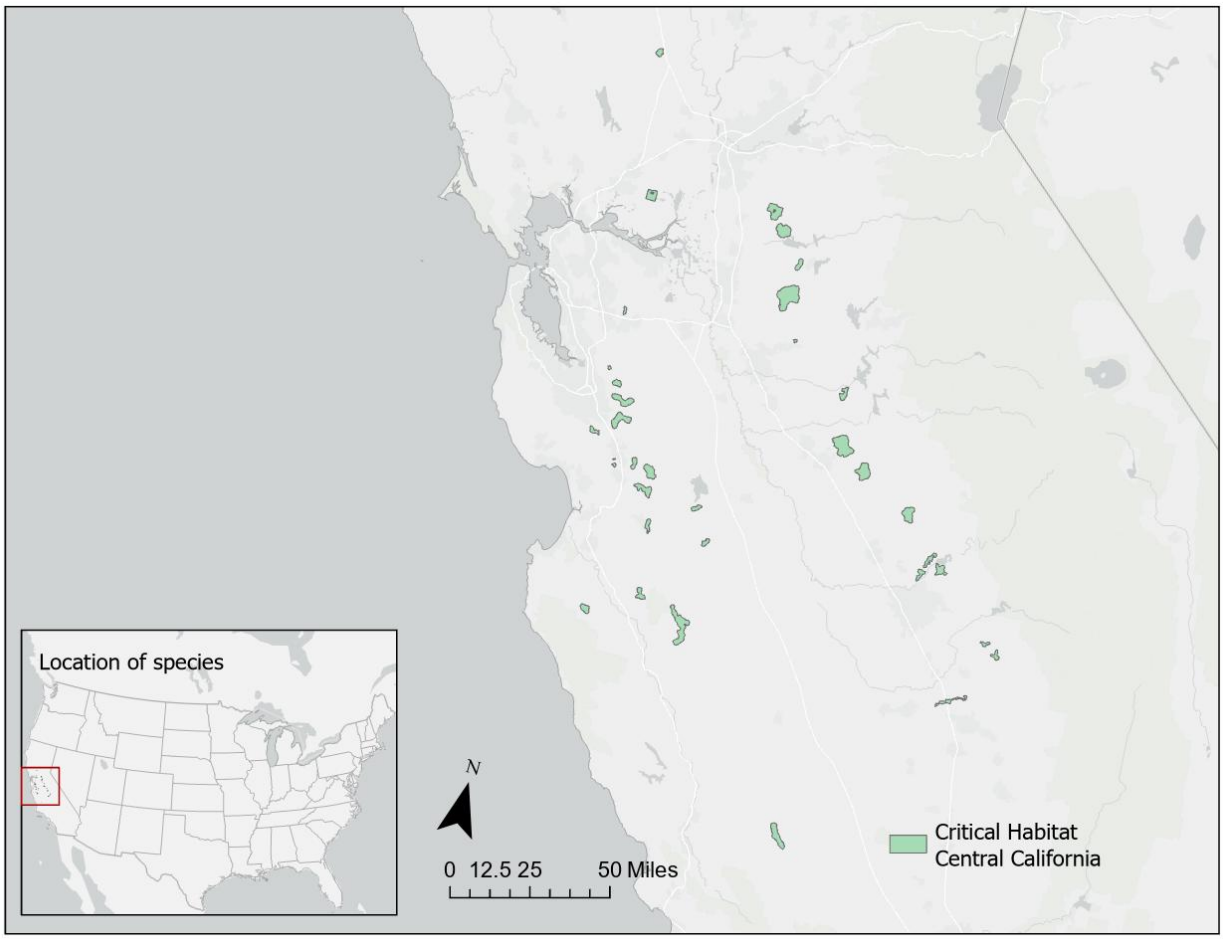

Figure A1-7. Critical habitat of the California tiger salamander, Central California DPS only.

- **Santa Barbara County DPS:** designated 11/24/2004, total acreage is about 11,175 acres (**Figure A1-8**)

Figure A1-8. Critical habitat of the California tiger salamander, Santa Barbara County DPS only.

8. **Known Locations**
   - **Known Locations Described in FWS Recovery Documents**
     - Central California DPS
       - "The Central California tiger salamander is restricted to disjunct populations that form a ring along the foothills of the Central Valley and Inner Coast Range from San Luis Obispo, Kern, and Tulare Counties in the south, to Sacramento and Yolo Counties in the north."
     - Santa Barbara County DPS
       - "The Santa Barbara County California tiger salamander is found in six metapopulation areas: (1) West Santa Maria/Orcutt, (2) East Santa Maria, (3) West Los Alamos, (4) East Los Alamos, (5) Purisima Hills, and (6) Santa Rita Valley."
     - Sonoma County DPS
       - "The current core range of Sonoma County California tiger salamander encompasses approximately 18,000-20,000 acres of fragmented habitat, with extant occurrences. This distribution has been curtailed primarily in two areas in recent times: the Santa Rosa Air Center area (southwest Santa Rosa) where observations have decreased since the early 1990s; and in the

south Cotati area, where salamanders were once commonly observed in the late 1980s to early 1990s."

- The FWS Recovery Plan Maps are summarized below in Figures A1-9 through A1-11.

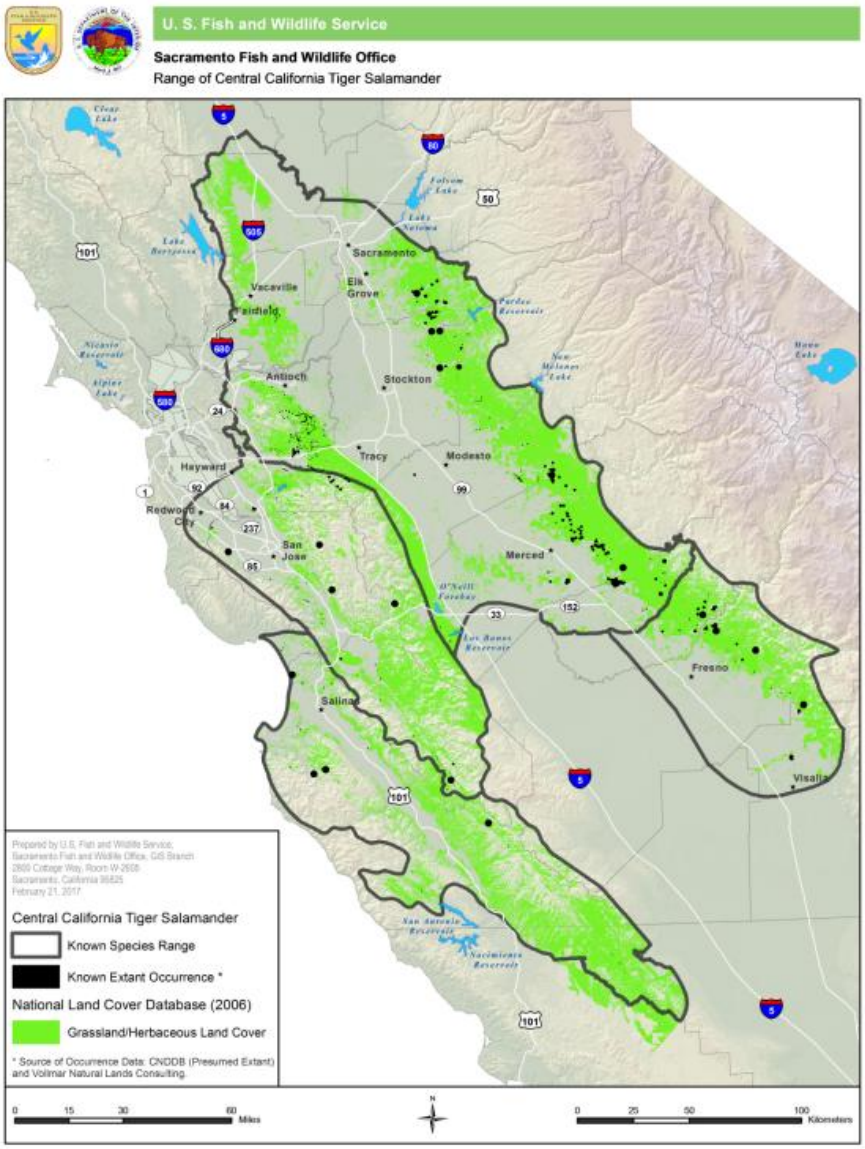

Figure 1: Range of Central California tiger salamander

Figure A1-9. Central California DPS Range with known occurrences. Reproduced from the FWS Recovery Plan for the Central California DPS (2017).

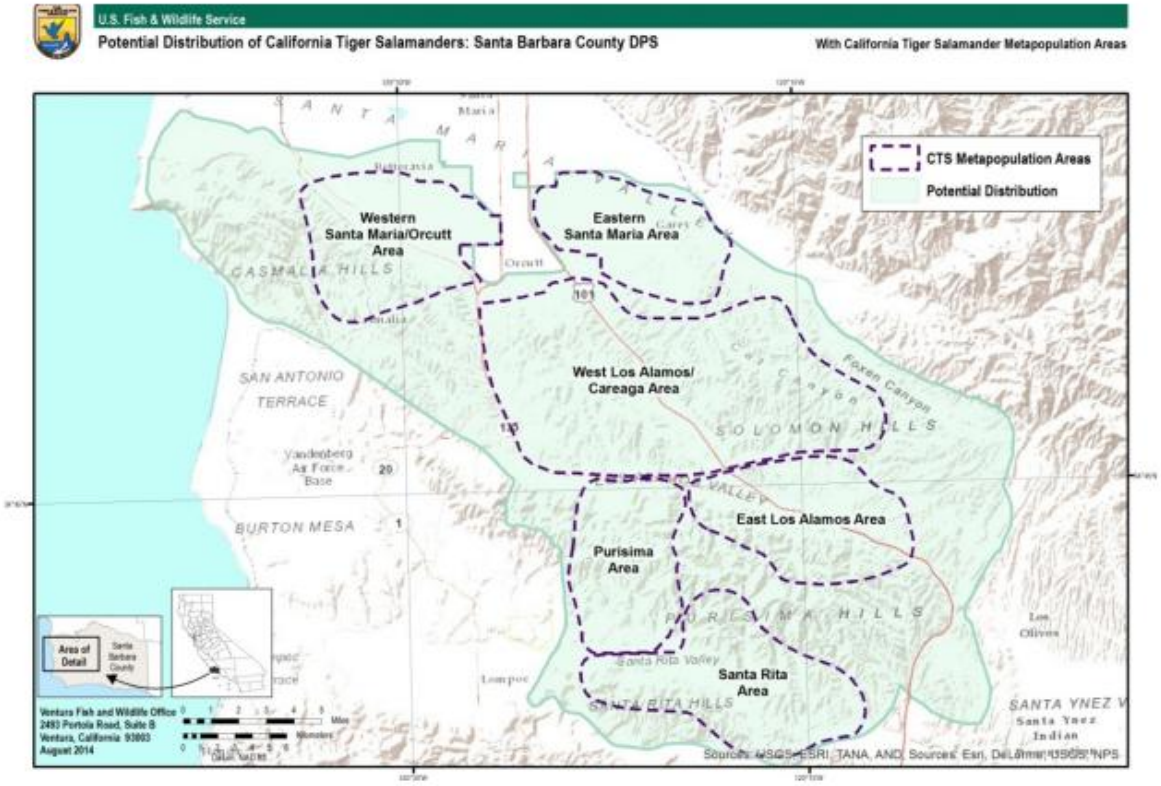

Figure 1. Distribution of Santa Barbara County California Tiger Salamanders.
Metapopulation areas encompass the general area of current occurrences and associated habitat and outline the general areas where recovery actions will be focused. Potential Distribution includes the general area of suitable habitat within the range of the species that is currently occupied or has the potential to become occupied.

Figure A1-10. Santa Barbara County DPS distribution map. Reproduced from the FWS Recovery Plan for the Santa Barbara DPS (2016).

Figure 9. Distribution of the Sonoma County California Tiger Salamander

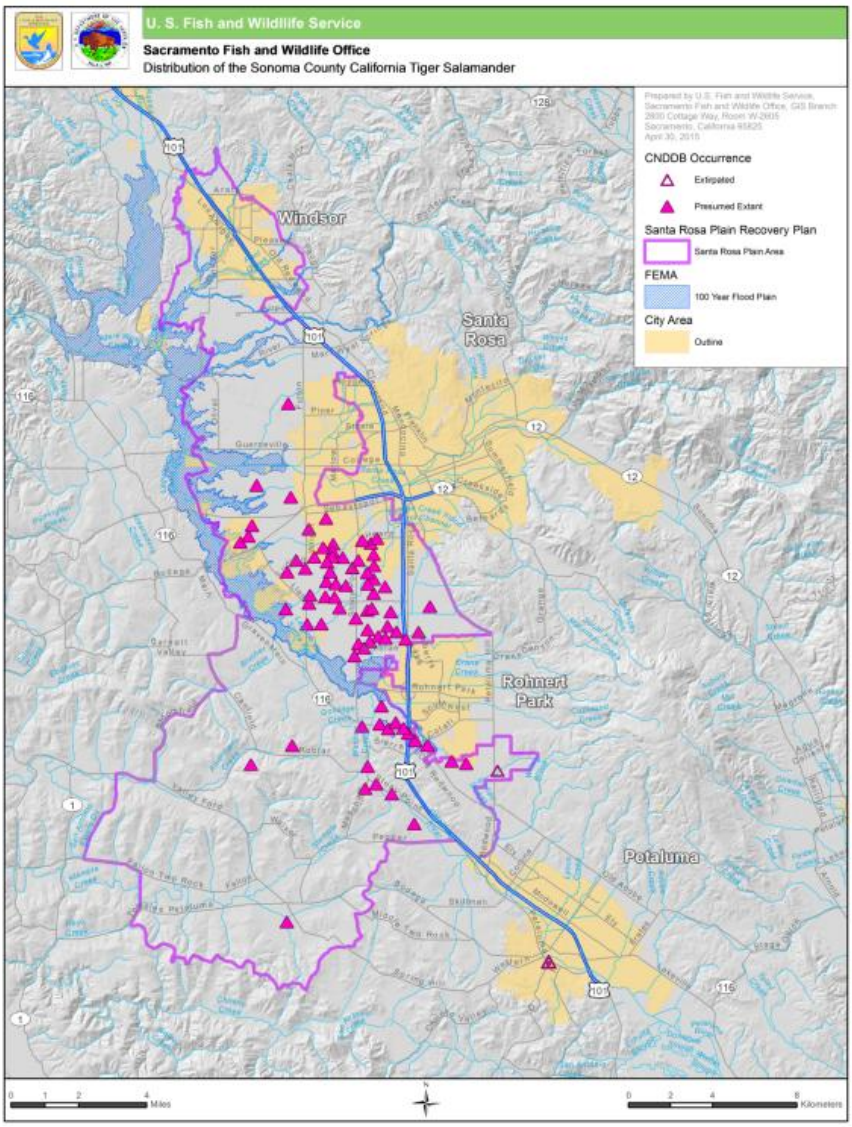

Figure A1-11. Sonoma County DPS distribution map. Reproduced from the FWS Recovery Plan for the Sonoma County DPS (2016).

- **Occurrences Included in Public Databases**
  - EPA queried iNaturalist, GBIF, and NatureServe. The observations closely follow the species interim core map. However, the positional accuracy of the points do not allow EPA to determine if these occurrences were in or out of the interim core map. Collectively, the occurrence data are consistent with the interim core map.
  - iNaturalist (available here) had 955 research grade observations for this species. GBIF (available here) included 937 occurrences and human observations (from 2010-2025). Occurrences in NatureServe were consistent with other occurrence data (linked here).