



United States Department of the Interior



FISH AND WILDLIFE SERVICE

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In reply refer to:
1-1-03-F-0154

January 24, 2005

Mr. Gene Fong
Federal Highway Administration
U. S. Department of Transportation
650 Capitol Mall Suite 4-100
Sacramento, California 95814

Subject: Programmatic Biological Opinion on the Effects of Small Highway Projects on the Threatened Giant Garter Snake in Butte, Colusa, Glenn, Sacramento, San Joaquin, Solano, Sutter, Yolo, and Yuba Counties, California

Dear Mr. Fong:

This is in response to your April 14, 2003, request for formal consultation with the U. S. Fish and Wildlife Service's (Service) on minor transportation projects that affect the threatened giant garter snake (*Thamnophis gigas*)(snake) within Butte, Colusa, Glenn, Sacramento, San Joaquin, Solano, Sutter, Yolo, and Yuba counties, California. Your letter was received by the Service on April 16, 2003. This biological opinion was prepared in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(Act).

This biological opinion is based on: (1) letters dated February 20, 2003, and April 14, 2003, from the Federal Highway Administration (FHWA) to the Service; (2) numerous telephone conversations and e-mails between the FHWA on and the Service; (3) a meeting between the California Department of Transportation and the Service on September 22, 2004; and (4) other information available to the Service.

Consultation History

On eight occasions between December 17, 2002, and April 2, 2003, Service and Federal Highway Administration staff engaged in informal consultation via e-mail regarding the proposed programmatic action.

February 20, 2003: The FHWA provided comments and questions regarding the proposed programmatic consultation in a letter to the Service.



April 14, 2003: The FHWA formally requested that the Service initiate formal consultation on the proposed action.

On five occasions between August 20 and October 23, 2003, Service and FHWA staff discussed the proposed action via electronic mail.

October 24, 2003: Service staff discussed the proposed action with a representative of the California Department of Transportation.

May 11, 2004: The Service sent a copy of the draft programmatic biological opinion to FHWA and the California Department of Transportation.

September 22, 2004: The Service and the California Department of Transportation met to discuss the draft programmatic biological opinion.

November 11, 2004: Staff from the Service and the California Department of Transportation discussed the proposed project on the telephone.

BIOLOGICAL OPINION

Description of the Proposed Action

The following program design criteria were jointly developed by the Service and FHWA to expedite FHWA-funded projects with relatively small effects on the snake that the Service and FHWA determine to be non-growth inducing or facilitating. Projects that exceed small effects on the snake and/or induce/facilitate growth are not covered by this biological opinion and will require separate consultations. The federally funded actions for which FHWA and the California Department of Transportation are responsible also include the repair, rehabilitation, maintenance, and other routine actions for county and city roads often called "Local Assistance" projects. The Service, with consideration of information from the FHWA and the California Department of Transportation, will review this programmatic action annually to ensure that its application is consistent with the design criteria discussed herein. The term of the proposed action is five years from the date of issuance of this programmatic biological opinion.

The FHWA proposes to append specific projects with relatively small effects on the snake to this programmatic biological opinion including, but not limited to: bridge rehabilitation/replacement, drainage improvements, scour repair, culvert repairs/extensions/replacements, roadway/shoulder widening, curve corrections, interchange improvements/construction, over-crossings, and, in limited circumstances, emergency repair projects. Effects of projects that meet the criteria outlined below under Project Design Criteria will be assigned to Levels 1 through 3 according to the amount of temporary and/or permanent effects. Each level includes a compensation standard that provides for restoration, preservation, and/or creation of affected snake habitat. All restored, preserved, and created habitat will be protected under a Service-approved conservation easement.

Project Design Criteria

Projects that qualify for coverage under this biological opinion through an appended process must meet the following criteria:

1. The effects will not exceed permanent losses of 3 acres of snake habitat. Snake habitat includes either or both upland and aquatic habitat components. The aquatic habitat component of snake habitat will not exceed more than one acre of the total permanent losses.
2. The effects will not exceed 20 acres of temporary disturbance to snake habitat. This total includes either or both upland and aquatic habitat components of snake habitat.
3. The Scope of Work is one or more of the types routinely funded by FHWA programs such as the Federal-Aid Highway Program.
4. Appendage of proposed projects to this programmatic biological opinion includes a written commitment by the FHWA, California Department of Transportation, and if appropriate, the local sponsor, to implement the measures outlined in Appendices A-D.

Project Level Effect and Compensation Criteria

Level 1

Level 1 projects result in minimal environmental effects. Examples include repair, rehabilitation, or replacement of existing structures where implementation of the project including restoration of the temporarily disturbed areas, requires one season to complete. The work will not result in any permanent loss of snake habitat, and the temporary disturbance area will not exceed 20 acres of snake habitat.

Compensation for Level 1 projects requires restoration of affected snake habitat to pre-project conditions within the same season or, at most, the same calendar year. It also includes one calendar year of monitoring of the restored habitat and the project site with a photo documentation report containing pre- and post-project area photos due one year from the date that the restoration action was completed.

Level 2

Level 2 projects include activities such as repair, rehabilitation, or replacement of previously authorized structures where implementation of the project, including restoration of the temporarily disturbed areas, requires two seasons to complete. The work will not result in any permanent loss of snake habitat and will not exceed 20 acres of temporary disturbance over two seasons.

Compensation for Level 2 projects requires restoration of affected snake habitat to pre-project conditions within one (1) year of completion of construction. Replacement of affected snake habitat will be replaced at a ratio of 1:1. One calendar year of monitoring of the restored habitat will be completed and the project site with a photo documentation report containing pre- and post-project area photos due one year from the date that the restoration action was completed.

Level 3

Level 3 projects include road crossings, and bridge replacements or improvements that will result in the: permanent loss that will not exceed 3 acres of snake aquatic and upland habitats, including no more than 1 acre of aquatic snake habitat and the temporary disturbances that will not exceed 20 acres of snake aquatic and upland habitats. Projects with temporary disturbance to snake habitat that require more than two seasons to complete will be categorized as Level 3.

The permanent loss of snake aquatic and upland habitat will be compensated at a ratio of 3 acres created for every acre lost. Where the loss involves rice habitat, it shall be compensated at a 1:1 ratio, where created habitat consists of aquatic and upland habitat. All created habitat must include both upland and aquatic habitat components with at least 1/3 perennial wetlands and 1/3 uplands. The remainder may be a combination of perennial and seasonal wetlands and uplands, as appropriate for the site.

All areas of snake habitat subject to temporary disturbance shall be restored to pre-project conditions within one (1) year of completion of construction. Compensation also includes one year of monitoring of the restored habitat and the project site with a photo documentation report containing pre- and post-project area photos due one year from the date that the restoration action was completed. The restoration and monitoring shall follow the Guidelines for Restoration and/or Replacement of Giant Garter Snake Habitat Appendix C. If the restoration is unsuccessful, as determined by the Service, consultation will be reinitiated by FHWA; reinitiation will include the appropriate actions necessary to fulfill the success criteria for restoration of the temporary disturbance.

Preservation Options

If a project proponent needs to compensate at Level 3 and wishes to secure existing snake habitat by fee title or conservation easement, preservation of the snake habitat may be credited against, but may not exceed, 50 percent of the aquatic habitat acreage that needs to be created.

Implementing Procedures

The following process will be used to append future proposed projects under this biological opinion:

1. The FHWA will submit a letter to the Service requesting that the proposed project (inclusive of appropriate compensation, based on the project level effect and compensation criteria

above) be appended to this programmatic biological opinion and also provide the Service with a brief biological assessment containing the information identified in Appendices A-D.

2. The Service will review the proposed project to determine if the proposed project: (1) may affect the snake; (2) is appropriate to append to this programmatic opinion; or (3) needs an individual biological opinion.
3. For projects that qualify for appending to this biological opinion, the Service will evaluate the adequacy of the proposed compensation and provide formal comments to the FHWA and the California Department of Transportation if the review reveals inadequacies.
4. Upon resolution of the outstanding issue(s), the Service will formally append the project to this biological opinion and specify the amount of incidental take exempted, if any, in a letter to the FHWA, with copies to the appropriate California Department of Transportation office.
5. At the quarterly coordination meetings between the Service and the California Department of Transportation, the California Department of Transportation will provide a list of the projects that have been appended, are currently in review, or are expected to be submitted to the Service for inclusion in this programmatic biological opinion, including the County where the proposed project will be conducted and the anticipated temporary and permanent effects. The California Department of Transportation will include status of the conservation measures, progress on restoration of disturbed areas, and acquisition of compensation lands.
6. In the event of changes to the number of seasons or disturbance area, and associated mitigation required, and provided that all other project conditions stay the same, the California Department of Transportation will submit a letter of clarification documenting these changes with a request to amend the originally appended project, including any additional restoration or compensation requirements.

Scope and Duration of the Proposed Action

The FHWA is proposing to append up to 18 proposed projects per year to this programmatic biological opinion. Each project may permanently affect up to 3 acres (total = 54 acres per year through the action area) and temporarily affect up to 20 acres (total = 360 acres per year throughout the action area) for a grand total of 270 acres of snake habitat permanently affected and 1,800 acres of snake habitat temporarily affected during the 5-year term of this proposed action.

Action Area

The action area for this consultation comprises a significant portion of the geographic range of the snake encompassing all or portions of Butte, Colusa, Glenn, Sacramento, San Joaquin, Solano, Sutter, Yolo, and Yuba counties in California. Your April 14, 2003, letter requested that a programmatic biological opinion be issued by the Service for the giant garter snake throughout its range. However, this biological opinion does not include Tehama County where

the animal is at the northern periphery of its distribution, or Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern counties where the species is either in low numbers or possibly has been extirpated.

Definition of Terms Used in this Biological Opinion

Giant Garter Snake Habitat. The snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, other waterways and agricultural wetlands such as irrigation and drainage canals and rice fields, and the adjacent uplands. Essential habitat components consist of: (1) adequate water during the snake's active period (i.e., early spring through mid-fall) to provide a prey base and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat; (3) upland habitat for basking, cover, and retreat sites; and (4) higher elevation uplands for cover and refuge from flood waters (Hansen 1980; Hansen 1988; Brode and Hansen 1992; Hansen and Brode 1993). However, not all four of these components are required for an area to be considered potential snake habitat. For example, the lack of higher elevation uplands on a project site does not preclude the snake's use of the area.

Habitat types found within the snake's range that are not suitable snake habitat include: larger rivers and other water bodies; and wetlands with sand, gravel, or rock substrates; and riparian woodlands (Hansen 1980; Rossman and Stewart 1987; Hansen 1988). The Service further considers the following habitat types unsuitable for the snake because they lack adequate cover, and are subject to frequent disturbance, or are otherwise not expected to be associated with the snake: portions of urban areas (e.g., manicured lawns, paved areas), industrial areas (i.e., paved areas, frequently disturbed areas, tank farms), some agricultural areas (i.e., row crops, small grains (except rice), vineyards, orchards), concrete-lined ditches/canals, forested areas, and paved roads. Unpaved disturbed ruderal areas adjacent to roadways may be suitable upland habitat, as they may be used for basking and/or contain rodent burrows suitable for use by the giant garter snake.

The giant garter snake is an aquatic species that requires both aquatic and upland habitat. Potential habitat is identified by the presence of suitable aquatic habitat; without suitable aquatic habitat, an area is not suitable for the snake. Much of the animal's activity takes place in the uplands surrounding the snake's aquatic habitat. Although the species has been observed to use burrows over 800 feet from its aquatic habitat in the winter, the majority of habitat use occurs much closer to the aquatic habitat (< 200 feet)(Wylie *et al.* 1997). Therefore, for the purpose of this consultation, the Service considers appropriate uplands within 200 feet of the snake's aquatic habitat to be potential snake upland habitat. If the Service determines that the snake may be using uplands at a particular site greater than 200 feet from the aquatic habitat or if new information reveals that uplands greater than 200 feet are more important to the snake than previously thought, the Service will notify FHWA in writing why designating uplands greater than 200 feet from the aquatic habitat is appropriate.

Disturbance Area. Primary disturbance acreage will be determined by the proposed project area. However, disturbance area may exceed the proposed project boundaries because a 200-

foot radius from the edge of snake aquatic habitat is incorporated to include essential habitat components and to determine the extent of potential incidental take of the snake. For example, if snake aquatic habitat is converted to habitat that is no longer suitable for the snake, the surrounding uplands within 200 feet also may be considered affected because the aquatic component of the habitat is no longer available (i.e., if there is no aquatic habitat, there is no upland habitat). When determining the disturbance area, the FHWA, California Department of Transportation, or project applicants should consider: (1) opportunities to avoid snake habitat within the project area; (2) areas of dewatering and the period of time they are dewatered; and (3) the location of temporary haul roads, equipment staging areas, parking areas, and fill, borrow, and fuel sites relative to snake habitat. The 200- foot radius also will be used to evaluate aquatic habitat disturbance during temporary alterations (e.g., upstream and downstream from berms placed for temporary dewatering).

Temporary Effects. Temporary effects are project activities that temporarily remove one or more essential snake habitat components, but can be restored to pre-project conditions of equal or greater habitat value. In order for the effects to be considered temporary, the project must be implemented and the snake habitat restored within two seasons.

Permanent Effects. Permanent effects are those in which project activities result in loss of snake habitat and/or permanently remove one or more essential habitat components. Temporary projects that exceed two seasons to complete (including restoration of habitat) will be considered permanent effects and require compensation equal to permanent effects. Temporary projects that exceed two seasons may partially satisfy the permanent effect ratio described below by completing restoration of the affected habitat. The effects of relocating irrigation/drainage canals are considered permanent, as studies have demonstrated that relocated canals may not be inhabited by snakes for at least four years (Hansen and Brode 1993).

Season. A season is defined as the calendar year period between May 1 and October 1, the active period for the snake when mortality is less likely to occur. Project effects and restoration of habitat should be completed within this period or, if necessary and approved by the Service, within the same calendar year.

Monitoring. The following level of monitoring is assumed unless otherwise specified by the Service: (1) photo documentation of the project site and restoration area included in a report issued when the habitat restoration or creation is completed, what materials were used, plantings (if specified) and justification of any substitutions to the Service-recommended guidelines included in Appendix A; (2) photo documentation of the project site and restoration area and a progress report submitted one year from restoration implementation, or years one, two, and five for created habitat; (3) justification for no further monitoring; and (4) recommendations for remedial actions, as appropriate, and a request for approval from the Service.

Replacement Habitat. Projects that result in Level 2 or Level 3 effects require that “replacement habitat” in the form of habitat creation and/or preservation be provided and protected in perpetuity to compensate for the project’s effects on the snake.

Examples

Example 1. FHWA awards a grant to replace a bridge over a creek in Colusa County. The new bridge is wider than the old bridge and will result in the permanent loss of 0.01 acre of snake aquatic habitat in the creek and 0.02 acre of ruderal snake upland habitat. The widened bridge will require that the bridge approaches be modified. On one side of the bridge, the new approach will be built in a corn field (0.15 acre). On the other side of the bridge, the new approach will be built in a pasture (0.20 acre). Construction activities will temporarily disturb 0.75 acre of ruderal snake uplands and a 2.5 acre rice field will be fallowed for one year to serve as a staging and parking area. Construction and restoration activities will be completed between May 1 and October 1 in one construction season.

In this case, the total area of Level 3 effects is 0.23 acre (0.01 aquatic habitat + 0.02 acre ruderal uplands + 0.2 acre pasture). The total area of Level 1 effects is 3.25 acres (0.75 acre ruderal uplands + 2.5 acres rice). Corn is not considered suitable snake habitat. In order for the proposed project to be appended to the programmatic consultation, Colusa County will provide 0.69 acre of snake habitat (0.23 acre at 3:1) in order to compensate for permanent effects to snake aquatic and upland habitat. Colusa County will also restore the temporarily affected upland areas within one year of the completion of construction and allow the rice field to be farmed the year following disturbance.

Example 2. FHWA funds the correction of a curve in a rural area of Sutter County. The new curve will result in the permanent loss of 1.5 acres of snake aquatic and upland habitat. In addition, several rice fields totaling 18.0 acres will be temporarily fallowed, and construction activities, staging, and parking will result in 5.3 acres of one-season temporary effects to snake upland habitat.

In this case, the amount of Level 1 effects exceeds that allowed under this programmatic consultation. The project proponent should either redesign their project so that it is consistent with this programmatic consultation or consult under a separate biological opinion.

Example 3. FHWA funds the improvement of a freeway interchange in Yolo County. The new interchange will result in the permanent conversion of 1.2 acres of a rice field and require that an irrigation canal totaling 0.4 acre between the existing freeway and rice field be relocated to outside of the new interchange. A 0.05 acre berm is located between the irrigation canal and the rice field. An additional 3.7 acres of snake habitat (ruderal areas and meadow) will be temporarily affected. Construction activities will take one season to complete; however, restoration of the 3.7 acres of temporarily disturbed habitat will not be performed until the second season.

In this case, Level 3 effects to rice habitat totals 1.2 acres. An additional 0.45 acres of Level 3 effects will result from the relocation of the irrigation canal and berm. Level 2 effects equal 3.7 acres. Permanent loss of rice habitat should be compensated at 1:1 (1.2 acres). Permanent loss of aquatic and upland habitat should be compensated at 3:1 (1.35 acres). Level 2 effects to 3.7 acres should be compensated at 1:1 (3.7 acres). Therefore, the total compensation is 6.25 acres. The relocated canal and berm may be used to offset the 6.25 acres of compensation after the amount of compensation required is calculated. Temporally disturbed habitat should be restored within one year of completion of construction.

Example 4. The California Department of Transportation wishes to improve a 2-mile section of a highway in Glenn County. Project activities include culvert repairs/replacements, scour repair, and other drainage improvements. Snake aquatic habitat in the form of irrigation canals is located along four-0.2 mile sections of the proposed work area. A small ruderal upland area 15 feet in width is located between the highway and the irrigation canals. Project activities will result in the permanent conversion of 0.1 acre of aquatic and upland habitat (the ruderal area), as well as temporary disturbance of 0.75 acre of snake upland habitat (the ruderal area). Project activities and restoration will take one season to complete and will be conducted between May 1 and October 1.

In this case, Level 1 effects total 0.75 acre of upland habitat. Level 3 effects total 0.1 acre and should be compensated at a 3:1 ratio (total compensation = 0.3 acre) at a Service-approved conservation bank. Temporally disturbed habitat should be restored within one year of completion of construction.

STATUS OF THE SPECIES

The Service published a proposal to list the snake as an endangered species on December 27, 1991 (U.S. Fish and Wildlife Service 1991). The Service reevaluated the status of the snake before adopting the final rule. The snake was listed as a threatened species on October 20, 1993 (U.S. Fish and Wildlife Service 2003). The *Draft Recovery Plan for the Giant Garter Snake* was issued by the Service in July 1999. Additional information on the species' biology may be found in those documents.

Description

The giant garter snake is one of the largest garter snakes and may reach a total length of at least 54 inches. Females tend to be slightly longer and proportionately heavier than males. The weight of adult female snakes is typically 1.1-1.5 pounds. Dorsal background coloration varies from brownish to olive with a checkered pattern of black spots, separated by a yellow dorsal stripe and two light-colored lateral stripes. Background coloration and prominence of a black-checkered pattern and the three yellow stripes are geographically and individually variable (Hansen 1980). The ventral surface is cream to olive or brown and sometimes infused with orange, especially in northern populations.

Historical and Current Range

This species formerly occurred throughout the wetlands that were extensive and widely distributed in the Central Valley. Fitch (1941) described the historical range of the snake as extending from the vicinity of Sacramento and Contra Costa Counties southward to Buena Vista Lake, near Bakersfield, in Kern County. Prior to 1970, the snake was recorded historically from 17 localities (Hansen and Brode 1980). Five of these localities were clustered in and around Los Banos, Merced County. The paucity of information makes it difficult to determine precisely the species' former range. Nonetheless, these records coincide with the historical distribution of large flood basins, fresh water marshes, and tributary streams. Destruction of wetlands for agriculture and other purposes apparently extirpated the species from the southern one-third of its range by the 1940s -1950s, including the former Buena Vista Lake and Kern Lake in Kern County, and the historic Tulare Lake and other wetlands in Kings and Tulare Counties (Hansen and Brode 1980; Hansen 1980). Surveys over the last two decades have found the snake as far north as the Butte Basin in the Sacramento Valley. As recently as the 1970s, the range of the snake extended from near Burrell, Fresno County (Hansen and Brode 1980), northward to the vicinity of Chico, Butte County (Rossman and Stewart 1987).

Essential Habitat Components

Endemic to wetlands in the Sacramento and San Joaquin valleys, the snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, and other waterways and agricultural wetlands, such as irrigation and drainage canals and rice fields, and the adjacent uplands. The snake feeds on small fishes, tadpoles, and frogs (Fitch 1941; Hansen 1980; Hansen 1988). Essential habitat components consist of: (1) wetlands with adequate water during the snake's active season (early- spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) upland habitat with grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for escape cover (vegetation, burrows) and underground refugia (crevices and small mammal burrows) (Hansen 1980).

Reproductive Ecology

The breeding season extends through March and April, and females give birth to live young from late July through early September (Hansen and Hansen 1990). Brood size is variable, ranging from 10 to 46 young, with a mean of 23 (Hansen and Hansen 1990). At birth, young average about 8.1 inches snout-vent length and 0.10-0.18 ounces. Young immediately scatter into dense cover and absorb their yolk sacs, after which they begin feeding on their own. Although growth rates are variable, young typically more than double in size by one year of age, and sexual maturity averages three years in males and five years for females (U.S. Fish and Wildlife Service 1993).

Movements and Habitat Use

The snake typically inhabits small mammal burrows and other soil crevices throughout its winter dormancy period (November to mid-March). The snake also uses burrows as refuge from extreme heat during their active period. While the snakes usually remain in close proximity to wetland habitats, the Biological Research Division (BRD) of the U.S. Geological Survey has documented snakes using burrows as much as 165 feet away from the marsh edge to escape extreme heat (Wylie *et al.* 1997). Overwintering snakes have been documented to use burrows as far as 820 feet from the edge of marsh habitat. Snakes typically select south- and west-facing burrows as hibernacula (U.S. Fish and Wildlife Service 1993).

In studies of marked snakes in the Natomas Basin, snakes moved about 0.25-0.5 miles per day (Hansen and Brode 1993). However, total activity varies widely between individuals, and individual snakes have been documented moving up to 5 miles over the period of a few days in response to dewatering of habitat (Wylie *et al.* 1997). In agricultural areas, snakes were documented using rice fields in 19-20 percent of the observations, marsh habitat in 20-23 percent of observations, and canal and agricultural waterway habitats in 50-56 percent of the observations (Wylie 1999). Telemetry studies have also shown that active snakes use uplands extensively—more than 31 percent of observations were in uplands (Wylie 1999). Almost all snakes observed in uplands during the active season were near vegetative cover, where cover exceeded 50 percent in the area within 1.6 feet of the snake; less than 1 percent of observations were of snakes in uplands with less than 50 percent cover nearby (Wylie 1999).

Reasons for Decline and Threats to Survival

Ongoing maintenance of aquatic habitats for flood control and agricultural purposes eliminate or prevent the establishment of habitat characteristics required by snakes and can fragment and isolate available habitat, prevent dispersal of snakes among habitat units, and adversely affect the availability of the snake's food items (Hansen 1988; Brode and Hansen 1992). In many areas, the restriction of suitable habitat to water canals bordered by roadways and levee tops renders snakes vulnerable to vehicular mortality. Fluctuation in rice and agricultural production affects stability and availability of habitat. Recreational activities, such as fishing, may disturb snakes and disrupt basking and foraging activities. Nonnative predators, including introduced predatory gamefish, bullfrogs (*Rana catesbeiana*), and domestic cats (*Felis catus*) also threaten snake populations. Although large areas of seemingly suitable snake habitat exist in the form of duck clubs and waterfowl management areas, water management of these areas typically does not provide the summer water needed by snakes. Although snakes on national wildlife refuges are relatively protected from many of the threats to the species, degraded water quality continues to be a threat to the species both on and off refuges. A number of land use practices and other human activities currently threaten the survival of the snake throughout the remainder of its range. Although some snake populations have persisted at low levels in artificial wetlands associated with agricultural and flood control activities, many of these altered wetlands are now threatened with urban development.

Status with Respect to Recovery

The draft recovery plan for the snake subdivided its historic range into four recovery units (U.S. Fish and Wildlife Service 1999). These are: (1) the Sacramento Valley unit, extending from the vicinity of Red Bluff south to the confluence of the Sacramento and Feather Rivers; (2) the Mid-Valley unit, extending from the American and Yolo Basins south to Duck Creek near the City of Stockton; (3) the San Joaquin Valley unit, extending south from Duck Creek to the Kings River; and (4) the South Valley unit, extending south of the Kings River to the Kern River Basin. Portions of Mid-Valley recovery unit are within the action area.

The Sacramento Valley Recovery Unit at the northern end of the species' range is known to support relatively large, stable populations of the snake. This unit contains three populations (Butte Basin, Colusa Basin, and Sutter Basin) and a large amount of suitable habitat, in protected areas on California Department of Fish and Game reserves and refuges of the Sacramento National Wildlife Refuge Complex in the Colusa and Sutter Basins, and along waterways associated with rice farming (U.S. Fish and Wildlife Service 1999).

The Mid-Valley Recovery Unit, directly to the south of the Sacramento Valley Recovery Unit, includes seven populations: American Basin, Yolo Basin–Willow Slough, Yolo Basin–Liberty Farms, Sacramento Area, Badger Creek/Willow Creek, Caldoni Marsh, and East Stockton. The status of the seven snake populations in the Mid-Valley Recovery Unit is uncertain. The East Stockton population may be extirpated, and is not considered recoverable as a result of urban encroachment into habitat (U.S. Fish and Wildlife Service 1999). Five of the remaining six populations within the recovery unit are small, highly fragmented and isolated, and, except for the Badger Creek/Willow Slough population, are also threatened by urbanization. This latter population is within a small isolated area. Within the Mid-Valley unit, only the American Basin population supports a sizeable snake population which is dependent largely upon rice lands.

The remaining two recovery units are located to the south in the San Joaquin Valley, where the best available data indicate that the snake's status is precarious. The San Joaquin Valley Recovery Unit contains three historic snake populations: North and South Grasslands; Mendota Area; and Burrel/Lanare Area (U.S. Fish and Wildlife Service 1999). This recovery unit formerly supported large snake populations, but numbers have declined severely in recent decades, and recent survey efforts indicate numbers are very low compared to Sacramento Valley populations.

No surviving snake populations are known from the fourth recovery unit, the South Valley Recovery Unit, at the southern end of the snake's historic range; this unit includes only extirpated populations, including the historic but lost Tulare and Buena Vista lakes.

The draft recovery criteria require multiple, stable populations within each of the four recovery units, with subpopulations well-connected by corridors of suitable habitat. Currently, only the Sacramento Valley Recovery Unit, at the northern end of the species' range, is known to support relatively large, stable populations. Habitat corridors connecting populations or

subpopulations, even for the Sacramento Valley Recovery Unit, are not present and/or protected.

In 1994, the Biological Research Division (BRD)(then the National Biological Survey) began a study of the life history and habitat requirements of the snake in response to an interagency request from the Service. Since April of 1995, the BRD has further documented occurrences of snakes within some of the known populations. The BRD has studied snake subpopulations at the Sacramento and Colusa NWRs within the Colusa Basin, at Gilsizer Slough within the Sutter Basin, the Badger Creek area of the Cosumnes River Preserve within the Badger Creek-Willow Creek area, and the Natomas area within the American Basin (Wylie *et al.* 1997; Wylie 1999). These subpopulations represent the largest known extant subpopulations. The remaining nine populations identified in the final rule are distributed discontinuously in small isolated patches and are vulnerable to extirpation by stochastic environmental, demographic, and genetic processes. The 13 extant populations are largely isolated from each other, with any dispersal corridors between them limited and not protected. When small populations are extirpated, the recolonization is unlikely in most cases, given the isolation from larger populations and the lack of dispersal corridors between them.

There are numerous recent sightings of the giant garter snake in the action area of this programmatic consultation (California Department of Fish and Game 2004). In addition, suitable habitat exists within the action in the form of marshes, sloughs, ponds, small lakes, low gradient streams, other waterways and agricultural wetlands such as irrigation and drainage canals and rice fields, and the adjacent uplands. Therefore, the Service believes that the giant garter snake is reasonably certain to occur within the action area because of the biology and ecology of the animal, the presence of suitable habitat in and adjacent to the action area, as well as the recent observations of this listed species.

Environmental Baseline

Surveys over the last two decades have located the giant garter snake as far north as the Butte Basin in the Sacramento Valley. Currently, the Service recognizes 13 separate populations of the snake, with each population representing a cluster of discrete locality records (Service 1993). The 13 extant population clusters largely coincide with historical riverine flood basins and tributary streams throughout the Central Valley (Hansen 1980; Brode and Hansen 1992): (1) Butte Basin, (2) Colusa Basin, (3) Sutter Basin, (4) American Basin, (5) Yolo Basin-Willow Slough, (6) Yolo Basin-Liberty Farms, (7) Sacramento Basin, (8) Badger Creek-Willow Creek, (9) Caldoni Marsh, (10) East Stockton-Diverting Canal and Duck Creek, (11) North and South Grasslands, (12) Mendota, and (13) Burrell-Lanare. These populations span the Central Valley from just southwest of Fresno (Burrell-Lanare) north to Chico (Hamilton Slough).

Since April of 1995, the Biological Resources Division (BRD) of U.S. Geological Survey has further documented occurrences of giant garter snakes at the Sacramento, Delevan, and Colusa National Wildlife Refuges within the Colusa Basin, at Gilsizer Slough within the Sutter Basin, at the Badger Creek area of the Cosumnes River Preserve within the Badger Creek-Willow Creek area, and in the Natomas Basin within the American Basin (Wylie 1999, 2001; Wylie *et*

al. 1997, 2000a, 2000b, 2002). These populations of giant garter snakes represent the largest extant populations. The remaining nine population clusters identified in the final rule are distributed discontinuously in small isolated patches and are vulnerable to extirpation by random environmental, demographic, and genetic processes. Until recently, there were no post-1980 sightings of snakes from Stockton and southward, and surveys of historic localities conducted in 1986 did not detect any snakes (U.S. Fish and Wildlife Service 1999). Since 1995, however, surveys conducted by the California Department of Fish and Game in cooperation with BRD in the Grasslands Area in the San Joaquin Valley have detected snakes, but in numbers much lower than those found in the Sacramento Valley populations. These observations indicate that snakes are still extant in at least three locations in the San Joaquin Valley, but probably in extremely low numbers (U.S. Fish and Wildlife Service 1999). All 13 population clusters are isolated from each other with no protected dispersal corridors. Opportunities for recolonization of small populations which may become extirpated is unlikely given the isolation from larger populations and lack of dispersal corridors between them.

A number of State, local, private, and unrelated Federal actions have occurred within the action area and adjacent region affecting the environmental baseline of the species. Some of these projects have been subject to prior section 7 consultation. These actions have resulted in both direct and indirect effects to the giant garter snake and its habitat within the region.

An October 10, 2003, informal review of Service files revealed that the Service has issued biological opinions for 21 projects since 1994 in Butte County (Sacramento Valley Recovery Unit). This review did include many projects such as water transfers/exchanges that often include many species in a large action area; the project types included bridge replacements, highway drainage improvements, fish passage, boat ramp improvements, fiber optic line installations, fire management, habitat enhancement and restoration, irrigation, flood control, a natural gas pipeline, and natural gas exploration.

Twelve biological opinions have been issued for projects in Colusa County (Sacramento Valley Recovery Unit); the project types included flood control, bridge replacements, irrigation, fish passage, road improvements, habitat restoration and enhancement, natural gas exploration, a natural gas pipeline, and a power plant.

Six biological opinions have been issued for Glenn County (Sacramento Valley Recovery Unit); the project types included fish passage, irrigation, habitat restoration and enhancement, and natural gas exploration.

Sixty-six biological opinions have been issued for projects in Sacramento County (Sacramento Valley and Mid-Valley Recovery Units); the project types included flood control, urban development, bridge replacement and repairs, a golf course, flood control, road improvements, interceptor pipelines, a habitat conservation plan, pest management, habitat restoration and enhancement, geotechnical borings, gas pipelines, a cellular communication tower, and a power plant.

Fifteen biological opinions have been issued for projects in San Joaquin County (San Joaquin and Mid-Valley Recovery Units); the project types included: flood control, sewer repair,

railroad, riparian brush rabbit propagation, dredging, gas pipeline, invasive species control, bridge replacements, urban development, and habitat restoration and enhancement.

Five biological opinions have been issued for projects in Solano County (Mid-Valley Recovery Unit); the project types included: habitat restoration and enhancement, flood control, gas pipeline, and invasive species control.

Nineteen biological opinions have been issued for projects in Sutter County Sacramento Valley and Mid-Valley Recovery Units); the project types included: bridge replacements, a power plant, flood control, geotechnical borings, habitat restoration and enhancement, fish passage, road improvements, and a habitat conservation plan.

Twenty-five biological opinions have been issued for projects in Yolo County (Sacramento Valley and Mid-Valley Recovery Units); the project types included: utility lines, flood control, irrigation, road improvements, a gas pipeline, bridge replacements, habitat restoration and enhancement, railway improvements, invasive species control, and fish passage.

Seven biological opinions have been issued for projects in Yuba County (Mid-Valley Recovery Unit); the project types included flood control, road improvements, a sewage pipeline, and habitat restoration and enhancement.

Ongoing agricultural activities also affect the environmental baseline for the snake, and are largely not subject to section 7 consultation. Some agriculture, such as rice farming, can provide valuable seasonal foraging and upland habitat for the snake. Although rice fields and agricultural waterways can provide habitat for the snake, agricultural activities such as waterway maintenance, weed abatement, rodent control, and discharge of contaminants into wetlands and waterways can degrade snake habitat and increase the risk of snake mortality (U.S. Fish and Wildlife Service 1999). Ongoing maintenance of agricultural waterways can also eliminate or prevent establishment of snake habitat, eliminate food resources for the snake, and can fragment existing habitat and prevent dispersal of snakes (U.S. Fish and Wildlife Service 1999). Flood control and maintenance activities which can result in snake mortality and degradation of habitat include levee construction, stream channelization, the riprapping of streams and canals (U.S. Fish and Wildlife Service 1999) and water transfers/ exchanges.

Effects of the Action

Proposed projects appended to this programmatic biological opinion are likely to have a variety of direct effects on the snake. Essential behavior patterns such as breeding, feeding, and sheltering are likely to be disrupted to the point of causing the injury or death of snakes by factors such as vibration (noise), and human disturbance from construction activities in areas of snake-occupied habitat. For example, vibrations produced by construction equipment could cause snakes to flee across roads and be run over and killed by cars. The destruction, disturbance, or conversion of snake aquatic, rice, or upland habitat could cause harm to snakes by interfering with essential behavior patterns. Construction activities could remove vegetative cover and basking sites necessary for thermoregulation, or fill or crush burrows or crevices

necessary for retreat and overwintering sites. Because snakes use small mammal burrows and soil crevices for shelter, snakes could be crushed, buried, or otherwise injured during construction activities. Snakes could also be run over by construction equipment or other vehicles accessing the construction areas. Implementation of certain types of erosion control materials, such as plastic netting, could result in the entanglement and death of giant garter snakes within these materials (Stuart *et al.* 2001). Silting, fill, or spill of petroleum products or other chemicals could cause death or injury to the giant garter snake, or loss of its prey in or adjacent to the project area. Bisecting or directly filling rice fields could result in the loss of foraging habitat for the snake, interrupt movement corridors, and remove basking areas on berms and check levees.

Proposed projects appended to this programmatic biological opinion are also likely to indirectly affect the snake. Disturbance caused by construction activities could cause snakes to disperse into areas of unsuitable habitat, increasing the risk of injury or death from factors such as predation, and interspecific and intraspecific competition. Decreased water quality from run-off associated with project construction and subsequent vehicle use could adversely affect snakes, decrease the snake's prey base, affect the growth of emergent aquatic vegetation, etc. Increased traffic levels could cause snakes to flee the project area for less-disturbed habitats.

Projects contemplated under this programmatic biological opinion are anticipated to take place during the snake's active season, May 1 to October 1. During this period, direct effects are lessened because snakes are actively moving and avoiding danger. Projects occurring outside this period will have greater effects on the snake since the snake is less likely to actively avoid danger, and its essential feeding, reproductive, and sheltering behaviors may be disrupted. Dispersal from wintering sites and breeding occurs from mid-March through April. Snakes are more vulnerable when they first become active. After the winter inactive period, initial successful foraging is critical to reproductive success, particularly for breeding females, and to juvenile survival. Snakes are also seeking mates and breeding at this period. Disturbance during this time may lessen reproductive success. Snakes begin their winter inactive period in October. Snakes are vulnerable during their inactive period when they are occupying burrows and soil crevices because they are unlikely to leave their retreat sites and may be crushed, trapped, or buried during movement of heavy equipment or excavation.

The FHWA is proposing to append up to 18 proposed projects per year to this programmatic biological opinion. Each project may permanently affect up to 3 acres (total = 54 acres per year throughout the action area) and temporarily affect up to 20 acres (total = 360 acres per year throughout the action area) for a grand total of 270 acres of snake habitat permanently affected and 1,800 acres of snake habitat temporarily affected during the 5-year term of this proposed action.

Under the design criteria included as part of the proposed action these adverse effects will be offset by: (1) restoration of temporarily affected snake habitat to pre-project conditions within the same season or, at most, within one season of completion of construction, (2) creation or preservation of functional snake habitat at a 1:1 or greater ratio relative to permanently affected snake habitat; and (3) management of restored, created, or preserved snake habitat in perpetuity.

Based on the beneficial effects to the snake associated with the proposed compensation program, the Service concludes that the anticipated adverse effects associated with the proposed action are likely to be small in magnitude and short in duration, and that the beneficial effects will enhance the snake's ability to persist within the action area.

Based on previous biological opinions, many of the projects that the FHWA is contemplating, such as bridge replacements, often permanently affect less than 1 acre of snake habitat. The FHWA proposes to append specific projects with relatively small effects on the snake to this programmatic biological opinion including, but not limited to: bridge rehabilitation or replacement, drainage improvements, scour repair, culvert repairs or extensions or replacements, roadway and shoulder widening, curve corrections, interchange improvements or construction, over-crossings, and, in limited circumstances, emergency repair projects.

Because the proposed action will expedite projects that do not exceed 3 acres of permanent effects to snake habitat, it may encourage applicants to avoid greater effects that would require a lengthier permit process. Projects that conform to the requirements of the proposed action are likely to contribute to snake recovery through the management of restored, created, or preserved snake habitat. Occupied habitat protected under conservation easements will provide population components that are not threatened by the factors that contributed to the listing of the species. The Service anticipates that habitat restoration and enhancement now will lead to the development of protected snake habitat areas distributed across the landscape. Local communities can use these preserved areas as foundations for future habitat conservation plans.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Because the snake inhabits wetlands and adjacent uplands in highly modified portions of the Central Valley, the Service anticipates that a wide range of activities will affect this species. An undetermined number of future land use conversions and routine agricultural practices are not subject to Federal permitting processes and may convert or otherwise alter habitat or disturb, kill, or injure snakes. These cumulative effects include: (1) fluctuations in acres of aquatic habitat due to water management or acres of ricelands in production; (2) diversion of water; (3) levee repairs; (4) riprapping or lining of canals and stream banks; (5) dredging, clearing, and spraying to remove vegetation from irrigation canals; (6) disking, mowing, clearing and spraying vegetation adjacent to canals and streams; (7) use of burrow fumigants on levees and other potential upland refugia; (8) release of contaminated runoff from agriculture and urbanization; (9) use of plastic erosion control netting; (10) use of herbicides and pesticides in ricelands and other agricultural lands that provide snake habitat, or which are adjacent to and/or drain into snake habitat; (11) increased vehicular traffic on roads and levees; (12) human intrusion into habitat; and (13) predation by feral animals and pets.

Conclusion

After reviewing the current status of the giant garter snake, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the FHWA's action, as proposed, is not likely to jeopardize the continued existence of this species. No critical habitat has been proposed or designated for the snake; therefore, none will be affected.

The Service reached this conclusion because the net effect of the proposed action is compatible with the conservation needs of the snake. Adverse effects associated with the proposed action are likely to be small in magnitude and duration given the snake habitat restoration, creation, and preservation requirements also associated with the proposed action. Projects that conform to the requirements of the proposed action are likely to contribute to snake recovery through the management of restored, created, or preserved snake habitat. Occupied habitat protected under conservation easements will provide population components that are not threatened by the factors that contributed to the listing of the species. The Service anticipates that habitat restoration and enhancement at sites affected by the proposed action will lead to the development of protected snake habitat areas distributed across the landscape.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by the FHWA so that they become binding conditions of any grant or permit issued to the applicants, as appropriate, in order for the exemption in section 7(o)(2) to apply. The FHWA has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the FHWA: (1) fails to require the applicant to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

The Service anticipates incidental take of the snake will occur for the reasons described above in the "Effects of the Action" section. Giant garter snakes are secretive and highly sensitive to human activities. Individual snakes are difficult to detect unless they are observed, undisturbed, at a distance. Most close-range observations represent chance encounters that are difficult to predict. The Service anticipates that up to 18 roadway projects per year will be appended to this programmatic biological opinion. Each project may permanently affect up to 3 acres (total = 54 acres per year throughout the action area) and temporarily affect up to 20 acres (total = 360 acres per year throughout the action area) for a grand total of 270 acres of snake habitat permanently affected and 1,800 acres of snake habitat temporarily affected during the 5-year term of this proposed action. Upon implementation of reasonable and prudent measures, incidental take associated with the Proposed Action on the giant garter snake, in the form of harm and/or harassment from loss of habitat noted above, or direct injury or mortality of two (2) giant garter snakes, will become exempt from the prohibitions described under section 9 of the Act for direct and indirect effects.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the snake; critical habitat has not been proposed or designated for this species, therefore, none will be adversely modified or destroyed.

Reasonable and Prudent Measures

The exemption provided herein is effective for specific projects that are developed in accordance with the design criteria set forth in the *Description of the Proposed Action* section above when they are appended to this biological opinion and a specific amount of take is determined. Reasonable and Prudent Measures, Terms and Conditions, can be found in Appendices A-D, and will be implemented as applicable to the work description of the project being appended.

Reporting Requirements

A Service-approved biologist, which includes California Department of Transportation staff biologists experienced with giant garter snake natural history, shall notify the Service immediately if a giant garter snake is found on site of a project appended to this biological opinion, and will submit a report including date(s), location(s), habitat description, and any corrective measures taken to protect the snake(s) found. The Service-approved biologist shall submit this locality and ecological information to the Natural Diversity Data Base of the California Department of Fish & Game, using California Native Species Field Survey Forms, no more than 30 calendar days after completing the last field visit of the project site. Each form shall have an accompanying scale map of the site, such as an appropriate 7.5 minute U.S. Geological Survey map, and shall provide at least the following information: township, range, and quarter section; name of the 7.5' or 15' quadrangle; dates (day, month, year) of field work;

number of individuals and life stage (where appropriate) encountered; and a description of the habitat by community-vegetation type. The address of the Natural Diversity Data Base is 1807 13th Street Room 202, Sacramento, California 95814.

The Service Law Enforcement Division is to be notified immediately upon the discovery of an injured or dead snake or unanticipated harm to this species, or the unauthorized take of any other listed species. Injured giant garter snakes should be cared for by a licensed veterinarian or other person(s) approved by the Service; in the case of a dead animal, the individual animal shall be preserved, as appropriate, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen or the Service takes custody of the specimen. Notification must include the date, time, and location of the incident or the finding of a dead or injured animal. The Service contact person is Scott Heard, Resident Agent-in-Charge of the Service's Law Enforcement Division at 916/414-6660. The Chief of the Endangered Species Division (Central Valley) at the Sacramento Fish and Wildlife Office also should be notified at 916/414-6600.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and databases. The Service has the following recommendations:

1. The FHWA and the California Department of Transportation should incorporate culverts, tunnels, or bridges on highways and other roadways to allow safe passage by the giant garter snake, California tiger salamander, San Joaquin kit fox, other listed animals, and sensitive species.
2. The FHWA and the California Department of Transportation should work with the Service to address significant, unavoidable environmental effects resulting from projects proposed by non-Federal parties.
3. The FHWA and the California Department of Transportation should assist the Service in implementing the draft, and, when completed, the final recovery plan for the snake.

For the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

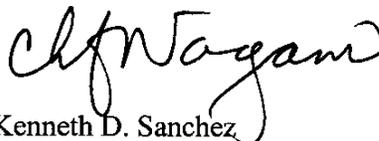
REINITIATION NOTICE

This concludes formal programmatic consultation on minor transportation projects that affect the threatened giant garter snake within Butte, Colusa, Glenn, Sacramento, San Joaquin,

Solano, Sutter, Yolo, and Yuba counties, California. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions about this programmatic biological opinion on minor transportation projects that affect the threatened giant garter snake within Butte, Colusa, Glenn, Sacramento, San Joaquin, Solano, Sutter, Yolo, and Yuba counties, California biological opinion, please contact the Chief of our Sacramento Valley Branch, or the Chief of our Endangered Species Division (Central Valley) at the letterhead address or at 916/414-6600.

Sincerely,


Kenneth D. Sanchez
Acting Field Supervisor

Attachments

- 1) Information that should be included with Requests for Initiation of Programmatic Formal Consultation on Projects with Effects to Giant Garter Snake Appendix A
- 2) Standard Avoidance and Minimization Measures During Construction Activities in Giant Garter Snake Habitat Appendix B
- 3) Guidelines for Restoration and/or Replacement of Giant Garter Snake Habitat Appendix C
- 4) Information to include in a Construction Monitoring Report for Giant Garter Snake Appendix D

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**Appendix A – FHWA GGS Programmatic Biological Opinion
Guidelines for Restoration and/or
Replacement of Giant Garter Snake Habitat**

Replacement and Restoration Guidelines are provided together, as the two conservation measures may not be mutually exclusive. Replacement of habitat may also require restoration of some areas. Preserved habitat may additionally be improved for giant garter snake by using some of the restoration guidelines.

Reference sites

A nearby reference site should be chosen both for restoration of giant garter snake habitat and for creation of replacement habitat. The reference site will be used to determine the success of conservation efforts. For restoration of habitat, the pre-project condition may be used as a reference site if adequate documentation exists. For creation of replacement habitat or for restoration where pre-project conditions are not documented, the reference site should be nearby or adjacent and should represent high quality giant garter snake habitat.

Restoration of giant garter snake habitat

Restoration may include incorporating some of the Replacement guidelines to enhance habitat value for giant garter snake. Restoration should follow the guidelines outlined below:

1. Restoring giant garter snake habitat includes minimizing impacts of project activities to the existing habitat, including using silt fencing, designating environmentally sensitive areas, using protective mats, preventing runoff, and providing worker awareness training. Measures to minimize impacts include:
 - a. Avoid construction activities within 200 feet from the banks of giant garter snake aquatic habitat. Confine movement of heavy equipment to existing roadways to minimize habitat disturbance.
 - b. Construction activity within habitat should be conducted between May 1 and October 1. This is the active period for giant garter snakes and direct mortality is lessened, because snakes are expected to actively move and avoid danger. Between October 2 and April 30 contact the Service's Sacramento Fish and Wildlife Office to determine if additional measures are necessary to minimize and avoid take.
 - c. Confine clearing to the minimal area necessary to facilitate construction activities. Flag and designate avoided giant garter snake habitat within or adjacent to the project area as Environmentally Sensitive Areas. This area should be avoided by all construction personnel.

- d. Construction personnel should receive Service-approved worker environmental awareness training. The Service approves of this awareness training when given by Caltrans biologists experienced in giant garter snake natural history. This training instructs workers to recognize giant garter snakes and its habitat(s).
 - e. 24-hours prior to construction activities, the project area should be surveyed for giant garter snakes. Survey of the project area should be repeated if a lapse in construction activity of two weeks or greater has occurred. If a snake is encountered during construction, activities shall cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. Report any sightings and any incidental take to the Service immediately by telephone at (916) 414-6600.
 - f. Any dewatered habitat should remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.
2. Remove all construction debris and stockpiled materials.
 2. Regrade area to preexisting contour, or a contour that would improve restoration potential of the site.
 3. Replant and hydroseed the restoration area. Recommended plantings consist of a) wetland emergents, b) low-growing cover on or adjacent to banks, and c) upland plantings/hydroseeding mix to encourage use by other wildlife. Riparian plantings are not appropriate because shading may result in lack of basking sites. Native plantings are encouraged except where non-natives will provide additional values to wildlife habitat and will not become invasive in native communities. The applicant should obtain cuttings, plantings, plugs, or seeds, from local sources wherever possible. The applicant should attempt to restore conditions similar to that of adjacent or nearby habitats.
 - a. Emergent wetland plants recommended for giant garter snake habitat are California bulrush (*Scirpus californicus*), cattail (*Typha* spp.), and water primrose (*Ludwigia peploides*). Additional wetland plantings may include common tule (*Scirpus acutus*), Baltic rush (*Juncus balticus*), or duckweed (*Lemna* spp.).
 - b. Cover species on or adjacent to the bank may include California blackberry (*Rubus vitifolius*) or wild grape (*Vitis californica*), along with the hydroseeding mix recommended below.
 - c. Upland plantings/hydroseeding mix: Disturbed soil surfaces such as levee slopes should be hydroseeded to prevent erosion. The Service recommends a mix of at least 20-40 percent native grass seeds [such as annual fescue (*Vulpia* spp.), California brome (*Bromus carinatus*), blue

wildrye (*Elymus glaucus*), and needle grass (*Nassella* spp.)), 2-10 percent native forb seeds, five percent rose clover (*Trifolium hirtum*), and five percent alfalfa (*Medicago sativa*). Approximately 40-68 percent of the mixture may be non-aggressive European annual grasses [such as wild oats (*Avena sativa*), wheat (*Triticum* spp.), and barley (*Hordeum vulgare*)]. The Corps will not include aggressive non-native grasses, such as perennial ryegrass (*Lolium perenne*), cheatgrass (*Bromus tectorum*), fescue (*Festuca* spp.), giant reed (*Arundo donax*), medusa-head (*Taeniatherum caput-medusae*), or Pampas grass (*Cortaderia selloana*) in the hydroseed mix. The Caltrans will not include endophyte-infected grasses in the mix. Mixes of one-hundred percent native grasses and forbs may also be used, and are encouraged.

Replacement of giant garter snake habitat

Location

Replacement location should be within the same population cluster boundaries (population clusters are defined in 58 FR 54053) as the habitat lost. For example: The boundaries of the Sacramento Basin population cluster are approximately, Highway 16 to the north, Sacramento River to the west, Twin Cities Road to the south, and the Folsom Aqueduct to the east. Habitat lost within this area must also be replaced within this area.

Habitat components

Giant Garter Snake Habitat. The giant garter snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, other waterways and agricultural wetlands such as irrigation and drainage canals and rice fields, and the adjacent uplands. Essential habitat components consist of (1) adequate water during the snake's active period, (early spring through mid-fall) to provide a prey base and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat; (3) upland habitat for basking, cover, and retreat sites; and (4) higher elevation uplands for cover and refuge from flood waters. For the purposes of this programmatic opinion, a basic giant garter snake habitat unit will incorporate 2.00 acres (0.81 hectares) of surrounding upland for every 1.00 acre (0.40 hectare) of aquatic habitat. The 2.00 acres (0.81 hectares) of upland also may be defined as 218 linear feet (66 meters) of bankside habitat which incorporates adjacent uplands to a width of 200 feet (61 meters) from the edge of the bank.

Replacement habitat must provide the above mentioned essential habitat components and include the following:

1. All replacement habitat must include both upland and aquatic habitat components. Upland and aquatic habitat components must be included in the replacement habitat at a ratio of 2:1 upland acres to aquatic acres

2. A semi-permanent or permanent aquatic habitat which provides water during the active period for giant garter snakes (April through October) with suitable vegetative cover present. Linear or meandering channels with slow flowing water over mud or silt substrate are preferred.
3. Upland basking and retreat sites with low growing vegetation cover adjacent to aquatic habitat, and upland retreats and flood refugia with partially buried broken concrete or animal burrows.
4. Small fish and amphibian larvae for foraging, but predatory "gamefish" (bass, *Micropterus* spp.; sunfish, *Lepomis* spp.; catfish, *Ictalurus* spp. and *Ameiurus* spp.) absent or controlled.
5. An adequate buffer (at least 200 feet) from roadways to reduce vehicular mortality.
6. Follow planting recommendation provided above under restoration guidelines.

Monitoring

Habitat restoration

Restoration of habitat should be monitored for one year following implementation. Monitoring reports documenting the restoration effort should be submitted to the Service: (1) upon completion of the restoration implementation; and (2) one year from restoration implementation. Monitoring reports should include photodocumentation, when restoration was completed, what materials were used, plantings (if specified) and justification of any substitutions to the Service recommended guidelines. Monitoring reports should also include recommendations for remedial actions and approval from the Service, if necessary, and justification from release of any further monitoring, if requested.

Creation of replacement habitat

Replacement habitat should be monitored for 5 years following implementation. Hydrology should be monitored for the first two years after creation of wetlands. The monitoring effort should continue for three additional years to ensure success criteria are met. Monitoring reports documenting implementation of conservation measures should be submitted to the Service: (1) upon completion of wetland creation; (2) yearly for the first two years of monitoring; and (3) 5 years from implementation. Monitoring reports should include photodocumentation, when restoration was completed, what materials were used, plantings (if specified) and justification of any substitutions to the Service recommended guidelines. Monitoring reports should also include recommendations for remedial actions and approval from the Service, if necessary, and justification from release of any further monitoring, if requested.

Success criteria for replacement habitat:

1. At completion of monitoring, the cover measured on the habitat area should be 90 percent of cover measured on the reference site.
2. At completion of monitoring, the species composition measured on the habitat area should be 90 percent of that measured on the reference site.
3. At completion of monitoring, wetlands created on the site should meet U.S. Fish and Wildlife Service wetlands criteria.

Maintenance and management of replacement giant garter snake habitat

1. A final management plan of replacement habitat must be approved by the Service.
2. All maintenance activities should follow Standard Avoidance and Minimization Measures During Construction Activities in Giant Garter Snake Habitat.
3. Additional guidance includes:
 - a. Canal Maintenance - Hand clearing of canals is preferred for removal of excessive vegetation or debris. Any equipment should be operated from the bank top. Excavate from only one side of the canal during a given year. Avoid excavating the banks above the high water level. Preferably, one side of the canal should be left undisturbed indefinitely (the preferred side would be the west or north side) so that emergent vegetation and bank side cover is left in place.
 - b. Place the spoils from canal clearing in a designated location, rather than along bank tops. This will prevent burying or crushing snakes basking on the banks, or trapping snakes taking cover in burrows or bank-top soil crevices.
 - c. Vegetation control - Uplands should not be disced. Leave vegetation on levees and canal sides wherever possible. Mowing to control vegetation should take place July through September and mower blades should be raised at least six inches to avoid injuring snakes and to leave some grassy cover.
 - d. Traffic - Control vehicle access to avoid vehicular mortality of giant garter snakes.
4. Use a water maintenance regime that will maintain some open water to provide vegetated edge for giant garter snake to forage along.
5. Eradicate/control non-natives and invasive exotics.

Compatible uses of giant garter snake replacement habitat:

Rice farming is a compatible land use for adjacent properties.

Uses of giant garter snake replacement habitat that are incompatible with the habitat of giant garter snake, or represent threats to giant garter snakes include row cropping on uplands, orchards on uplands, OHV (off-highway vehicle) use, and combining with riparian habitat creation which requires dense cover or SRA (shaded riverine aquatic) habitat.

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Appendix B – FHWA GGS Programmatic Biological Opinion
Items Necessary for the Service to Complete Formal Consultation
on Projects with Impacts to Giant Garter Snake

1. A description of the specific area that may be affected by the action, including:
 - a. Precise location of the project site clearly delineated on either an original or high quality copy of a U.S. Geological Survey topographic map (exact scale, 7.5 minute, 1" = 2,000 ft.). The map should include quad name(s), county name(s), legal location, and project name.
 - b. Area (in acres) affected by the proposed project, including total area of the project, estimated area of giant garter snake habitat filled/destroyed, and estimated area of habitat temporarily disturbed. Also include linear feet of bank habitat disturbed and linear feet of aquatic habitat (canal, waterway, marsh) dewatered, filled, excavated, or cleared of vegetation. Giant garter snake habitat includes both aquatic and upland habitats. Aquatic habitat may be seasonal or perennial marshes, sloughs, ponds, small lakes, low gradient streams, and irrigation and drainage canals.
 - c. Detailed map of proposed project site in addition to the location map specified above. This map should include the following items: potential habitat of giant garter snake on-site, and on adjacent property where habitat crosses property boundary, location and type of potential impacts (i.e., buildings, other structures, roads, riprap, staging areas, haul roads, stockpiling areas, borrow sites) on proposed site, and other listed or proposed species locations/habitats.
 - d. Detailed map of the location of any proposed habitat restoration and/or replacement, including distance from the project site and proximity to existing habitat.
2. A description of the action to be considered, including:
 - a. Any dewatering and time period of dewatering.
 - b. Project schedule/timing of project.
 - c. Type of project by category (development, conservation banking, utilities or infrastructure project).
 - d. Any grading, dredging, excavation, or clearing of vegetation required.
3. A description of all listed species or critical habitat that may be affected by the action. Projects may affect more than one federally listed or proposed species, and may require consultation on more than one species. Including an evaluation of the potential effects of the action on listed and proposed species will give the Service the opportunity to concur with the Federal Highway Administration's and Caltrans' determination, or to recommend formal consultation. If the action may

affect a listed or proposed species, but is not likely to adversely affect the species, the Service will include this determination with completion of the formal consultation on giant garter snake. If formal consultation is required on other species in addition to giant garter snake, the Service will work with Caltrans to include all necessary species into the formal consultation process.

4. A description of the manner in which the action may affect any listed species or critical habitat and an analysis of any cumulative effects:
 - a. Analysis of direct and indirect effects.
 - b. Analysis of cumulative effects will include:
 - i. A list of non-Federal actions reasonably certain to occur in the project area, quantifying permanent and temporary impacts to giant garter snake habitat.
 - ii. A brief synopsis of list of non-Federal actions as noted above.
 - iii. Sources of information would be city and county planners, general plans, various environmental documents, website reviews, and state agency contacts.
 - c. Include any conservation measures, including restoration and/or replacement of habitat and other measures, that the applicant proposes to avoid and minimize the effects of take on the snake. Proposed conservation measures should include monitoring and management plans for restored and replacement habitat. **To expedite consultation, such plans and measures should be developed during the informal consultation process with the Service.**
5. Relevant reports, including any environmental impact statement, environmental assessment, or biological assessment.
6. Any other relevant available information.

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Appendix C – FHWA GGS Programmatic Biological Opinion
Standard Avoidance and Minimization Measures During Construction Activities in
Giant Garter Snake (*Thamnophis gigas*) Habitat

HABITAT TYPE:

Marshes, sloughs, ponds, small lakes, low gradient streams, irrigation and drainage canals, and rice fields. Permanent aquatic habitat, or seasonally flooded during the snake's active season (early-spring through mid-fall), with herbaceous wetland vegetation, such as cattails and bulrushes, grassy banks (often salt grass), and uplands for cover and retreat sites during the snake's active season and for refuge from flood waters during the dormant season (winter). Giant garter snakes are typically absent from larger rivers because of lack of suitable habitat, and from wetlands with sand, gravel, or rock substrates. Some riparian woodlands may not provide suitable habitat because of excessive shade, lack of basking sites, and absence of giant garter snake prey.

AVOIDANCE AND MINIMIZATION MEASURES:

1. Avoid construction activities within 200 feet from the banks of giant garter snake aquatic habitat. Confine movement of heavy equipment to existing roadways to minimize habitat disturbance.
2. Construction activity within habitat should be conducted between May 1 and October 1. This is the active period for giant garter snakes and direct mortality is lessened, because snakes are expected to actively move and avoid danger. Between October 2 and April 30 contact the Service's Sacramento Fish and Wildlife Office to determine if additional measures are necessary to minimize and avoid take.
3. Confine clearing to the minimal area necessary to facilitate construction activities. Flag and designate avoided giant garter snake habitat within or adjacent to the project area as Environmentally Sensitive Areas. This area should be avoided by all construction personnel.
4. Construction personnel should receive Service-approved worker environmental awareness training. Awareness training may be given by Caltrans biologists who have experience in giant garter snake natural history. This training instructs workers to recognize giant garter snakes and their habitat(s).
5. 24-hours prior to construction activities, the project area should be surveyed for giant garter snakes. Survey of the project area should be repeated if a lapse in construction activity of two weeks or greater has occurred. If a snake is encountered during construction, activities shall cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. Report any sightings and any incidental take to the Service immediately by telephone at (916) 414-6600.

6. Any dewatered habitat should remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.
7. After completion of construction activities, remove any temporary fill and construction debris and, wherever feasible, restore disturbed areas to pre-project conditions. Restoration work may include such activities as replanting species removed from banks or replanting emergent vegetation in the active channel.
8. Follow the conservation measures in Table 1 to minimize the effects of loss and disturbance of habitat on giant garter snakes. Replacement ratios are based on the acreage and on the duration of disturbance.

TABLE 1 - SUMMARY OF GIANT GARTER SNAKE CONSERVATION MEASURES

	EFFECTS: DURATION	EFFECTS: ACRES	CONSERVATION MEASURE: COMPENSATION
LEVEL 1	1 season	Will not exceed 20 and temporary	Restoration
LEVEL 2	2 seasons	Will not exceed 20 and temporary	Restoration plus 1:1 replacement
LEVEL 3	More than 2 seasons and temporary	Will not exceed 20 and temporary	3:1 Replacement (or restoration plus 2:1 replacement)
	Permanent loss	Will not exceed 3 acres total giant garter snake habitat AND Less than 1 acre aquatic habitat	3:1 Replacement

Giant garter snake habitat includes 2.0 acres of surrounding upland habitat for every 1.0 acre of aquatic habitat. The 2.0 acres of upland habitat also may be defined as 218 linear feet of bankside habitat which incorporates adjacent uplands to a width of 200 feet from the edge of each bank. Each acre of created aquatic habitat should be supported by two acres of surrounding upland habitat. Compensation may include creating upland refuges and hibernacula for the giant garter snake that are above the 100-year flood plain.

A season is defined as the calendar year period between May 1 and October 1, the active period for giant garter snake when mortality is less likely to occur.

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Appendix D: FHWA GGS Programmatic Biological Opinion

Information to Include in Monitoring Reports for the Giant Garter Snake

1. Date
2. Surveyor
3. Project information (Please include the following):
 - a. Project name
 - b. Location
 - c. Project effects and acres affected
4. Survey information (should include the following):
 - a. Time of day
 - b. Temperature at start and end of survey. Include ambient temperature, temperature at ground level, and at approximately 3 inches above ground level.
 - c. Weather conditions (include wind conditions and cloud cover)
 - d. Acres/area surveyed
5. Site description (may include the following):
 - a. Habitat types present, substrate/soils, etc.
 - b. Topography/elevation
 - c. Surrounding land-use/activity
 - d. Description of project features
6. Habitat characteristics:
 - a. Burrows/potential hibernacula present? (Y/N)
 - b. Amount and type of cover present, including upland and emergent vegetation
 - c. Prey species present? (Y/N)
 - d. Distance to nearest available habitat
 - e. Other species observed
7. Giant garter snakes present? (Y/N) If observed provide the following information:
 - a. Number of individuals, and if possible to determine, whether juveniles or adults
 - b. Location(s)

- c. Describe behavior and activity
 - d. Describe protective measures implemented
8. Describe on site minimization and avoidance measures implemented (fencing, dewatering, worker awareness training, etc.). Include any difficulties implementing measures and corrective measures taken.

Please report all sightings to the US Fish and Wildlife Service, Sacramento Fish and Wildlife Office at 916/414-6600, and to the California Department of Fish and Game. The monitoring biologist also should submit all sightings to California Department of Fish and Game Natural Diversity Data Base using a California Native Species Field Survey Form.