Appendix D

USFWS Biological Opinion

United States Department of the Interior

FISH AND WILDLIFE SERVICE
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In reply refer to:
1-1-05-F-0102

JUL 1 2005

Mr. Gene Fong
Division Administrator
Federal Highway Administration
650 Capitol Mall, Suite 4-100
Sacramento, California 95814

Subject: Review of the Proposed State Route 70 Widening and Ophir Road Interchange Project (Federal Highway Administration File Number 03-But-70 KP, 16.2/21.8 (PM 10.0/13.6), Document Number P52099), Butte County, California

Dear Mr. Fong:

This is in response to the Federal Highway Administration's (FHWA) request for formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed State Route 70 Widening and Ophir Road Interchange project (proposed project) in Butte County, California. Your March 25, 2005, request was received by the Service on March 31, 2005. This document represents the Service's biological opinion on the effects of the action on the threatened giant garter snake (*Thamnophis gigas*) (snake), the threatened vernal pool fairy shrimp (*Branchinecta lynchi*), the endangered vernal pool tadpole shrimp (*Lepidurus packardi*) (vernal pool crustaceans), and the threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (beetle), in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act).

The Service concurs with the FHWA's determination that the proposed project is not likely to adversely affect the threatened California red-legged frog (*Rana aurora draytonii*), the endangered Butte County meadowfoam (*Limnanthes floccose* ssp. *californica*), the endangered Greene's tuctoria (*Tuctoria greenei*), the endangered hairy Orcutt grass (*Orcuttia pilosa*), the threatened slender Orcutt grass (*Orcuttia tenuis*), and the threatened Hoover's spurge (*Chamaesyce hooveri*). Protocol level special-status plant surveys were performed by the California Department of Transportation (Caltrans) and no federally-listed plant species were detected. In addition, protocol level surveys for the California red-legged frog were performed and the species was not detected.

The findings and recommendations in this consultation are based on: (1) the *State Route 70 Freeway Extension and Ophir Road Interchange Project Biological Assessment*, dated March 2005; (2) a site visit on May 3, 2005, attended by Rick Kuyper of the Service and Caroline Warren of Caltrans; (3) the June 6, 2005, letter from Caltrans to the Service providing additional information for the proposed project; and (4) other information available to the Service.

Consultation History

March 25, 2005. FHWA requested formal consultation with the Service for the State Route 70 Widening and Ophir Road Interchange project.

April 15, 2005. The Service requested additional information regarding the proposed project's potential effects to the federally-listed snake, beetle, and vernal pool crustaceans.

April 18, 2005. Caroline Warren of Caltrans provided a map of vernal pool crustacean habitat within the proposed project site to Rick Kuyper.

May 3, 2005. A site visit was attended by Rick Kuyper and Caroline Warren of Caltrans.

June 7, 2005. The Service received the June 6, 2005, letter from Caltrans regarding additional information on the proposed project's potential effects to the federally-listed snake, beetle, and vernal pool crustaceans.

June 8, 2005. Rick Kuyper provided a draft of the project description and proposed conservation measures for the biological opinion to Caltrans.

June 17, 2005. Sue Bauer of Caltrans provided comments on the project description to Rick Kuyper.

BIOLOGICAL OPINION

Project Description

Caltrans and FHWA propose to upgrade a 3.6 mile segment of State Route (SR) 70 from expressway to four-lane freeway. The proposed project would occur from 1 mile north of Palermo Road to 0.3 mile south of the SR 162 junction, near the City of Oroville in Butte County. The proposed project would be constructed in three phases (Safety Phase, Phase 1, and Phase 2). A summary of the three phases follows.

Safety Phase

The safety phase would include the relocation of the State Route 70/Ophir Road intersection to the north and installation of a 4-way stop signal. This component is expected to begin in the late summer/Fall of 2006. This phase is an interim project that would address safety and highway operational issues until the phase 2 (interchange phase) project would commence. This

component would adversely affect the snake and the beetle, but would not adversely affect vernal pool crustaceans because there is no suitable vernal pool habitat within 250 feet of the proposed traffic signal construction area. To allow for construction of this traffic signal in a timely manner, Caltrans has proposed to complete the compensation measures for the snake and the beetle prior to construction of the traffic signal and relocation of the intersection. The proposed conservation measures for the vernal pool crustaceans would be completed prior to the commencement of the remainder of the proposed project (Phase 1 and 2).

Phase 1

Phase 1 of the ultimate interchange project would include widening SR 70 to four lanes from the new Ophir Road signalized intersection north to the existing four-lane section just south of SR 162. This phase would have these design features: (1) 12 foot lanes; (2) a 61-foot median; (3) 10-foot shoulders; and (4) 5-foot median shoulders. This phase is expected to begin in 2008 and would take approximately two years to complete.

Phase 2

Phase 2 of the interchange would include the following components: (1) widening of State Route 70 to four lanes from one mile north of Palermo Road to the new Ophir Road signalized intersection; (2) construction of an interchange at the State Route 70/Ophir Road intersection and an overcrossing at Georgia Pacific Way; (3) realignment of the frontage road system to accommodate the proposed interchange and road crossing; and (4) elimination of driveway access points.

Proposed Conservation Measures

Caltrans has proposed conservation measures to avoid adverse effects to sensitive biological resources in the March 2005 *State Route 70 Freeway Extension and Ophir Road Interchange Project Biological Assessment* and the June 6, 2005, letter provided by Caltrans to the Service. A summary of these proposed conservation measures is provided below.

Prior to initiating any construction activities for the Safety Phase, Phase 1, and Phase 2, Caltrans will designate those sensitive resources within the limits of the respective construction area that can be avoided as Environmentally Sensitive Areas (ESAs). Within each of the construction areas, these ESAs would be temporarily fenced off with orange plastic fencing for protection from construction activities. The contractor would be instructed that ESAs are to be avoided by construction equipment and activities. ESAs in the proposed project area would include: (1) giant garter snake habitat at ponds and associated uplands; (2) riparian habitat along Tailings Creek; (3) blue oak (*Quercas douglasli*) woodland on both sides of State Route 70; (4) and vernal pools and swales within and adjacent to proposed project construction.

To prevent erosion, turbidity, and adverse effects to water quality, Caltrans has proposed to use Best Management Practices (BMPs). Examples of BMPs include use of mulches and

revegetation of disturbed sites with native California plants. Caltrans has proposed to prohibit the contractor from discharging grease, oil, or chemicals into receiving waters. In addition, Caltrans' contractor would prepare a Storm Water Pollution Prevention Plan (SWPPP), which is compliant with the Caltrans National Pollution Discharge Elimination System permit and approved by the Resident Engineer.

Proposed Conservation Measures for the Giant Garter Snake

The proposed project would permanently remove 0.28 acres of upland snake habitat and would temporarily affect 1.59 acres of upland snake habitat. Caltrans has proposed to compensate for permanent and temporary effects to snake habitat per the Service's 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*. Caltrans has proposed to purchase the appropriate amount of credits from Wildland's Dolan Ranch to compensate for the permanent loss of 0.28 acre of snake upland habitat. Caltrans will restore the 1.59 acres of temporarily affected upland snake habitat within one year of construction completion. Caltrans has also proposed to monitor the restored habitat for one year with a report containing pre- and post-project area photographs. If the restoration is determined by the Service to not be successful, FHWA will reinitiate with the Service to ensure that all success criteria for the restoration are achieved. Other avoidance and minimization measures for the snake proposed by Caltrans include the following:

1. Other than the work in snake habitat noted above, construction activities will be avoided within 200 feet from the banks of snake aquatic habitat. Movement of heavy equipment will be confined to existing roadways to minimize habitat disturbance.

2. Construction activity within snake habitat will be conducted between May 1 and October 1. If construction occurs from October 2 to April 30, Caltrans will contact the Service's Sacramento Fish and Wildlife Office to determine if additional measures are necessary to avoid take.

3. Clearing will be confined to the minimal area necessary to facilitate construction activities.

4. Construction personnel will receive Service-approved worker environmental awareness training.

5. The proposed project area will be surveyed for giant garter snakes 24-hours prior to construction activities. If a lapse in construction activities of two weeks or greater occurs, surveys for the snake within the proposed project area will be repeated. If the snake is encountered during construction activities, all activities will cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. Sightings of giant garter snakes will be reported to the Service immediately by telephone.

6. Any dewatered habitat will 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, all temporary fill and construction debris will be removed.

8. All avoided snake habitat will be designated as ESAs and will continue to be avoided throughout all the phased construction period. Orange mesh fencing will be placed along the limits of all snake habitat, and no construction activities will be allowed within the ESAs.

Proposed Conservation Measures for the Vernal Pool Crustaceans

Caltrans has proposed to compensate for direct effects to 3.37 acres and indirect effects to 3.279 acres of habitat for the federally-listed vernal pool crustaceans by preserving and creating vernal pool habitat off-site at the Cottonwood parcel, in Butte County, and the Neary parcel, adjacent to the Nature Conservancy's Vina Plains Preserve, in Tehama County. If Caltrans or the Service determines that it is not feasible to use either of these parcels for the preservation/creation of vernal pool habitat, Caltrans will instead purchase the appropriate amount of vernal pool conservation credits at a Service-approved conservation bank that services the proposed project site area. Total preserved and created vernal pool wetlands will be determined by utilizing the ratios specified in the Service's *Programmatic Formal Endangered Species Act Consultation on Issuance of 404 Permits for Projects with Relatively Small Effects on Listed Vernal Pool Crustaceans within the Jurisdiction of the Sacramento Field Office, California* (Programmatic Consultation). Final ratios will be dependent on whether preservation and creation of vernal pool habitat will occur at a Service-approved bank or at a non-bank site (Table 1).

Table 1. Summary of the required preservation and creation amounts for wetted vernal pool acreage as described in the Programmatic Consultation:

Service-approved conservation bank	**Non-bank (i.e. Neary or Cottonwood Parcels)**
Direct Effects to 3.370 acres	
2:1 preservation and 1:1 creation	3:1 preservation and 2:1 creation
6.74 acres preservation and 3.37 acres creation	10.11 acres preservation and 6.74 acres creation
Indirect Effects to 3.279 acres	
2:1 preservation	3:1 preservation
6.56 acres preservation	9.84 acres preservation
Total = 16.67 acres	**Total = 26.69 acres**

Proposed Conservation Measures for the Valley Elderberry Longhorn Beetle

The proposed project would directly affect five elderberry shrubs (*Sambucus* sp.), which are the sole host plants for the beetle. Stems 1.0 inches or greater at ground level are required for this species to complete its life cycle. The five elderberry shrubs have a combined total of 26 stems greater than 1.0 inch in diameter at ground level (Table 2). Caltrans currently has 98 beetle conservation credits at Wildland's Sheridan Conservation Bank that can be used as compensation for future Caltrans projects. Caltrans has proposed to use 12 of their current 98 beetle conservation credits at the Sheridan Conservation Bank to compensate for the loss of 26 elderberry stems greater than 1.0 inch in diameter at ground level, per the Service's 1999 *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (Beetle Conservation Guidelines).

Table 2. Proposed compensation for adverse effects to beetle habitat.

Plant I.D.	# Stems >1"	# Stems > 3"	# Stems >5"	Exit Holes	Riparian	Elderberry seedlings required	Assoc. natives required
1	1	0	1	no	yes	6	6
2	6	4	6	no	no	32	32
3	2	2	0	no	no	6	6
4	6	3	0	no	no	12	12
5	0	1	0	no	no	2	2
Total	9	10	7			**58**	**58**

Status of the Species

Giant Garter Snake

The Service published a proposal to list the snake as an endangered species on December 27, 1991 (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 (Service 1993).

The snake is one of the largest garter snakes and may reach a total length of at least 64 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.

Snakes formerly occurred throughout 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 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 precisely determine 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 conducted during the last two decades have identified 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).

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. It feeds upon 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).

The breeding season extends through March and April, and females give birth to live young from late July through early September. Brood size is variable, ranging from 10 to 46 young (mean=23) (Hansen and Hansen 1990). Newborns average approximately 8.1 inch snout-vent length and 0.10-0.17 ounces. Immediately following birth, young 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 (Service 1993).

Giant garter snakes are fed on by a variety of predators including raccoons, striped skunks, (*Mephitis mephitis*), oppossums (*Didelphus virginianus*), hawks, crows (*Corvus branchyrhynchos*), ravens (*Corvus corax*), egrets (*Casmerodius albus, Egretta thula*), and great blue herons (*Ardea herodias*).

The snake typically inhabits small mammal burrows and other soil crevices throughout its winter dormancy period (November to mid-March). It also uses burrows as refuge from extreme heat during its active period. While individuals usually remain in close proximity to wetland habitats, the Biological Resource Division (BRD) of the U.S. Geological Survey (USGS) 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 using burrows as far as 820 feet from the edge of marsh habitat. Snakes typically select south- and west-facing burrows as hibernacula (Service 1993).

In studies of marked snakes in the Natomas Basin, snakes moved about 0.25 to 0.5 mile per day (Hansen and Brode 1993). However, total activity varies widely between individuals, and 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 also indicate 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).

The current distribution and abundance of the snake is much reduced from former times. Loss of habitat due to agricultural activities and flood control have extirpated the snake from the southern one third of its range in former wetlands associated with the historic Buena Vista, Tulare, and Kern lakebeds. These lakebeds once supported vast expanses of ideal snake habitat, consisting of cattail and bulrush dominated marshes. Vast expanses of bulrush and cattail floodplain habitat also typified much of the Sacramento Valley historically (Hinds 1952). Prior to reclamation activities beginning in the mid to late 1800s, about 60 percent of the Sacramento Valley was subject to seasonal overflow flooding in broad, shallow flood basins that provided expansive areas of snake habitat (Hinds 1952). Valley floor wetlands are subject to the cumulative effects of upstream watershed modifications, water storage and diversion projects, as well as urban and agricultural development; all natural habitats have been lost and an unquantifiable but small percentage of semi-natural wetlands remain extant. Only a small percentage of extant wetlands currently provide habitat suitable for the snake.

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 garter 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. Materials used in construction projects (e.g., erosion control netting) entangle and kill snakes (Stuart *et al.* 2001). 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. Non-native predators, including introduced predatory gamefish, bullfrogs, and domestic cats also threaten snake populations. While 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.

The draft recovery plan for the snake subdivided its historic range into four recovery units (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 the 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 state refuges and refuges of the Sacramento National Wildlife Refuge (NWR) Complex in the Colusa and Sutter Basins, and along waterways associated with rice farming (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 very uncertain. Five of the remaining six populations within the recovery unit are very 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 American Basin population, although threatened by urban development, receives protection from the approved Metro Air Park and in-progress Natomas Basin habitat conservation plans (HCPs), which share a regional strategy to maintain a viable snake population in the basin.

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 (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 Visa 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 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. With the exception of the American Basin, these subpopulations are largely protected from many of the threats to the species. Outside of these protected areas, snakes in these populations are still subject to all the threats identified in the final listing rule. 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.

Vernal Pool Crustaceans

A final rule was published on September 19, 1994 (Service 1994), to list the vernal pool fairy shrimp as threatened and vernal pool tadpole shrimp as endangered under the Act. The final rule to designate critical habitat for 15 vernal pool species, including the vernal pool fairy shrimp and vernal pool tadpole shrimp, was published on August 6, 2003 (Service 2003). Further information on the life history and ecology of the vernal pool fairy shrimp and vernal pool tadpole shrimp may be found in the final listing rule, the final rule to designate critical habitat, Eng *et al.* (1990), Helm (1998), and Simovich *et al.* (1992). Vernal pool fairy shrimp are restricted to vernal pools, swales, and other seasonal wetlands in California and southern Oregon. Vernal pool tadpole shrimp are restricted to similar habitats in California's Central Valley and the San Francisco Bay area.

Vernal Pool Fairy Shrimp

Vernal pool fairy shrimp inhabit alkaline pools, ephemeral drainages, rock outcrop pools, vernal pools, and vernal swales (Helm 1998). Occupied habitats range in size from rock outcrop pools as small as one square meter to large vernal pools up to 12 acres; the potential ponding depth of occupied habitat ranges from 1.2 inches to 48 inches. The vernal pool fairy shrimp has been collected from early December to early May.

All known occurrences of vernal pool fairy shrimp occur in California or southern Oregon. The geographic range of this species encompasses most of the Central Valley from Shasta County to Tulare County and the central coast range from northern Solano County to Santa Barbara County,

California; additional disjunct occurrences have been identified in western Riverside County, California, and in Jackson County, Oregon, near the City of Medford (CNDDB 2005; Helm 1998; Eriksen and Belk 1999; Volmar 2002; Service 1994; Service 2003).

Vernal pool fairy shrimp have delicate elongate bodies; large, stalked, compound eyes; no hard shell (i.e., no carapace); and 11 pairs of swimming legs. Typically less than 1 inch long, they swim or glide gracefully upside-down by means of complex, wavelike beating movements while feeding on algae, bacteria, protozoa, rotifers, and detritus. Female vernal pool fairy shrimp carry eggs in a pear-shaped, ventral brood sac until the eggs are either dropped or sink to the pool bottom with the female when she dies. Eggs which remain after pools dry are known as cysts and are able to withstand heat, cold, and prolonged desiccation. When pools refill in the same or subsequent seasons, some, but not all, of the cysts may hatch, resulting in a cyst bank in the soil that may include cysts from several breeding seasons (Donald 1983). Vernal pool fairy shrimp develop rapidly and may become sexually mature within two weeks after hatching (Gallagher 1996; Helm 1998). Such quick maturation permits fairy shrimp populations to persist in short-lived, shallow bodies of water (Simovich *et al.* 1992).

The primary historic dispersal method for the vernal pool fairy shrimp was likely large scale flooding resulting from winter and spring rains which allowed colonization of different individual vernal pools and other vernal pool complexes. This dispersal is no longer feasible due to the construction of dams, levees, and other flood control measures, and widespread urbanization within significant portions of the range of this species. Waterfowl and shorebirds likely are now the primary dispersal agents for the vernal pool fairy shrimp (Simovich *et al.* 1992). The eggs of these crustaceans are either ingested (Krapu 1974; Ahl 1991) and/or adhere to the legs and feathers where they are transported to new habitats.

Vernal Pool Tadpole Shrimp

Vernal pool tadpole shrimp inhabit alkaline pools, clay flats, vernal lakes, vernal pools, vernal swales, and other seasonal wetlands (Helm 1998). The vernal pool tadpole shrimp is known from 19 populations in the Central Valley, ranging from east of Redding in Shasta County south to Fresno County, and from a single vernal pool complex located on the San Francisco Bay National Wildlife Refuge in Alameda County. The species inhabits vernal pools containing clear to highly turbid water, ranging in size from 54 square feet in the former Mather Air Force Base area of Sacramento County, to the 89-acre Olcott Lake at Jepson Prairie in Solano County. Vernal pools at Jepson Prairie, and Vina Plains in Tehama County, have a neutral pH, and very low conductivity, total dissolved solids, and alkalinity (Eng *et al.* 1990). These pools are located most commonly in grass-bottomed swales of grasslands in old alluvial soils underlain by hardpan or in mud-bottomed claypan pools containing highly turbid water.

Vernal pool tadpole shrimp have large, shield-like carapaces approximately one inch long that covers most of their body; dorsal, compound eyes; and a pair of long cercopods, one on each side of a flat caudal plate, at the end of their last abdominal segment. Vernal pool tadpole shrimp are primarily bottom-dwelling animals that move with their legs down while feeding on detritus and other animals, including fairy shrimp and other invertebrates (Pennak 1989). Females deposit

cysts (partially developed embryos encased in an egg-like structure) which settle on the pool bottom. Although some cysts may hatch quickly, others remain dormant to hatch during later rainy seasons (Ahl 1991). When winter rains refill inhabited wetlands, tadpole shrimp reestablish from dormant cysts and may become sexually mature within three to four weeks after hatching (Ahl 1991, Helm 1998). Reproductively mature adults may be present in pools until the habitats dry up in the spring (Ahl 1991; Gallagher 1996; Simovich *et al.* 1992).

The primary historic dispersal method for the vernal pool tadpole shrimp was likely large scale flooding resulting from winter and spring rains which allowed colonization of different individual vernal pools and other vernal pool complexes. This dispersal is prohibited by the construction of dams, levees, and other flood control measures, and widespread urbanization within significant portions of the range of this species. Waterfowl and shorebirds likely are now the primary dispersal agents for vernal pool tadpole shrimp (Simovich 1992). The eggs of this crustacean are either ingested (Krapu 1974; Ahl 1991) and/or adhere to the legs and feathers where they are transported to new habitats.

Valley Elderberry Longhorn Beetle

The beetle was listed as a threatened species under the Act on August 8, 1980 (Service 1980). Two areas along the American River in the Sacramento metropolitan area have been designated as critical habitat for the beetle (Service 1980). Critical habitat for this species has been designated along the lower American River at Goethe and Ancil Hoffman parks (American River Parkway Zone) and at the Sacramento Zone, an area about a half mile from the American River downstream from the American River Parkway Zone. In addition, an area along Putah Creek in Solano County, and the area west of Nimbus Dam along the American River Parkway in Sacramento County, are considered essential habitat, according to the *Valley Elderberry Longhorn Beetle Recovery Plan* (Service 1984). These critical habitat and essential habitat areas within the American River Parkway and Putah Creek support large numbers of mature elderberry shrubs with extensive evidence of use by the beetle.

The beetle is dependent on the elderberry, its host plant, which is a locally common component of the remaining riparian forests and savannah areas and, to a lesser extent, the mixed chaparral-foothill woodlands of the Central Valley. Use of the elderberry shrubs by the animal, a wood borer, is rarely apparent. Frequently but not exclusively, the only exterior evidence of the shrub's use by the beetle is an exit hole created by the larva just prior to the pupal stage. Observations made on elderberries along the Cosumnes River, in the Folsom Lake area, and near Blue Ravine in Folsom indicate that larval galleries can be found in shrubs with no evidence of exit holes; the larvae either succumb prior to constructing an exit hole or are not far enough along in the developmental process to construct an exit hole. Beetle larvae appear to be distributed in stems which are 1.0 inch or greater in diameter at ground level. The *Valley Elderberry Longhorn Beetle Recovery Plan* (Service 1984) and Barr (1991) contain further details on the valley elderberry longhorn beetle's life history.

Population densities of the beetle are probably naturally low (Service 1984); and it has been suggested, based on the spatial distribution of occupied shrubs (Barr 1991) that the beetle is a

poor disperser (Collinge *et al.* 2001). Low density and limited dispersal capability cause the beetle to be vulnerable to the negative effects of the isolation of small subpopulations due to habitat fragmentation.

When the beetle was listed in 1980, the species was known from less than ten localities along the American River, the Merced River, and Putah Creek. By the time the *Valley Elderberry Longhorn Beetle Recovery Plan* was prepared in 1984, additional occupied localities had been found along the American River and Putah Creek. As of 2005, the California Natural Diversity Database (CNDDB) contained 190 occurrences for this species in 44 drainages throughout the Central Valley, from a location along the Sacramento River in Shasta County, southward to an area along Caliente Creek in Kern County (CNDDB 2005). The beetle continues to be threatened by habitat loss and fragmentation, predation by the non-native Argentine ants (*Linepithema humile*) (Holway 1995; Huxel 2000; Huxel and Hastings 1998; Huxel *et al.* 2001; Ward 1987), and possibly other factors such as pesticide drift, non-native plant invasion, improper burning regimes, off-road vehicle use, rip-rap bank protection projects, wood cutting, and over-grazing by livestock (CNDDB 2005).

Environmental Baseline

Giant Garter Snake

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 snake habitat within the region. The FHWA and/or the U.S. Army Corps of Engineers have consulted the Service on the issuance of wetland fill permits for several bridge replacement and Highway improvement projects within the Colusa and Butte Basins that affected snake habitats. The direct effect of these projects is often small and localized, but transportation projects which improve access can indirectly affect snakes by facilitating development of habitat, and by increasing traffic mortality, and these effects are not quantifiable.

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 (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 (Service 1999). Flood control and maintenance activities which can result in snake mortality and degradation of habitat include levee construction, stream channelization, and the rip-rapping of streams and canals (Service 1999).

Surveys over the last two decades have located the snake as far north as the Butte Basin in the Sacramento Valley. Currently, the Service recognizes 13 separate populations of 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). The 11 counties where the snake is still presumed to occur are: Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo.

Since April of 1995, the BRD has further documented occurrences of snakes within some of the 13 populations identified in the final rule. The BRD has studied populations of snakes at the Sacramento 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. These populations of snakes represent the largest extant populations. With the exception of the American Basin, these populations are largely protected from many of the threats to the species. Outside of protected areas, snakes in these population clusters are still subject to all threats identified in the final rule. The remaining nine population clusters identified in the final rule are distributed discontinuously in small isolated patches and are vulnerable to extirpation by stochastic environmental, demographic, and genetic processes. Recent surveys conducted by 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. 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.

There is one known occurrence of the snake within the Biggs USGS 7.5 minute quadrangle, which is adjacent and to the west of the Palermo USGS 7.5 minute quadrangle (CNDDB 2005). The Service believes that the 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 observation of this listed species.

Vernal Pool Crustaceans

The vernal pool tadpole shrimp and vernal pool fairy shrimp are imperiled by a variety of human-caused activities, primarily urban development, water supply/flood control projects, and land conversion for agricultural use. Habitat loss occurs from direct destruction and modification of pools due to filling, grading, discing, leveling, and other activities, as well as modification of surrounding uplands which alters vernal pool watersheds. Other activities which adversely affect these species include off-road vehicle use, certain mosquito abatement measures, and pesticide/herbicide use.

In addition to direct habitat loss, the vernal pool habitat for the vernal pool tadpole shrimp and vernal pool fairy shrimp has been and continues to be highly fragmented throughout their ranges due to conversion of natural habitat for urban and agricultural uses. This fragmentation results in small isolated populations of these two species. Such populations may be highly susceptible to extirpation due to chance events, inbreeding depression, or additional environmental disturbance (Gilpin and Soule 1986; Goodman 1987a, 1987b). If an extirpation event occurs in a population that has been fragmented, the opportunities for recolonization will be greatly reduced due to physical (geographical) isolation from other (source) populations.

Holland (1978) estimated that between 67 and 88 percent of the area within the Central Valley of California which once supported vernal pools had been destroyed by 1973. In the ensuing years, threats to this habitat type have continued and resulted in a substantial amount of vernal pool habitat being converted for human uses in spite of Federal regulations implemented to protect wetlands. Current rapid urbanization and agricultural conversion throughout the ranges of these two species continue to pose the most severe threats to the continued existence of the vernal pool tadpole shrimp and vernal pool fairy shrimp.

Development projects within Butte County have reduced the number of vernal pool complexes within the area. These developments and others within the region, have resulted in both direct and indirect effects to vernal pools, and have contributed to the loss of vernal pool fairy shrimp and vernal pool tadpole shrimp occurrences. Although the reduction of federally-listed vernal pool crustacean populations has not been quantified, the acreage of lost habitat continues to grow. Despite these impacts, City and County governments continue to implement development projects within the area.

There are four known occurrences of vernal pool tadpole shrimp within the Oroville and Shippee USGS 7.5 minute quadrangles, which are adjacent to the Palermo USGS 7.5 minute quadrangle. There are two known occurrences of vernal pool fairy shrimp within the Biggs and Shippe USGS 7.5 minute quadrangles, which are adjacent to the Palermo USGS 7.5 minute quadrangle (CNDDB 2005). The action area contains habitat components that can be used by the listed vernal pool crustaceans for feeding, resting, mating, and other essential behaviors. Therefore, the Service believes that the two federally-listed vernal pool crustaceans are reasonably certain to occur within the action area because of the biology and ecology of the species, the presence of suitable habitat in and adjacent to the action area, as well as the recent observations of this listed species within ten miles of the proposed project site.

Valley Elderberry Longhorn Beetle

Riparian forests, the primary habitat for the beetle, have been severely depleted throughout the Central Valley over the last two centuries as a result of expansive agricultural and urban development (Huxel *et al.* 2001; Katibah 1984; Roberts *et al.* 1977; Thompson 1961). Since colonization, these forests have been "...modified with a rapidity and completeness matched in few parts of the United States" (Thompson 1961). As of 1849, the rivers and larger streams of the Central Valley were largely undisturbed. They supported continuous bands of riparian woodland four to five miles in width along some major drainages such as the lower Sacramento

River, and generally about two miles wide along the lesser streams (Thompson 1961). Most of the riverine floodplains supported riparian vegetation to about the 100-year flood line (Katibah 1984). A large human population influx occurred after 1849, however, and much of the Central Valley riparian habitat was rapidly converted to agriculture and used as a source of wood for fuel and construction to serve a wide area (Thompson 1961). By as early as 1868, riparian woodland had been severely affected in the Central Valley, as evidenced by the following excerpt:

> "This fine growth of timber which once graced our river [Sacramento], tempered the atmosphere, and gave protection to the adjoining plains from the sweeping winds, has entirely disappeared - the woodchopper's axe has stripped the river farms of nearly all the hard wood timber, and the owners are now obliged to rely upon the growth of willows for firewood." (Cronise 1868, in Thompson 1961).

The clearing of riparian forests for fuel and construction made this land available for agriculture (Thompson 1961). Natural levees bordering the rivers, once supporting vast tracts of riparian habitat, became prime agricultural land (Thompson 1961). As agriculture expanded in the Central Valley, needs for increased water supply and flood protection spurred water development and reclamation projects. Artificial levees, river channelization, dam building, water diversion, and heavy groundwater pumping further reduced riparian habitat to small, isolated fragments (Katibah 1984). In recent decades, these riparian areas have continued to decline as a result of ongoing agricultural conversion as well and urban development and stream channelization. As of 1989, there were over 100 dams within the Central Valley drainage basin, as well as thousands of miles of water delivery canals and streambank flood control projects for irrigation, municipal and industrial water supplies, hydroelectic power, flood control, navigation, and recreation (Frayer *et al.* 1989). Riparian forests in the Central Valley have dwindled to discontinuous strips of widths currently measurable in yards rather than miles.

Some accounts state that the Sacramento Valley supported approximately 775,000 to 800,000 acres of riparian forest as of approximately 1848, just prior to statehood (Smith 1977; Katibah 1984). No comparable estimates are available for the San Joaquin Valley. Based on early soil maps, however, more than 921,000 acres of riparian habitat are believed to have been present throughout the Central Valley under pre-settlement conditions (Huxel *et al* 2001; Katibah 1984). Another source estimates that of approximately five million acres of wetlands in the Central Valley in the 1850s, approximately 1,600,000 acres were riparian wetlands (Warner and Hendrix 1985; Frayer *et al.* 1989).

Based on a California Department of Fish and Game riparian vegetation distribution map, by 1979, there were approximately 102,000 acres of riparian vegetation remaining in the Central Valley. This represents a decline in acreage of approximately 89 percent as of 1979 (Katibah 1984). More extreme figures were given by Frayer *et al.* (1989), who reported that woody riparian forests in the Central Valley had declined to 34,600 acres by the mid-1980s (from 65,400 acres in 1939). Although these studies have differing findings in terms of the number of acres lost (most likely explained by differing methodologies), they attest to a dramatic historic loss of riparian habitat in the Central Valley. As there is no reason to believe that riparian habitat suitable to the beetle (elderberry shrubs) would be destroyed at a different rate than other riparian

habitat, we can assume that the rate of loss for beetle habitat in riparian areas has been equally dramatic.

A number of studies have focused on riparian vegetation losses along the Sacramento River, which supports some of the densest known populations of the beetle. Approximately 98 percent of the middle Sacramento River's historic riparian vegetation was believed to have been extirpated by 1977 (DWR 1979). The California Department of Water Resources estimated that native riparian habitat along the Sacramento River from Redding to Colusa decreased from 27,720 acres to 18,360 acres (34 percent) between 1952 and 1972 (McGill *et al.* 1975; Conrad *et al.* 1977). The average rate of riparian loss on the middle Sacramento River was 430 acres per year from 1952 to 1972, and 410 acres per year from 1972 to 1977. In 1987, riparian areas as large as 180 acres were observed converted to orchards along this River (McCarten and Patterson 1987).

Barr (1991) examined 79 sites in the Central Valley supporting valley elderberry longhorn beetle habitat. When 72 of these sites were re-examined by researchers in 1997, seven no longer supported valley elderberry longhorn beetle habitat. This loss represents a decrease in the number of sites with valley elderberry longhorn beetle habitat by approximately nine percent in six years.

No comparable information exists on the historic loss of non-riparian valley elderberry longhorn beetle habitat such as elderberry savanna and other vegetation communities where elderberry shrubs also occur (oak or mixed chaparral-woodland, or grasslands adjacent to riparian habitat). However, all natural habitats throughout the Central Valley have been heavily adversely affected within the last 200 years (Thompson 1961), and we can therefore assume that non-riparian beetle habitat also has suffered a widespread decline. This analysis focuses on loss of riparian habitat because the beetle is primarily dependent upon riparian habitat. Adjacent upland areas are also likely to be important for the species (Huxel 2000), but this upland habitat typically consist of oak woodland or elderberry savanna bordering willow riparian habitat (Barr 1991). The riparian acreage figures given by Frayer *et al.* (1989) and Katibah (1984) included oak woodlands concentrated along major drainages in the Central Valley, and therefore probably included lands we would classify as upland habitat for the beetle adjacent to riparian drainages.

While habitat loss is clearly a large factor leading to the species' decline, other factors are likely to pose significant threats to the long term survival of the beetle. Only approximately 20 percent of riparian sites with elderberry observed by Barr (1991) and Collinge *et al.* (2001) support beetle populations (Barr 1991, Collinge *et al.* 2001). Jones and Stokes (1988) found 65 percent of 4,800 riparian acres on the Sacramento River have evidence of beetle presence. The fact that a large percentage of apparently suitable habitat is unoccupied suggests that the beetle is limited by factors other than habitat availability, such as habitat quality or limited dispersal ability.

Destruction of riparian habitat in central California has resulted not only in a significant acreage loss, but also has resulted in beetle habitat fragmentation. Fahrig (1997) states that habitat fragmentation is only important for habitats that have suffered greater than 80 percent loss. Riparian habitat in the Central Valley, which has experienced greater than 90 percent loss by

most estimates, would meet this criterion as habitat vulnerable to effects of fragmentation. Existing data suggests that beetle populations, specifically, are affected by habitat fragmentation. Barr (1991) found that small, isolated habitat remnants were less likely to be occupied by beetles than larger patches, indicating that valley elderberry longhorn beetle subpopulations are extirpated from small habitat fragments. Barr (1991) and Collinge *et al.* (2001) consistently found valley elderberry longhorn beetle exit holes occurring in clumps of elderberry bushes rather than isolated bushes, suggesting that isolated shrubs do not typically provide long-term viable habitat for this species. Local populations of organisms often undergo periodic colonization and extinction, while the metapopulation (set of spatially separated groups of a species) may persist (Collinge 1996).

Habitat fragmentation can be an important factor contributing to species declines because: (1) it divides a large population into two or more small populations that become more vulnerable to direct loss, inbreeding depression, genetic drift, and other problems associated with small populations; (2) it limits a species' potential for dispersal and colonization; and (3) it makes habitat more vulnerable to outside influences by increasing the edge:interior ratio (Primack 1998).

Small, isolated subpopulations are susceptible to extirpation from random demographic, environmental, and/or genetic events (Shaffer 1981; Lande 1988; Lande 1993; Primack 1998). While a large area may support a single large population, the smaller subpopulations that result from habitat fragmentation may not be large enough to persist over a long time period. As a population becomes smaller, it tends to lose genetic variability through genetic drift, leading to inbreeding depression and a lack of adaptive flexibility. Smaller populations also become more vulnerable to random fluctuations in reproductive and mortality rates, and are more likely to be extirpated by random environmental factors.

The beetle is a specialist on elderberry plants, and tends to have small population sizes and occurs in low densities (Barr 1991; Collinge *et al.* 2001). Collinge *et al.* (2001) compared resource use and density of exit holes between the beetle and a related subspecies, the California elderberry longhorn beetle (*Desmocerus californicus californicus*). The valley elderberry longhorn beetle tended to occur in areas with higher elderberry densities, but had lower exit hole densities than the California elderberry longhorn beetle. With extensive riparian habitat loss and fragmentation, these naturally-small valley elderberry longhorn beetle populations are broken into even smaller, isolated populations. Once a small valley elderberry longhorn beetle population has been extirpated from an isolated habitat patch, the species may be unable to re-colonize this patch if it is unable to disperse from nearby occupied habitat. Insects with limited dispersal and colonization abilities may persist better in large habitat patches than small patches because small fragments may be insufficient to maintain viable populations and the insects may be unable to disperse to more suitable habitat (Collinge 1996).

Studies suggest that the beetle is unable to re-colonize drainages where the species has been extirpated, because of its limited dispersal ability (Barr 1991; Collinge *et al.* 2001). Huxel and Hastings (1999) used computer simulations of colonization and extinction patterns based on differing dispersal distances, and found that the short dispersal simulations best matched the

1997 census data in terms of site occupancy. This suggests that dispersal and colonization are limited to nearby sites. At spatial scales greater than 6.2 miles, such as across drainages, valley elderberry longhorn beetle occupancy appears to be strongly influenced by regional extinction and colonization processes, and colonization is constrained by limited dispersal (Collinge *et al.* 2001; Huxel and Hastings 1999). Except for one occasion, drainages examined by Barr that were occupied in 1991 remained occupied in 1997 (Collinge *et al.* 2001; Huxel and Hastings 1999). The one exception was Stoney Creek, which was occupied in 1991 but not in 1997. All drainages found by Barr (1991) to be unoccupied in 1991 were also unoccupied in 1997. This data suggests that drainages unoccupied by the valley elderberry longhorn beetle remain so.

Habitat fragmentation not only isolates small populations, but also increases the interface between habitat and urban or agricultural land, increasing negative edge effects such as the invasion of non-native species (Huxel *et al.* 2001; Huxel 2000; Soule 1990) and pesticide contamination (Barr 1991). Several edge effect-related factors may be related to the decline of the beetle.

Elderberry shrubs with stems 1.0 inch or greater in diameter that provide suitable habitat are found in and adjacent to the action area. The action area contains habitat components that can be used by the listed animal for feeding, resting, mating, and other essential behaviors. There is one known occurrence of the beetle within the Palermo USGS 7.5 minute quadrangle (CNDDB 2005). Therefore, the Service believes that the valley elderberry longhorn beetle 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 observation of this listed species.

Effects of the Proposed Action

Effects to Giant Garter Snake

The proposed project would directly affect 0.28 acre of upland habitat at the west end of the pond near Feather River Boulevard. The proposed project would also temporarily affect 1.59 acres of upland snake habitat. This upland habitat would be restored to pre-project conditions within one year of completion of the proposed project.

Effects to Vernal Pool Crustaceans

The proposed project would directly affect 3.370 acres and indirectly affect 3.279 acres of vernal pool crustacean habitat. Vernal pool habitat indirectly affected includes all habitat supported by future destroyed upland areas and swales, and all habitat otherwise damaged by loss of watershed, human intrusion, introduced species, and pollution that will be caused by the project. A description of potential indirect effects follows.

Erosion - The ground disturbing activities in the watershed of vernal pools associated with the proposed project action area are expected to result in siltation when pools fill during the wet season following construction. Siltation in pools supporting listed crustaceans may result in

decreased cyst viability, decreased hatching success, and decreased survivorship among early life history stages, thereby reducing the number of mature adults in future wet seasons. The proposed project construction activities could result in increased sedimentation transport into vernal pool crustacean habitats during periods of heavy rains.

Changes in hydrology - The biota of vernal pools and swales can change when the hydrologic regime is altered (Bauder 1986, 1987). Survival of aquatic organisms like the vernal pool fairy shrimp and vernal pool tadpole shrimp are directly linked to the water regime of their habitat (Zelder 1987). Therefore, construction near vernal pool areas will, at times, result in the decline of local sub-populations of vernal pool organisms, including fairy shrimp and tadpole shrimp.

Introduction of non-natives - There is an increased risk of introducing weedy, non-native plants into the vernal pools both during and after project construction due to the soil disturbance from clearing and grubbing operations, and general vegetation disturbance associated with the use of heavy equipment.

Chemical contamination - The runoff from chemical contamination can kill listed species by poisoning. Oils and other hazardous materials associated with construction equipment could be conveyed into the vernal pool crustacean habitats by overland runoff during the rainy season, thereby adversely affected water quality. Many of these chemical compounds are thought to have adverse affects on all of the listed vernal pool crustaceans and/or their cysts. Individuals may be killed directly or suffer reduced fitness through physiological stress or a reduction in their food base due to the presence of these chemicals.

In addition to the adverse effects detailed above, the proposed project will contribute to a local and range-wide trend of habitat loss and degradation, the principal reasons that the vernal pool fairy shrimp and vernal pool tadpole shrimp have declined. The proposed project will contribute to the fragmentation and reduction of the acreage of the remaining listed vernal pool crustacean habitat located in Butte County and throughout the range of these two listed vernal pool crustaceans.

Effects to Valley Elderberry Longhorn Beetle

The proposed project would remove five elderberry shrubs with a combined total of 26 stems greater than 1.0 inch in diameter at ground level. None of these five elderberry shrubs have exit holes. One shrub is in riparian habitat, and the other four are in non-riparian habitat. There would be no indirect effects to elderberry shrubs associated with the proposed project.

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 project are not considered in this section, because they require separate consultation pursuant to section 7 of the Act.

A number of other projects in the vicinity of Oroville are also proposed. This continued human population growth in the Oroville area and throughout the Central Valley of California is expected to drive further development of agriculture, cities, industry, transportation, and water resources in the foreseeable future. Some of these future activities will not be subject to Federal jurisdiction (and thus are considered to enter into cumulative effects), and are likely to result in loss of habitat for these four listed species occur.

Conclusion

After reviewing the current status of the giant garter snake, vernal pool crustaceans, and valley elderberry longhorn beetle, as well as the environmental baselines for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed project is not likely to jeopardize the continued existence of these four listed species. Critical habitat has been designated for the valley elderberry longhorn beetle, the vernal pool fairy shrimp, and the vernal pool tadpole shrimp; however, no critical habitat units for these species are located in the action area, and therefore, no destruction or adverse modification of critical habitat is anticipated. Critical habitat has not been designated for the giant garter snake.

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 agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. 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

Giant Garter Snake

The Service expects that incidental take of the giant garter snake will be difficult to detect or quantify for the following reasons: the aquatic nature of the organisms make the finding of a dead specimen unlikely, the secretive nature of the species, losses may be masked by seasonal fluctuations in numbers or other causes, and the species occur in habitat that makes them difficult to detect. Due to the difficulty in quantifying the number of giant garter snakes that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of habitat that will become unsuitable for the species as a result of the action. Therefore, the Service estimates that 1.59 acres of snake habitat will become temporarily unsuitable and 0.28 acre of snake habitat will become permanently destroyed as a result of the proposed action. Upon implementation of the following reasonable and prudent measures incidental take associated with the proposed project on these acres in the form of harm or harassment of the snake from temporary habitat loss, or disturbance will become exempt from the prohibitions described under section 9 of the Act for direct effects; in addition, incidental take in the form of harm or harassment associated with the proposed project on these acres of habitat will be exempt from the prohibitions described under section 9 of the Act for indirect effects as a result of the management activities described.

Vernal Pool Crustaceans

The Service anticipates incidental take of the vernal pool fairy shrimp and vernal pool tadpole shrimp will be difficult to detect or quantify. The cryptic nature of these species and their relatively small body size make the finding of a dead specimen unlikely. The species occur in habitats that make them difficult to detect. Due to the difficulty in quantifying the number of individuals that will be taken as a result of the proposed action, the Service is quantifying take incidental to the proposed project as the number of acres of vernal pools/ponded depressions (vernal pool habitat) that will become unsuitable for vernal pool crustaceans due to the proposed action. Therefore, the Service estimates that all vernal pool fairy shrimp and vernal pool tadpole shrimp inhabiting 6.649 acres of vernal pool habitat will be harassed, harmed, injured, or killed, as a result of the proposed action. The incidental take associated with the proposed action on vernal pool fairy shrimp and vernal pool tadpole shrimp is hereby exempted from prohibitions of take under section 9 of the Act.

Valley Elderberry Longhorn Beetle

The Service anticipates incidental take of the beetle will be difficult to measure because it is difficult to determine the number of beetle larvae and pupae contained within each elderberry plant. Because it is not known how many larvae or pupae each stem one inch or greater in diameter at ground level can support, the Service quantifies the amount of incidental take of the beetle in terms of the number of plants or stems one inch or greater in diameter at ground level that would be lost. The Service anticipates that all beetles inhabiting the 26 elderberry stems measuring one inch or greater in diameter at ground level, will be harmed, harassed, or killed, as

a result of the proposed action. The incidental take associated with the proposed action on the beetle is hereby exempted from prohibitions of take under section 9 of the Act.

Effect of the Take

The Service has determined that this level of anticipated take in this opinion is not likely to result in jeopardy to the federally-listed snake, vernal pool crustaceans, or valley elderberry longhorn beetle. No critical habitat has been proposed for the snake; therefore, there will not be any destruction or adverse modification of critical habitat. Critical habitat has been designated for the valley elderberry longhorn beetle, the vernal pool fairy shrimp, and the vernal pool tadpole shrimp; however, no critical habitat units for these species are located in the action area, and therefore, no destruction or adverse modification of critical habitat is anticipated.

Reasonable and Prudent Measures

The following reasonable and prudent measures are necessary and appropriate to minimize the effect of the proposed State Route 70 Widening and Ophir Road Interchange Project on the snake, vernal pool crustaceans, and the beetle. Take in the form of harassment or harm of these species during construction activities and associated with implementing the project shall be minimized.

1. Take in the form of harm, harassment, and mortality of the giant garter snake, the valley elderberry longhorn beetle, the vernal pool fairy shrimp, and the vernal pool tadpole shrimp during construction activities and/or activities associated with implementing the project shall be minimized.

2. The effects to the giant garter snake, the valley elderberry longhorn beetle, the vernal pool fairy shrimp, and the vernal pool tadpole shrimp resulting from habitat modification and temporary and/or permanent losses and degradation of habitat shall be minimized and, to the greatest extent practicable, habitat shall be restored to its pre-project condition.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the FHWA must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

The following terms and conditions implement reasonable and prudent measure number one (1) and number two (2):

1. The FHWA, through Caltrans, shall minimize the potential for harm and harassment of the four listed species resulting from project-related activities by implementation of the conservation measures as described in: (1) the March 2005 *State Route 70 Freeway Extension and Ophir Road Interchange Project*; (2) the June 6, 2005, letter provided by

Caltrans to the Service; (3) the project description of this biological opinion; and (4) appearing in the terms and conditions of this biological opinion.

2. The FHWA, through Caltrans, shall include a copy of this biological opinion within its solicitations for design and construction of the proposed project, making the prime contractor responsible for implementing all requirements and obligations included within the biological opinion, and to educate and inform all other contractors involved in the project as to the requirements of the biological opinion. A copy of the solicitations containing the biological opinion will also be provided to the Chief of Endangered Species (Central Valley) at the Sacramento Fish and Wildlife Office.

3. FHWA, through Caltrans, shall submit a post-construction compliance report prepared by the monitoring biologist(s) to the Sacramento Fish and Wildlife Office within 30 calendar days of the completion of construction activity or within 30 days of any break in construction activity lasting more than 30 days. This report shall detail (i) dates that construction occurred; (ii) pertinent information concerning the success of the project in meeting compensation and other conservation measures; (iii) an explanation of failure to meet such measures, if any; (iv) known project effects on listed species, if any; (v) occurrences of incidental take of any of this species; and (vi) other pertinent information.

4. If requested, during or upon completion of construction activities, the on-site biologist or Caltrans shall accompany Service or California Department of Fish and Game personnel on an on-site inspection of the site to review project effects to the giant garter snake, valley elderberry longhorn beetle, vernal pool crustaceans, and their habitats.

5. The FHWA, through Caltrans, shall adhere to the Reporting Requirements outlined below in this biological opinion.

6. To minimize take in the form of harm, harassment, and mortality of the giant garter snake, the FHWA, through Caltrans, shall adhere to the following:

   a. A qualified biologist shall be on-site during all initial ground disturbing activities that could result in the take of the giant garter snake. The qualifications of the biologist(s) shall be presented to the Service for review and approval at least 30 calendar days prior to any ground-breaking at the project site. The biologist(s) shall be given the authority to stop any work that may result in take of listed species. If the biologist(s) exercises this authority, the Service and the California Department of Fish and Game shall be notified by telephone and electronic mail within one (1) working day. The Service contact is the Chief of Endangered Species Division at the Sacramento Fish and Wildlife Office at telephone 916/414-6600.

   b. To prevent inadvertent entrapment of giant garter snakes during construction activities, all excavated, steep-walled holes or trenches more than 2 feet deep shall be covered at the close of each working day by plywood or similar

materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they must be thoroughly inspected for trapped animals. If at any time a trapped giant garter snake is discovered, a Caltrans biologist should immediately place escape ramps, other appropriate structures, or assistance to allow the animal to escape, or the Service shall be contacted for advice. The Service shall be notified of the incident by telephone and electronic mail within one (1) working day.

c. Plastic mono-filament netting (erosion control matting) or similar material should not be used at the project site because reptiles, mammals, and birds may become entangled or trapped in it. Acceptable substitutes include coconut coir matting or tackified hydroseeding.

d. Project-related vehicles shall observe a 20-mph speed limit in construction areas within potential giant garter snake habitat.

e. To eliminate an attraction to predators of the giant garter snake, all food-related trash items such as wrappers, cans, bottles, and food scraps must be disposed of in secure, closed trash containers.

7. To minimize take in the form of harm, harassment, and mortality of the vernal pool crustaceans, the FHWA, through Caltrans, shall adhere to the following:

a. Adequate high visibility fencing shall be placed around the avoided vernal pool areas within the proposed project site to prevent encroachment of construction equipment and personnel into these avoided wetland areas during project work activities. Such fencing shall be inspected and maintained daily until completion of the project.

b. All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 250 feet from any riparian habitat or water body or preserve area. The applicant shall ensure contamination of habitat does not occur during such operations. All workers shall be informed of the importance of preventing spills and appropriate measures to take should a spill occur.

c. Stockpiling of construction materials, portable equipment, vehicles and supplies, including chemicals, shall be restricted to the designated construction staging areas and exclusive of the riparian and wetlands avoidance areas. Refueling of construction equipment and vehicles within the floodplain shall occur only within designated areas not affecting the riparian and wetlands avoidance areas. Any spills of hazardous materials shall be cleaned up immediately.

d. Opportunity shall be given to third party individuals conducting vernal pool restoration efforts to collect innoculum from the vernal pools prior to fill and destruction. At least 90 days notice prior to the beginning of the wet season shall be given to the Service and appropriate wetland restoration contractors.

Construction activities shall not begin prior to opportunities to collect innoculum from vernal pools.

Reporting Requirements

The Sacramento Fish and Wildlife Office is to be notified within one working day of the finding of any dead federally-listed species or any unanticipated harm to the species addressed in this biological opinion. The Service contact person for this is the Chief, Endangered Species Division at (916) 414-6620 and the Resident Agent-in-charge of the Service's Law Enforcement Division at (916) 414-6660.

The FHWA must require the applicant to report to the Service immediately any information about take or suspected take of federally-listed species not authorized in this opinion. The FHWA must notify the Service within 24 hours of receiving such information. Notification must include the date, time, and location of the incident of the incident or of the finding of a dead or injured animal. The Service contact is the Resident Agent-in-charge of the Service's Law Enforcement Division at (916) 414-6660.

Any contractor or employee, who during routine operations and maintenance activities, inadvertently kills or injures a federally-listed species must immediately report the incident to their representative. This representative must contact the California Department of Fish and Game immediately in the case of a dead or injured listed species. The California Department of Fish and Game contact for immediate assistance is State Dispatch at (916) 445-0045.

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 data bases.

1. The FHWA should participate in the planning for regional habitat conservation plans for the giant garter snake, vernal pool crustaceans, valley elderberry longhorn beetle, and other listed species.

2. The FHWA should incorporate wildlife overpasses, underpasses, and appropriate fencing in highway/road design and construction in order to reduce vehicle-related injuries and deaths of giant garter snakes, other listed animals, and other wildlife who are attempting to cross roadways.

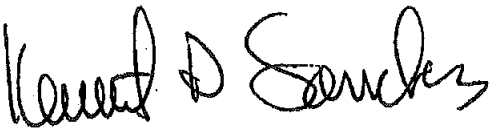
In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION--CLOSING STATEMENT

This concludes formal consultation on the proposed State Route 70 Widening and Ophir Road Interchange project. 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.

Please contact Rick Kuyper or the Acting Sacramento Valley Branch Chief of my staff at (916) 414-6645 if you have questions regarding the proposed State Route 70 Widening and Ophir Road Interchange project.

Sincerely,



Kenneth D. Sanchez
Acting Field Supervisor

cc:
Laura Whitney, U.S. Army Corps of Engineers, Sacramento, California
Jason Brush, U.S. Environmental Protection Agency, San Francisco, California
Jenny Marr, California Department of Fish and Game, Chico, California
Caroline Warren, California Department of Transportation, Marysville, California

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