

1 **A.12 GIANT GARTER SNAKE**  
 2 **(*THAMNOPHIS GIGAS*)**

3 **A.12.1 Legal and Other Status**

4 The giant garter snake is listed as threatened under the ESA and  
 5 California ESA. Critical habitat has not been designated for  
 6 this species.

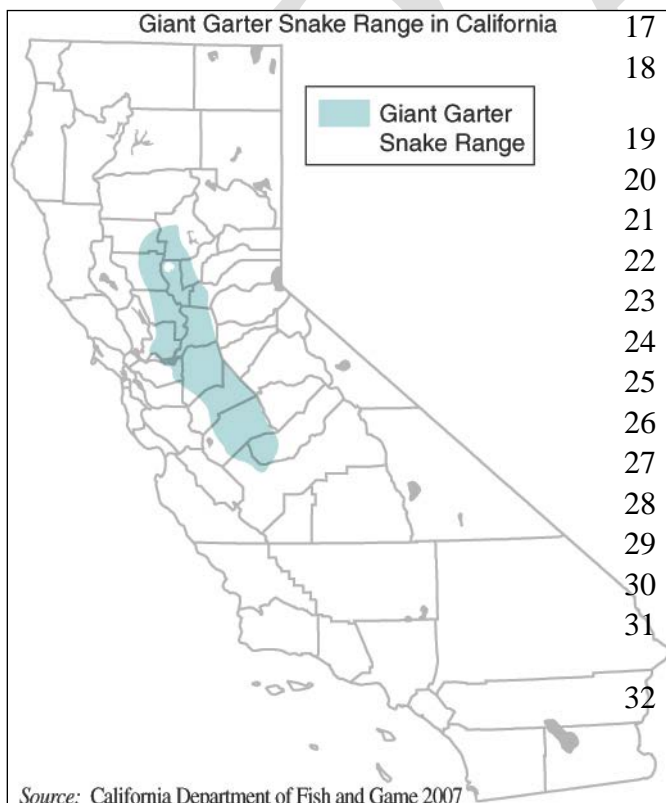


photo courtesy USGS

7 **A.12.2 Species Distribution and Status**

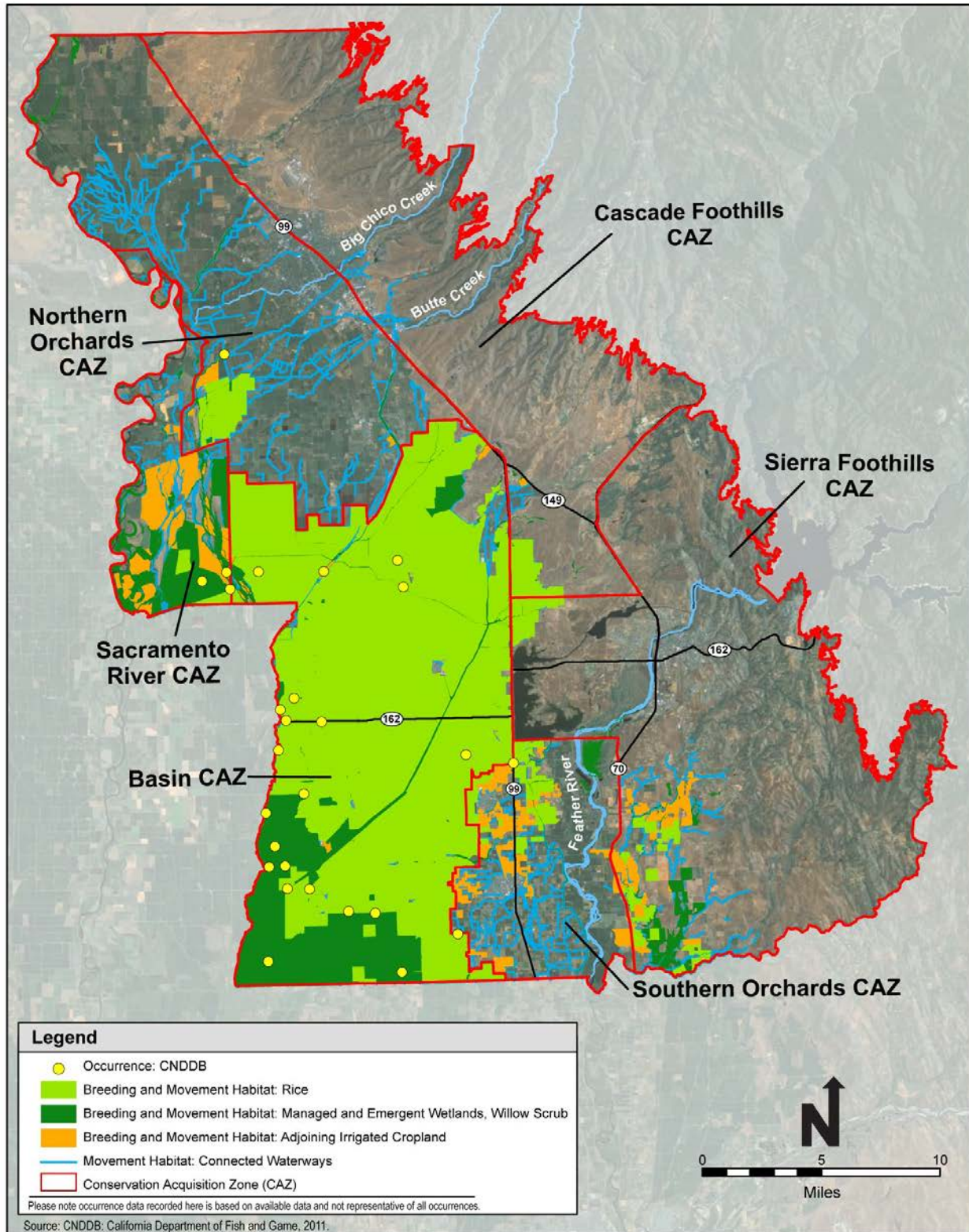
8 **A.12.2.1 Range and Status**

9 The giant garter snake is endemic to wetlands in the Sacramento and San Joaquin valleys and  
 10 was historically distributed throughout the San Joaquin Valley from the vicinity of Sacramento  
 11 and Antioch southward to Buena Vista and the Tulare Lake Basin (DFG 2000). Currently, this  
 12 species' distribution extends from near Chico, Butte County, to the vicinity of Burrel, Fresno  
 13 County. Due to the direct loss of natural habitat, the giant garter snake relies heavily on rice  
 14 fields in the Sacramento Valley but also uses managed marsh areas in federal and state wildlife  
 15 refuges. Only a few recent sightings of giant garter snakes have been reported in the San Joaquin  
 16 Valley.



17 **A.12.2.2 Distribution and Status in**  
 18 **the Plan Area**

19 In 1996, surveys were conducted in the  
 20 rice fields of Butte Basin near Butte Sink  
 21 (Butte County) and no giant garter snakes  
 22 were found (USFWS 2006a). Three  
 23 occurrences of the species were recently  
 24 discovered in the vicinity of the City of  
 25 Chico (USFWS 2006a). The giant garter  
 26 snake has been found in numerous  
 27 locations in the western portion of Butte  
 28 County area near the Sacramento River,  
 29 south of Chico and west of Biggs and  
 30 Gridley, in the 1990s (CNDDDB 2006) (see  
 31 Figure A-12).



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**Figure A-12. Giant Garter Snake Modeled Habitat and Recorded Occurrences**

### 1 **A.12.3 Habitat Requirements and Special Considerations**

2 The giant garter snake resides in marshes, ponds, sloughs, small lakes, low gradient streams, and  
3 other waterways, and in agricultural wetlands, including irrigation and drainage canals, rice fields,  
4 and the adjacent uplands (USFWS 1993).

5 Habitat requirements include 1) adequate water during the snake's active season (early spring through  
6 mid-fall) to provide food and cover; 2) emergent, herbaceous wetland vegetation, such as cattails and  
7 bulrushes, for escape cover and foraging habitat during the active season; 3) basking habitat of grassy  
8 banks and openings in waterside vegetation; and 4) higher elevation uplands for cover and refuge  
9 from flood waters during the snake's dormant season in the winter (USFWS 2006b). The giant  
10 garter snake resides in small mammal burrows and soil crevices located above prevailing flood  
11 elevations throughout its winter dormancy period (USFWS 2006b). Adequate burrows are  
12 typically located in sunny exposures along south and west facing slopes.

13 Due to lack of habitat and emergent vegetation cover, giant garter snakes generally are not  
14 present in larger rivers and wetlands with sand, gravel, or rock substrates. In addition, the major  
15 rivers have been highly channelized, removing oxbows and backwater areas that probably at one  
16 time provided suitable habitat. Riparian woodlands can provide suitable habitat, but it is not  
17 likely because most have excessive shade, lack of basking sites, and absence of prey populations  
18 (USFWS 2006b). In some rice-growing areas, giant garter snakes have adapted well to  
19 vegetated, artificial waterways and associated rice fields (Hansen and Brode 1993).

### 20 **A.12.4 Life History**

21 The breeding season extends through March and April, and females give birth to live young from  
22 late July through early September. Activity peaks during spring emergence and declines  
23 significantly after courtship behavior declines towards the end of June, after which a second peak  
24 of activity is observed after females give birth to their young (Hansen and Brode 1993, Wylie et  
25 al. 1997, USFWS 1999, Hansen 2004). Brood size is variable, ranging from 10 to 46 young, with  
26 a mean of 23. Young immediately scatter into dense cover and absorb their yolk sacs, after  
27 which they begin feeding on their own. Although growth rates are variable, young typically  
28 more than double in size within the first year. Sexual maturity averages 3 years for males and 5  
29 years for females. Giant garter snakes feed primarily on small fishes, tadpoles, and frogs  
30 (USFWS 2006b). Daily activity consists of emerging from burrows after sunrise, basking to  
31 warm bodies to active temperatures, and foraging or courting for the remainder of the day  
32 (Hansen and Brode 1993).

### 33 **A.12.5 Threats**

34 Habitat loss and fragmentation, flood control activities, changes in agricultural and land  
35 management practices, predation from introduced species, parasites, and water pollution are the  
36 main causes for the decline of giant garter snake. Continued loss of wetland or other suitable

1 habitat resulting from agricultural and urban development is the greatest threat to giant garter  
2 snake. Conversion of Central Valley wetlands for agriculture and urban uses has destroyed  
3 approximately 95 percent of historical giant garter snake habitat (Wylie et al. 1997). Where this  
4 species has adapted to agriculture, maintenance activities such as vegetation and rodent control,  
5 bankside grading or dredging, and discharge of pollutants, threaten their survival (Hansen and  
6 Brode 1993, USFWS 1999, Wylie et al. 2004). Giant garter snakes are also threatened by the  
7 introduction of exotic species. Gut content studies confirm that introduced bullfrogs (*Rana*  
8 *catesbeiana*) prey on juvenile giant garter snakes throughout their range (Treanor 1983, Dickert  
9 2003, Wylie et al. 2003). While the extent of this predation is not well understood, preliminary  
10 data from a study conducted at Colusa National Wildlife Refuge suggests that 22 percent of  
11 newborn giant garter snakes succumb to bullfrog predation (Wylie et al. 2003).

## 12 **A.12.6 Relevant Conservation Efforts**

13 Conservation efforts for the giant garter snake include restoration activities on wildlife refuges  
14 and mitigation banking. Due to continued loss of habitat, this species has become increasingly  
15 dependent on ten refuges and wildlife management areas in the Central Valley (Czech 2006).  
16 The absence of giant garter snake in apparently suitable habitat in the refuge system suggests that  
17 factors such as winter flooding and predation (especially by nonnative species such as bullfrogs)  
18 may be limiting in some areas. Giant garter snake prefers summer flooding and winter drying,  
19 but Central Valley refuges system properties are likely managed intensively for wintering  
20 waterfowl with a reversed water regime, resulting in habitat features that are problematic for  
21 giant garter snake conservation. These opposing requirements suggest that separate conservation  
22 areas for the snake are necessary. Efforts to restore the ecological integrity of the land at Colusa  
23 National Wildlife Refuge have proven beneficial to giant garter snake, and some mitigation  
24 banks designed specifically for giant garter snake, including the 565-acre (229-hectare) Gilsizer  
25 Slough South Giant Garter Snake Conservation Bank in Sutter County, are also beneficial for  
26 giant garter snake.

## 27 **A.12.7 Habitat Suitability Model**

### 28 **A.12.7.1 Breeding and Movement Habitat**

29 Breeding and movement habitat for the giant garter snake includes the following land cover  
30 types and conditions that are present below 200 feet mean sea level:

- 31 • Rice;
- 32 • Managed wetland;
- 33 • Managed seasonal wetland
- 34 • Emergent wetland;
- 35 • Willow scrub;

- 1 • Irrigated cropland adjoining rice, managed wetland, emergent wetland, and willow scrub;  
2 and
- 3 • Canals, sloughs, and permanent or intermittent low-gradient streams (except the  
4 Sacramento River, Feather River, and Big Chico Creek) that are internal to or within 8  
5 kilometers (km) of patches of rice, managed wetland, emergent wetland, and willow  
6 scrub.

7 Additionally, patches of habitat identified based on the above model that were less than 50 acres  
8 and greater than 1 mile from larger patches of habitat were not considered to function as habitat  
9 because they are isolated and not likely to support giant garter snakes.

#### 10 **A.12.7.2 Assumptions**

11 Giant garter snakes inhabit marshes, ponds, sloughs, small lakes, low gradient streams, and other  
12 waterways, and agricultural wetlands, including irrigation and drainage canals, rice fields, and  
13 the adjacent uplands (USFWS 2006). In the Sacramento Valley, their habitat requirements  
14 include (1) adequate water during the snake's active season (early spring through mid-fall) to  
15 provide food and cover; (2) emergent herbaceous wetland vegetation for escape cover and  
16 foraging habitat during the active season; (3) basking habitat of grassy banks and openings in  
17 waterside vegetation; and (4) higher elevation uplands for cover and refuge from flood waters  
18 during the snake's dormant season in the winter (USFWS 2006). Due to lack of habitat and  
19 emergent vegetative cover, giant garter snakes generally are not present in larger rivers with  
20 sand, rock, and gravel substrates (e.g., the Sacramento River, Feather River, and Big Chico  
21 Creek). Riparian woodlands are unlikely to provide suitable habitat due to excessive shade, lack  
22 of basking sites, and absence of prey populations (USFWS 2006). Irrigated cropland adjoining  
23 rice, managed wetland, emergent wetland, and willow scrub is included as habitat because canals  
24 associated with irrigated cropland in close proximity to these other habitat types may also be  
25 used by giant garter snakes.

26 The giant garter snake has been observed to relocate to new resource patches during the breeding  
27 season and when threatened (Wylie pers. comm., Hansen pers. comm.). Under extreme  
28 situations the snake has been known to migrate up 8 km along low gradient stream corridors  
29 (Wylie pers. comm., Hansen pers. comm.). To address this potential movement, low gradient  
30 waterways that are hydrologically connected to identified breeding and movement habitat  
31 (excluding the Sacramento River, Feather River, and Big Chico Creek) have been included as  
32 movement habitat. All streams internal to or within 8 km of identified breeding and movement  
33 habitat, and with a gradient of less than 2 percent were classified as movement habitat.

#### 34 **A.12.8 Recovery Plan Goals**

35 In 1999 the Draft Recovery Plan for the Giant Garter Snake was prepared by the USFWS. The  
36 overall objective of this recovery plan is to delist the giant garter snake. The goals are (1)  
37 stabilizing and protecting existing populations, and (2) conducting research necessary to further

1 refine recovery criteria. Recovery criteria in this plan are in the preliminary stages because at the  
2 time there was not enough data of the giant garter snake population dynamics upon which to base  
3 decisions.

4 The recovery plan divided the Central Valley into four recovery units to aid in the recovery  
5 process. These units are (1) the Sacramento Valley Unit, extending from the vicinity of Red  
6 Bluff south to the confluence of the Sacramento and Feather Rivers; (2) the Mid-Valley Unit,  
7 extending from the American and Yolo Basins south to Duck Slough near the City of Stockton;  
8 (3) the San Joaquin Valley Unit, extending south of Duck Slough to the Kings River; and (4) the  
9 South Valley Unit, extending south of the Kings River to the Kern River Basin.

10 Butte County populations of giant garter snake are included in the Sacramento Valley Unit.  
11 Recovery criteria for this unit are as follows:

- 12 1. Monitoring shows that in 17 out of 20 years, 90 percent of the subpopulations in the  
13 recovery unit contain both adults and young.
- 14 2. The three existing populations within the recovery unit are protected from threats that  
15 limit populations.
- 16 3. Supporting habitat within the recovery unit is adaptively managed and monitored.

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