

5.3.10 California Tiger Salamander (Central California DPS) (Ambystoma californiense)



California Tiger Salamander Photo Credit: Ivan Parr

Status

- Federally Threatened
- California Threatened

Ecological Requirements

- RCIS Regions: Salinas Valley, Gabilan Range and Pinnacles National Park, and Inner Coast Range (Figure 5-6)
- RCIS Natural Communities: Freshwater Emergent Wetland, Valley Oak Woodland, Mixed Chaparral, Annual Grassland, Vernal Pool (CDFW 2020)
- Breeding aquatic habitat: Vernal pools and ponds, livestock ponds, other modified ephemeral and permanent ponds. Optimal breeding habitat is ephemeral and should dry for at least 30 days before rains begin in the fall (CDFW 2020, USFWS 2017).
- Upland habitat: Spend most of time as adults in upland subterranean refugia. Require small mammal burrows in upland areas surrounding breeding pools (USFWS 2017).
 Prime terrestrial habitat is found in annual grassland (CDFW 2005, 2019).



- Dispersal: Adults engage in mass migrations (up to 1.5 miles) during rain events from November to April, from upland habitat to breeding ponds (USFWS 2017).
- Monterey is the epicenter of hybridization with non-native barred salamanders which threatens species genetic integrity (USFWS 2017).
- Susceptible to fungal diseases and mortality due to vehicle impacts (Padgett-Flohr 2008, USFWS 2017)
- Full species account available: *Recovery Plan for the Central California Distinct Population* Segment of the California Tiger Salamander (Ambystoma californiense) (USFWS 2017)
- RCIS Conservation Target: High (listed species, Monterey County is epicenter for hybridization and competition with barred salamander, limited distribution of breeding habitat)

Associated Non-Focal Species

- Western spadefoot (Spea hammondii)
- Contra Costa goldfields (Lasthenia conjugens)
- Jolon clarkia (Clarkia jolonensis)

Climate Change Vulnerability Assessment

California tiger salamander (CTS) is at 'intermediate risk' from climate change across the state (Wright et al. 2013) (Table 5-14.). Some of the climatically suitable habitat in the southern portion of the RCIS area is likely to remain suitable in 2050 under high emission scenarios, while areas in the Salinas Valley may become unsuitable. Species distribution, however, is projected to be reduced in both high and low emissions scenarios.

Although California tiger salamander life history strategies are adapted to drought conditions, climate change is projected to result in erratic weather patterns that the species is not likely to adapt quickly enough to (USFWS 2017). Increased durations of drought conditions may result in breeding ponds drying out before larvae can metamorphose, and increased water temperatures and fluctuations in water levels during the breeding season may result in embryo mortality (USFWS 2017). Drought conditions also favor the life history strategies of non-native hybrid tiger salamanders, which have been shown to travel further and faster than native California tiger salamanders at higher temperatures (USFWS 2017).



Type of Analysis	Low Emissions (RCP4.5)	High Emissions (RCP8.5)
Point Ranking (distribution)	Moderately Reduced - Moderate	Greatly Reduced – Mid-high
Area Ranking (habitat)	Somewhat Increased Vulnerability - Moderate	Increased Vulnerability – Mid-high

 Table 5-14. California Tiger Salamander Climate Vulnerability Ranking

Source: Wright et al. 2013

The goals, objectives, and actions shown in Table 5-15. aim to protect, enhance, and restore present day suitable habitats for California tiger salamander, as well as habitats that may become suitable in the future because of projected climate changes. Actions also address population stability, such as monitoring for disease and sources of road mortality, which may allow individuals to move to newly suitable habitats in the future.

A summary of natural communities where this species occurs is presented in Chapter 4. Figure 5-6 shows the range and modeled suitable habitat of the California tiger salamander.



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Figure 5-6. California Tiger Salamander Range and Modeled Habitat

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California Tiger Salamander Conservation Priorities, Goals, Objectives, and Actions

All RC and Amphibian goals, objectives, and actions apply to California tiger salamander. Water action 1.1.1, 1.1.3, 1.1.5, 1.1.7, 1.1.8, and Water Objective 1.2 apply. Table 5-15. summarizes the specific goals, objectives, and actions for this species.

Conservation Priorities

- Establish preserves of habitat suitable for all life stages in the five management units of the Central Coast Range Recovery Unit that occur in the RCIS area—Fort Ord, Carmel Valley, Fort Hunter-Liggett, Salinas Valley, and Peachtree Valley—and establish corridors between metapopulations (USFWS 2017) (CTS 1.1.2).
- Target eradication of hybrid and non-native barred tiger salamanders, which threaten genetic diversity, in Fort Ord and the Peachtree Valley, through management of breeding pond hydrology (USFWS 2017) (CTS 2.3.2).



Goal	Objective	Threats	Co-Benefits	Action
CTS Goal 1: Promote persistence of California tiger salamander populations in the RCIS area through protection, restoration, and enhancement of habitat.	CTS Objective 1.1: Protect known occurrences and allow expansion by protecting 109,000 acres of suitable habitat. Measure progress toward achieving this objective by the number of breeding locations, acres of adjacent upland habitat, and associated/equivalent acres protected.	 Habitat loss, degradation, fragmentation Climate change 	 Other focal/ non-focal species Biodiversity Climate change resilience 	CTS 1.1.1: Acquire parcels with known breeding occurrences and adjacent dispersal/terrestrial habitat as well as parcels with unoccupied suitable habitat for California tiger salamander through fee title purchase of conservation easement. Prioritize habitats with vernal pools or other ephemeral breeding ponds and habitat that creates corridors between metapopulations (USFWS 2017).

Table 5-15. California Tiger Salama	nder Goals, Objectives, and Actions
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Goal	Objective	Threats	Co-Benefits	Action
CTS Goal 1:	CTS Objective 1.1:	 Habitat loss, degradation, fragmentation Climate change Non-native species 	 Connectivity Other focal/ non-focal species Biodiversity Climate change resilience 	CTS 1.1.2 ¹ : Create California tiger salamander habitat preserves with suitable breeding and upland characteristics, totaling a minimum of 3,398 acres. Prioritize habitats with vernal pools or other ephemeral breeding ponds and habitats that create corridors between metapopulations, especially in the five management units of the Central Coast Range Recovery Unit that occur in the RCIS area, Fort Ord, Carmel Valley, Fort Hunter-Liggett, Salinas Valley, and Peachtree Valley (USFWS 2017). Genetic evaluation of metapopulations prior to creating corridor linkages should be completed to contain non-native and hybrids from genetically pure California tiger salamander.



Goal	Objective	Threats	Co-Benefits	Action
CTS Goal 1:	CTS Objective 1.2: Enhance occupied, suitable, and U.S. Fish and Wildlife Service- designated California tiger salamander critical habitat throughout the RCIS area. Measure progress toward achieving this objective by acres of breeding, dispersal, and upland habitat and adjacent/equivalent acres enhanced and occupied by California tiger salamander.	• Non-native species	 Other focal/ non-focal species Biodiversity Non-native invasive species 	CTS 1.2.1 ¹ : Remove non-native plant and wildlife species and hybrid tiger salamanders from breeding ponds where they are known to occur, by draining perennial ponds annually (USFWS 2017).
CTS Goal 1:	CTS Objective 1.2:	• Habitat loss, degradation, fragmentation	 Other focal/ non-focal species Biodiversity 	CTS 1.2.2: Reduce/eliminate small mammal control efforts. Implement programs to increase small mammal populations in areas where they have been eradicated (USFWS 2017).



Goal	Objective	Threats	Co-Benefits	Action
CTS Goal 1:	CTS Objective 1.2:	• Habitat loss, degradation, fragmentation	 Other focal/ non-focal species Biodiversity 	CTS 1.2.3: Manage upland vegetation structure and density to support California tiger salamanders.
CTS Goal 1:	CTS Objective 1.2:	• Habitat loss, degradation, fragmentation	 Other focal/ non-focal species Biodiversity Water quality Water recharge 	CTS 1.2.4: Manage aquatic pond vegetation to support California tiger salamanders.



Goal	Objective	Threats	Co-Benefits	Action
CTS Goal 1:	CTS Objective 1.3: Restore occupied, suitable, and U.S. Fish and Wildlife Service - designated California tiger salamander habitat and create new habitat. Measure progress toward achieving this objective by acres of breeding habitat and associated/equivalent acres restored or created and by the number of breeding ponds restored or created.	 Habitat loss, degradation, fragmentation Climate change 	 Other focal/ non-focal species Biodiversity Climate change resilience 	CTS 1.3.1: Restore and mange aquatic habitat, including restoring East Garrison Pond and at least one additional aquatic feature, totaling at least 2 acres at Fort Ord (FORA 2018).
CTS Goal 2: Support stability and recovery of California tiger salamander populations in the RCIS area through measures to reduce direct mortality.	CTS Objective 2.1: reduce vehicle-related mortality. Measure progress toward achieving this objective by the reduction of vehicle- related California tiger salamander deaths detected, compared to present day.	 Transportation infrastructure construction and maintenance Vehicle- impact mortality Climate change 	 Other focal/ non-focal species Biodiversity Connectivity Climate change resilience 	CTS 2.1.1: Implement measures to reduce road mortality, by creating wildlife crossing infrastructure (tunnels or overpasses) that promote California tiger salamander movement through transportation corridors (USFWS 2017). Focus on areas adjacent to known locations and protected habitats.



Goal	Objective	Threats	Co-Benefits	Action
CTS Goal 2:	CTS Objective 2.2: Reduce pathogen-related mortality. Measure progress toward achieving this objective by the reduction of disease- related California salamander deaths detected, compared to present day.	• Disease • Climate change	 Other focal/ non-focal species Biodiversity Climate change resilience 	CTS 2.2.1: Monitor for diseases that affect California tiger salamander populations, using traditional and eDNA methods, and implement management actions to reduce their transmission and impacts on the species.
CTS Goal 2:	CTS Objective 2.2:	 Disease Climate change 	 Other focal/ non-focal species Biodiversity Climate change resilience 	CTS 2.2.2: Sterilize all equipment entering known or suitable California salamander breeding habitat, to prevent the introduction of pathogens.



Goal	Objective	Threats	Co-Benefits	Action
CTS Goal 2:	CTS Objective 2.3: Reduce the rates of hybridization with non-native tiger salamanders. Measure progress toward achieving this objective by the reduction of hybrid tiger salamanders detected, compared to present day.	 Hybridization with non- native tiger salamanders Climate change 	 Other focal/ non-focal species Climate change resilience Biodiversity Non-native invasive species 	CTS 2.3.1 ¹ : Conduct genetic testing for hybrid and non- native tiger salamanders.
CTS Goal 2:	CTS Objective 2.3:	 Hybridization with non- native tiger salamanders Climate change 	 Other focal/ non-focal species Climate change resilience Biodiversity Non-native invasive species 	CTS 2.3.2 ¹ : Implement targeted eradication of hybrid and non- native tiger salamanders, through management of breeding pond hydrology (USFWS 2017).

Notes:

1. The California Endangered Species Act does not preclude hybrids and, therefore, CDFW should be consulted prior to any potential take of hybrids.

Sources: CDFW 2015, 2020; USFWS 2017; FORA 2018