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Cross Reference: Hansen; Brode; reptiles; snakes; giant garter snake;  
Thamnophis; distribution

State of California  
The Resources Agency  
DEPARTMENT OF FISH AND GAME

STATUS OF THE GIANT GARTER SNAKE  
*THAMNOPHIS COUCHI GIGAS* (FITCH)

by

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Inland Fisheries Endangered Species Program

Special Publication 80-5

September 1980

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STATUS OF THE GIANT GARTER SNAKE  
*Thamnophis couchi gigas* (Fitch)<sup>1/</sup>

by

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and

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ABSTRACT

Agricultural development has apparently eliminated the giant garter snake from the southern San Joaquin Valley. Its present range extends from Fresno County north through the Central Valley to the vicinity of Gridley, Butte County. Current land management practices where it still exists pose no visible threat, thus the subspecies appears to be in no immediate danger of becoming extinct. The history of its distribution and current status are discussed.

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<sup>1/</sup> Inland Fisheries Endangered Species Program Special Publication 80-5. This report was prepared as part of an Endangered Species Act, grant-in-aid project, "California E-F-4, Endangered, Threatened, and Rare Fish".

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## INTRODUCTION

The giant garter snake was referred to the species *Eutaenia hammondi* by Cooper (1870). Since then, its taxonomic status has been revised several times (Ruthven 1908, Van Denburgh and Slevin 1918, Fitch 1940, 1948, Fox 1948). Fitch (1940) described it as a new subspecies *Thamnophis ordinoides gigas*. The current name, *T. couchi gigas* was first applied by Fox and Dessauer (1965). The common and subspecific names of *T. c. gigas* are derived from the fact that it is one of the largest garter snakes, reaching a total length of 145 cm (57 in.) (Wright and Wright 1957) (Figure 1).

The original range of the giant garter snake as described by Fitch (1940) was the Central Valley from the vicinity of Sacramento and Antioch southward to Buena Vista Lake, between Taft and Bakersfield. Fox (1951) indicated that intergrades between the giant garter snake and a closely related subspecies may occur in the Sacramento Valley as far north as Gridley, Butte County.

Land development, particularly the reclamation of wetlands for agriculture, has eliminated much of the original habitat. South of Fresno County virtually no suitable freshwater habitats remain. Existing wetlands in the vicinity of northern Fresno County and western Madera and Merced counties could be cultivated with an improved irrigation return water disposal system (Leach 1960). These lands are presently managed for livestock grazing and waterfowl.

The use of pesticides by agriculture is suspected, though not proved, of having detrimental effects on *T. c. gigas* (Bury 1971, Stewart 1971).

Primarily because so much habitat has been lost, the giant garter snake was classified as rare by the California Fish and Game Commission in 1971. Under this classification its take, possession, or sale is prohibited by State law. However, since the collections of early workers (Van Denburgh and Slevin 1918, Fitch 1940) there have been no surveys to determine precisely where and in what numbers this subspecies occurs. The objective of this study was to clarify the status of the giant garter snake particularly its range and distribution. Preliminary field surveys were conducted in 1973 and 1974, culminating in a more intensive survey in 1976.

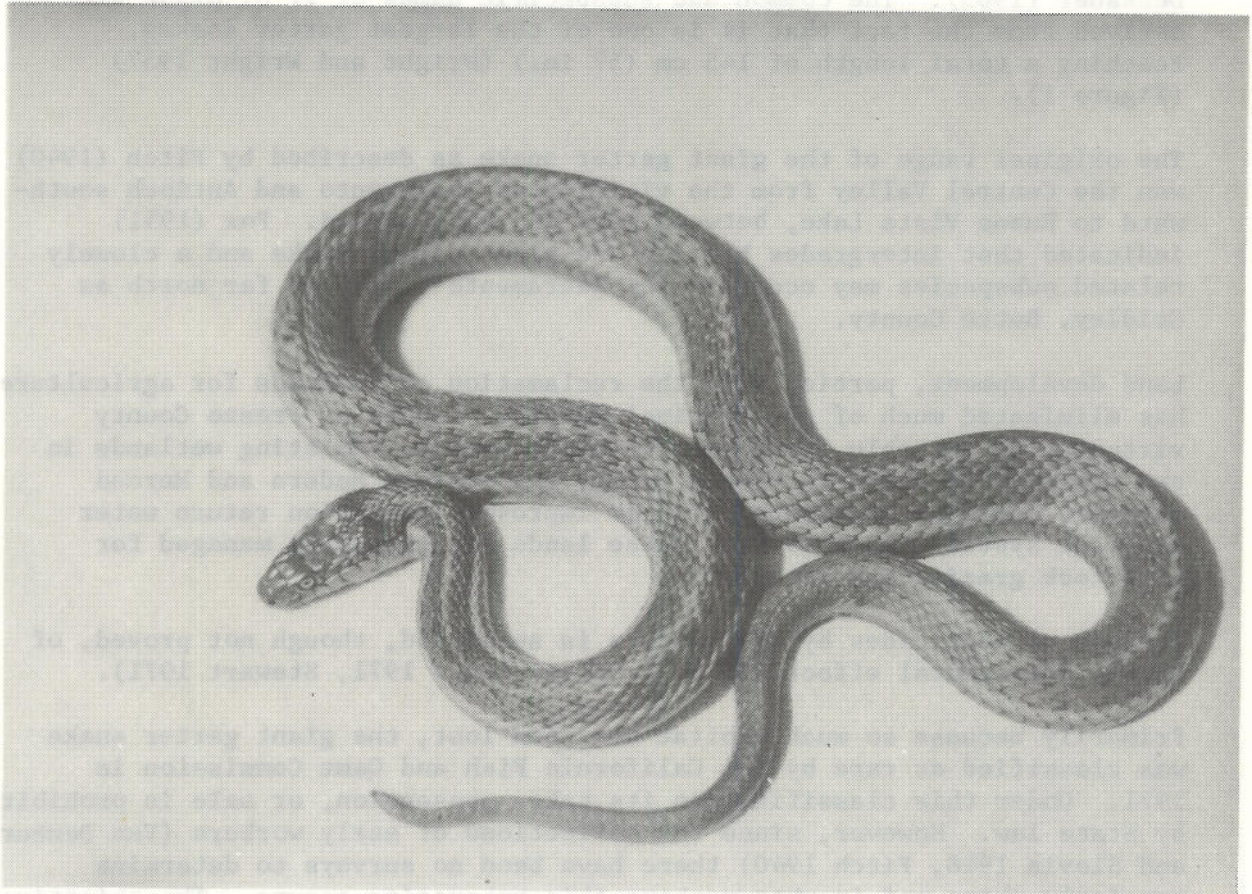
## METHODS

The primary means by which snakes were located was by direct observation while walking along water courses. A problem with this method was the extreme wariness of the snake, a trait long recognized. In a discussion of collecting at Buena Vista Lake, for example, Van Denburgh and Slevin (1918) reported that "...they are very hard to shoot, for they are very shy and slide into the water at the least alarm." Fitch (1940) was similarly impressed, stating that "...catching them by the usual method of stealthily approaching and seizing them by hand proved to be an impossibility, partly because of habitat conditions under which the snakes are found, but chiefly because of their alertness and timidity."



## INTRODUCTION

The giant garter snake was restricted to the species *Thamnophis* by Gooty (1930). Since then, the taxonomic status has been revised several times (Whitman 1938, Van Denburgh and Blinn 1940, Smith 1940, Fox 1945). Smith (1945) described it as a new subspecies *Thamnophis* *giganteus*. The current name, *T. elegans*, was first applied by Fox and Gooty (1953). The common and scientific names of *T. elegans* are



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## METHODS

The primary means by which snakes were located was by direct observation while walking along water courses. A problem with this method was the extreme wariness of the snake, a trait long recognized. In a discussion of collecting at Stone Lake, for example, Van Denburgh and Blinn (1940) reported that "they are very hard to shoot, for they are very

**FIGURE 1.** Adult female giant garter snake. Photo by senior author, June 1977.

of extremely suspicious and retiring than by hand. It is impossible, partly because of habitat conditions under which the snakes are found, but chiefly because of their alertness and timidity."



In addition to the problem of wariness, positive identification of all snakes sighted was necessary because of the occurrence of two other garter snake species (*T. elegans* and *T. sirtalis*) within the range of the giant garter snake. These problems were overcome by using binoculars, which facilitated location of snakes before they were alarmed and usually permitted positive identification when a close approach was not possible.

This basic survey technique was supplemented in 1976 by trapping using a procedure similar to that described by Fitch (1951), and in some areas, by slowly driving near suitable habitat in search of snakes basking on or moving across roads. Both of these methods produced mixed results. No population estimates were made during this study and many localities represent only one sighting. The time spent at each locality varied, depending on the nature of the habitat and the proximity of recent sightings. In many cases, if a giant garter snake was sighted shortly after arrival, additional search at the locality was foregone in lieu of visiting additional sites during that day.

To investigate the possible occurrence of intergrades in the Sacramento Valley and to more accurately assess the northern distributional limits of *T. couchi gigas*, snakes were captured and examined whenever possible, and the following meristic data were recorded: dorsal scale row number, ventral and caudal scale number, number of supralabial and infralabial scales, snout-vent and tail lengths, and sex and color. Additional information recorded included those aspects of habitat, activity, or environmental conditions which might prove useful in determining life history requirements.

During this study, ten giant garter snakes were collected and preserved. Of these, five were road-kills and five represented voucher specimens from new localities. These specimens are deposited at the California Department of Fish and Game field station, Sacramento. All other specimens of *T. c. gigas* captured were examined in the field and released immediately at the point of capture.

#### PAST DISTRIBUTION

The literature and available museum records prior to 1970 documented the occurrence of the giant garter snake at only sixteen localities (Table 1). This paucity of early records, especially in the northern portion of its range, makes it difficult to determine its past distribution accurately. However, an examination of old accounts and all localities where this snake is known to exist today shows it to be primarily associated with riparian marsh or slough habitats (Figure 2). The early collecting localities of the giant garter snake coincided with the distribution of this habitat.

Leach (1960) described the past occurrence of large areas of riparian marsh and slough habitat in the Tulare Lake Basin and Grasslands (Figure 3). The Tulare Lake Basin, comprising portions of Kings, Tulare, and Kern counties, contained Kern, Buena Vista, Goose, and



TABLE 1. Known Localities of the Giant Garter Snake Prior to 1970,  
Based on Literature and Museum Records.

Locality	County	Reference
Near Buttonwillow	Kern	Fitch 1940
Buena Vista Lake	Kern	LACM <sup>1/</sup>
14.8 miles E Fellows, Hwy. 399	Kern	MVZ <sup>2/</sup>
San Joaquin River, 1.5 miles N Mendota	Fresno	MVZ
Gadwall	Merced	MVZ
Near Dos Palos	Merced	MVZ
Between Ingomar and Gustine	Merced	MVZ
4 miles N Los Banos	Merced	MVZ
4 miles NE Los Banos (vic. Mud Slough)	Merced	MVZ
3 miles and 4 miles SE Gustine (vic. Los Banos Creek)	Merced	MVZ
Los Banos	Merced	CAS <sup>3/</sup>
Merced	Merced	CAS
Mormon Island	San Joaquin	Fitch 1940
Antioch Bridge	Sacramento	UMMZ <sup>4/</sup>
10 miles S Sacramento	Sacramento	Fitch 1940
Gray Lodge Waterfowl Management Area	Butte	LSUMZ <sup>5/</sup> , MVZ

<sup>1/</sup> Los Angeles County Museum

<sup>2/</sup> Museum of Vertebrate Zoology, University of California, Berkeley

<sup>3/</sup> California Academy of Sciences

<sup>4/</sup> University of Michigan Museum of Zoology

<sup>5/</sup> Louisiana State University Museum of Zoology



FIGURE 2. Tule-cattail marsh, general habitat of *Thamnophis couchi gigas*, Arno Rd. at Highway 99, San Joaquin County. Photo by senior author, June 1977.



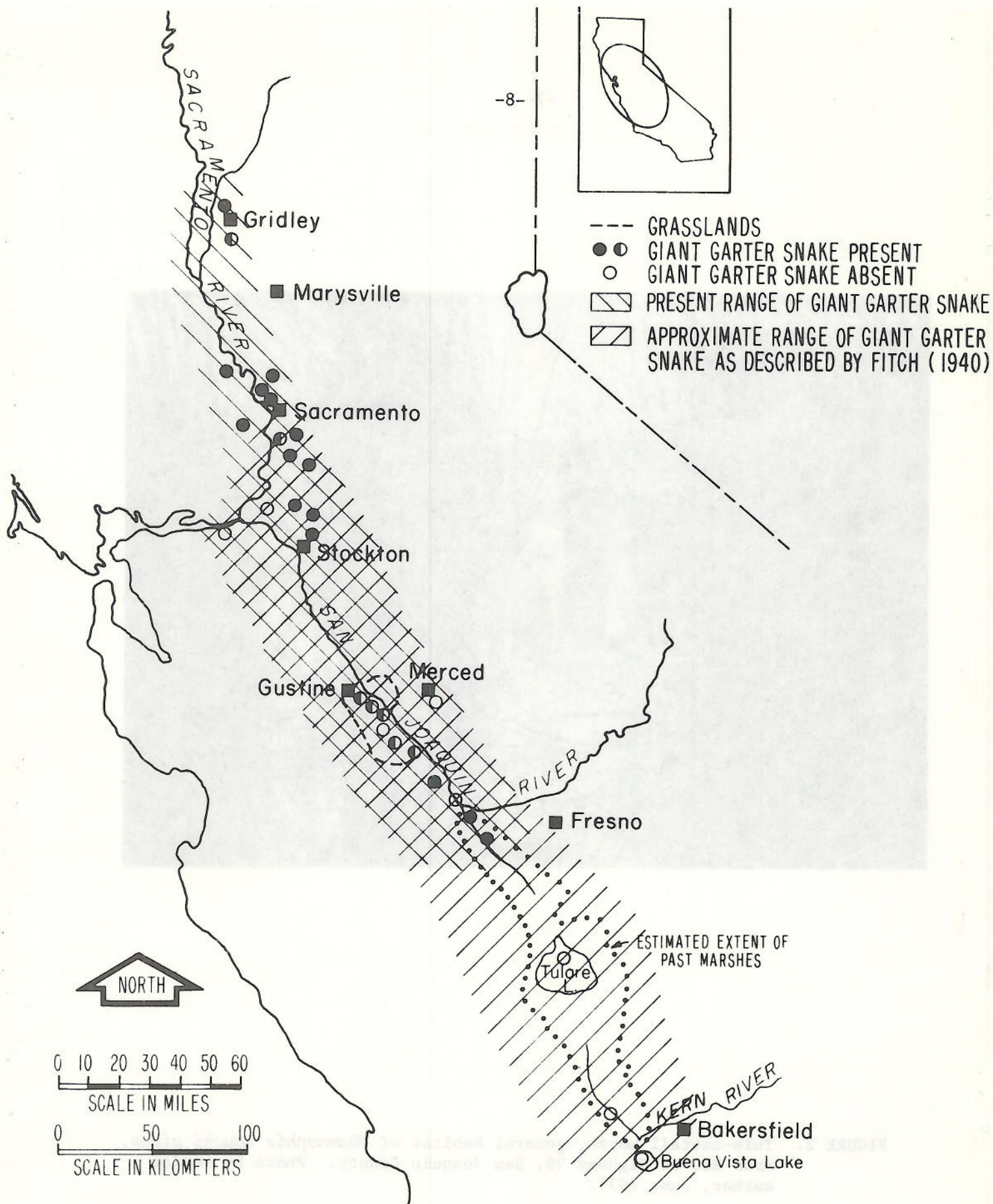


FIGURE 3. Past and present distribution of the giant garter snake. Open circles indicate localities reported prior to 1970 where it no longer occurs. Half-solid circles indicate localities reported prior to 1970 where it still occurs. Solid circles indicate localities recorded during 1973-76.



Tulare lakes and numerous interconnecting sloughs. Van Denburgh and Slevin (1918) collected giant garter snakes from Buena Vista Lake, Kern County. They described seeing them out in the lake "...in considerable numbers sunning themselves on broken down tules..." Fitch (1940) wrote on hunting for them in 1936 along irrigation canals between Buttonwillow and Tupman, Kern County. Here he reported them "...fairly common..." along canals where "...the banks were usually overgrown with tules, willows, and weeds..." Mr. Carol M. Ferrel, California Department of Fish and Game (pers. commun.) reported seeing "large brown garter snakes" at Tulare Lake, Kings County, in September and October of 1941. The Grasslands represent an extensive floodplain of the San Joaquin River, occupying northern Fresno County and western Madera and Merced counties. Records of the giant garter snake from this region show that it occurred primarily along Los Banos Creek and Mud Slough.

Three old records demonstrate the past occurrence of this subspecies in the marshes of the Sacramento-San Joaquin River Delta in Sacramento and northern San Joaquin counties. However, there are no records of the giant garter snake between the Grasslands and the Delta, a distance of 60-70 miles, where the floodplain of the San Joaquin River is restricted to a narrow trough by alluvium from tributary rivers and streams. The lack of records from this area does not preclude the possibility that *T. c. gigas* occurred here. Pristine conditions in this area probably allowed colonization and dispersal between the Grasslands and the Delta.

#### HABITAT CHANGES

Agricultural development has been the predominant force affecting the landscape of the San Joaquin Valley. The greatest impact has been within the Tulare Lake Basin, which represents over one-third of the original range of the giant garter snake as described by Fitch (1940). Van Dyke (1902) reported that ditching and diking began to dry up the marshes of Tulare Lake Basin as early as the 1860's. During years of low precipitation large areas of the lake bottoms could be farmed, but it was not until Isabella and Pine Flat dams were constructed on the Kern and Kings rivers, and other tributaries largely diverted, that the entire basin could be reclaimed for agriculture (Leach 1960). The rivers have been channelized and habitat of the giant garter snake has been virtually eliminated in this region.

The impact of agricultural development in the northern and central San Joaquin Valley has not been as great. Destruction of wetlands has proceeded at a slower pace. The Grasslands of western Merced County is primarily a livestock grazing area interspersed with public and private waterfowl management areas. Flooding during the fall and winter waterfowl season (Leach 1960) may benefit the giant garter snake. In addition, numerous sloughs and marshes, notably Mud and Salt sloughs and Los Banos Creek, contain permanent water. Kesterson and San Luis National Wildlife refuges and the Los Banos State Waterfowl Management Area are located on these watercourses and provide suitable habitat for this snake.



The Sacramento Valley, from the Sacramento-San Joaquin Delta north into Butte County, supports a relatively large wetlands complex. Greater availability of water in the northern valley has permitted rice and other water consumptive crops to be cultivated on a broad scale. The resulting network of irrigation canals and flood control bypasses, augmented by such waterfowl areas as the Gray Lodge Waterfowl Management Area and the Sutter National Wildlife Refuge, continues to provide suitable habitat for this species.

#### PRESENT DISTRIBUTION

We observed no giant garter snakes in the San Joaquin Valley south of Fresno County; however, the Kings River at State Route 41 near Stratford, Kings County, may afford suitable habitat for the snake.

In the Grasslands and Delta regions of the northern San Joaquin Valley, the giant garter snake seems to be fairly widespread (Table 2). In the Grasslands, snakes were sighted along Mud Slough, Los Banos Creek, and along several nearby canals and marshes from near Firebaugh, Fresno County to Gustine, Merced County. These localities are all west of the San Joaquin River.

No giant garter snakes were observed in the area between Gustine, Merced County, and Stockton, San Joaquin County. However, several populations of this snake were discovered in the Delta region between Stockton and Sacramento where they occupied small disjunct areas of suitable habitat remaining along the eastern margin of the Delta.

This species was found to occur at several localities within the southern half of the Sacramento Valley. Irrigation canals and small impoundments in northwestern Sacramento County, eastern Yolo County, and southwestern Butte County (including the Gray Lodge Waterfowl Management area) support this snake. While the lack of early collection records precludes the assessment of its former distribution in this region, *T. couchi* appears today to be confined to the old floodlands of the Sacramento River.

Our examination of *T. couchi* from the Sacramento Valley indicates that they are most closely related to San Joaquin Valley *T. c. gigas*. While the most frequently encountered phenotypes from each region differ slightly, the range of phenotypic variation encountered in the Sacramento Valley lies within the variation noted in the Grasslands (Calif. Dep. of Fish and Game, unpublished data). Dr. Douglas A. Rossman (Louisiana State University, Baton Rouge, pers. commun.) and Dr. Glenn R. Stewart (California State Polytechnic University, Pomona, pers. commun.) have examined our data and specimens and agree that *T. couchi* from the Delta and the Sacramento Valley appear to represent *T. c. gigas* and not intergrades. We therefore conclude the present range of the giant garter snake extends from the vicinity of Burrell, Fresno County, north through the Central Valley to the vicinity of Gridley, Butte County.



TABLE 2. Known Localities of the Giant Garter Snake in 1976, Based on Records of the California Department of Fish and Game.

Locality	County
Fresno Slough, 1 mile W Burrell	Fresno
Hwy. 180, 0.7 miles E San Mateo Ave., 4 miles ESE Mendota	Fresno
Mendota Waterfowl Management Area, 2.5 miles SE Mendota	Fresno
Fresno Slough, N Hwy. 180, 2 miles SE Mendota	Fresno
Mendota Pool Area, E end Bass Ave., 1.5 miles N Mendota	Fresno
Hwy. 33 at Douglass Ave., 2 miles NW Firebaugh	Fresno
Helm Canal Rd. at Coaches Gun Club, 3.5 miles SW Dos Palos	Merced
Santa Fe Rd., vic. Britto Rd., 4 miles W Dos Palos	Merced
Santa Fe Rd., 3 miles NW Britto Rd., 6 miles SE Los Banos	Merced
Santa Fe Rd. at Arroyo Canal, 3 miles E Los Banos	Merced
Santa Fe Rd. at San Luis Spillway, 6 miles N Los Banos	Merced
Salt Slough at Wolfsen Rd., 7 miles N Los Banos	Merced
Los Banos Waterfowl Management Area, 4 miles N Los Banos	Merced
San Luis National Wildlife Refuge, 10 miles NW Los Banos	Merced
Canal W side Hwy. 165, 8 miles N Los Banos	Merced
Los Banos Creek, Santa Fe Rd. 2.5 miles S Gun Club Rd., 6 miles SE Gustine	Merced
Los Banos Creek at Gun Club Rd., 4 miles SE Gustine	Merced
Los Banos Creek, 0.5 miles N Hwy. 140, 3 miles NE Gustine	Merced
Stockton Diverting Canal, 0.5 miles E Hwy. 88 at Hwy. 99	San Joaquin
Eight Mile Rd. at W. P. Railroad tracks, 3.5 miles W Hwy. 99	San Joaquin
White Slough, 1 mile W Thornton Rd., 1.5 miles S Hwy. 12	San Joaquin
Coldani Marsh, 0.8 miles W Thornton Rd. at Hwy. 12	San Joaquin



TABLE 2 (Contd)

Locality	County
Arno Rd., W side Hwy. 99	Sacramento
Franklin Blvd., 0.5 miles S Hood-Franklin Rd.	Sacramento
0.4 miles N Elk Grove Blvd., W side Hwy. 99	Sacramento
Sheldon Rd., 0.3 W Bruceville Rd.	Sacramento
Beach Lake Preserve, 1 mile S Freeport	Sacramento
West Drainage Canal, 1 mile W to 1 mile S intersection, El Centro Rd. and Del Paso Rd.	Sacramento
Meister Rd., E Sacto. Metro. Airport	Sacramento
Elverta Rd., 1.5 miles E Garden Hwy.	Sacramento
Reigo Rd., 0.5 mile W Hwy. 99	Sacramento
Rd. 108 at Rd. 95 B and 1 mile E, 6 miles W Knights Landing	Yolo
Hwy. 45, 0.6 mile E Rd. 95 B, 9 miles NW Knights Landing	Yolo
South Fork Putah Creek at Old Davis Rd., Davis	Solano
Gray Lodge Waterfowl Management Area	Butte
Butte City Hwy., 0.7 mile E Goodspeed-Watt Rd., 10 miles NW Gridley	Butte

#### STATUS AND RECOMMENDATIONS

Although the giant garter snake has apparently been extirpated from the southern portion of its range, the remaining populations in the Grasslands and Mendota areas appear stable. Current land use practices in the Grasslands pose no visible threat to *T. c. gigas*. The Waterbank Program, recently initiated in this area to provide waterfowl habitat (Ronald Schultze, U. S. Soil Cons. Serv., pers. commun.) may benefit this snake. There appear to be no immediate threats to most populations occurring in the Delta and Sacramento Valley regions.

On the Mendota Waterfowl Area we observed several instances where snakes were deliberately killed by users of the area. We recommend that areas of high snake density be closed to private vehicles during peak periods of snake activity (May-June). Informational brochures should be provided to area users to educate them to the need to protect the giant garter snake and other nongame wildlife.

While it may be possible to reestablish this snake in portions of its former range, its future appears to depend on preserving existing wetlands. Because these constitute such a small portion of its original range in the San Joaquin Valley, and because the extent of habitat loss in the Sacramento Valley is not known, this snake should retain its rare status under California law.

#### ACKNOWLEDGMENTS

George A. Balding, Allan H. Sartain, and Dennis C. Stroud conducted the preliminary surveys in 1973 and 1974. We are grateful to Stephen J. Nicola, Glenn R. Stewart, and Douglas A. Rossman for their advice and critical review of the manuscript.

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