

APPENDIX B

Biological Opinion for the SSCP2 Project (2008)



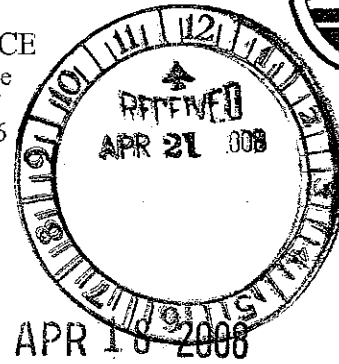
United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846



In reply refer to:
81420-2008-F-0285



Leslie T. Rogers
Regional Administrator
U.S. Department of Transportation
Federal Transit Administration
201 Mission Street, Suite 1650
San Francisco, California 94105-1839

Subject Section 7 Consultation for the Proposed South Sacramento Corridor Phase 2 Project, Sacramento County, California.

Dear Ms. Rogers:

This is in response to your request for formal consultation dated 25 January, 2007, and received by this office on 31 January, 2007, for the U. S. Fish and Wildlife's (Service) biological opinion (Bio Op) regarding the Federal Transit Administration (FTA) and the Sacramento Regional Transit District's (RT) proposed extension of the light rail transit (LRT) service from the existing Meadowview Station to Cosumnes River College, a total of approximately 4.3 miles (mi), and including four LRT stations and associated facilities (Project). This document represents the Service's biological opinion regarding the effects of this project on the Federally endangered vernal pool tadpole shrimp (*Lepidurus packardii*) and the threatened vernal pool fairy shrimp (*Branchinecta lynchi*) (collectively vernal pool crustaceans), the giant garter snake (*Thamnophis gigas*) (GGS), and the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (VELB) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(Act).

The Service has reviewed the biological information submitted by your office, by the permit applicant and by their consultant describing the effects of the proposed project. Information analyzed to develop this biological opinion included the following: (1) *South Sacramento Corridor Phase 2 Project Biological Assessment* dated October 2006; (2) *South Sacramento Corridor Phase 2 Project Revised Biological Assessment* dated November 2007; (3) *South Sacramento Corridor Phase 2 Project Preliminary Wetland Delineation* dated July 2005; (4) *South Sacramento Corridor Phase 2 Project Revised Wetland Delineation* dated May 2006; (5) *South Sacramento Corridor Phase 2 Project Special-Status Plant Survey* dated April 2007; (6) *South Sacramento Corridor Phase 2 Project-Supplemental Information in Support of Section 7*

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Consultation dated May 2007; (7) *South Sacramento Corridor Phase 2 Project-Additional Information in Support of Section 7 Consultation*; and (8) other information available to the Service.

Thirty-three elderberry shrubs occur adjacent to Franklin Blvd within the SRCSD Bufferlands property. The interim driveway to the proposed Franklin Station would directly impact approximately 20 of these shrubs. However, according to the City of Sacramento, the Interstate-5/Cosumnes River Blvd Interchange Project is anticipated to initiate construction ahead of the proposed South Sacramento Corridor Phase 2 Project at the location where the elderberry shrubs are currently. The 20 shrubs that the South Sacramento Corridor Phase 2 Project would affect are a subset of the 26 elderberry shrubs that the Interstate-5/Cosumnes River Blvd Interchange Project will affect, for that reason the FTA has made the determination of *Not Likely to Adversely Affect* for the proposed South Sacramento Corridor Phase 2 Project regarding the VELB. Based on this, the Service concurs with the FTA determination of *Not Likely to Adversely Affect* for the proposed South Sacramento Corridor Phase 2 Project. No further discussion of VELB will appear in this Bio Op. However, in the event that the project timing is modified such that project-related activities associated with the South Sacramento Corridor Phase 2 Project occur prior to the Interstate-5/Cosumnes River Blvd Interchange Project, then it will be necessary for the FTA to reinitiate and address the impacts on VELB by the proposed South Sacramento Corridor Phase 2 Project.

Consultation History

- January 31, 2007* The Service received a request to initiate formal consultation under section 7 of the Act from the FTA for the Project with a copy of the BA prepared by Parsons Corp.
- February 8, 2007* The Service received an electronic copy of the *Supplemental Draft Environmental Impact Statement (SDEIS)/ Subsequent Draft Environmental Impact Report (SDEIR)* on a compact disk format (CD).
- March 30, 2007* A letter was sent by Justin Cutler (Service) requesting additional information (1-1-07-I-0576) regarding the Project to Leslie Rogers (FTA).
- April 2, 2007* Adam Ballard (ECORP) sent an electronic mail to Justin Cutler (Service) clarifying what additional information was needed by the Service.
- April 3, 2007* Justin Cutler (Service) confirmed additional information required to Adam Ballard (ECORP) via electronic mail.
- May 9, 2007* Service received *Supplemental Information in Support of Section 7 Consultation Packet* from ECORP which included:
- Current plan set overlaid on the wetland delineation;
 - Preliminary engineering drawings for proposed bridges;

- Copy of the 2006 *Special Status Plant Survey*, dated 4/26/2007;
- Copy of Parsons preliminary wetland delineation report;
- Copy of the verified wetland map set;
- Copy of CADD/GIS files to support the wetland delineation;
- Copy of the biological opinion (1-1-04-F-0363), for the *Proposed Interstate-5 Cosumnes River Boulevard Interchange Project*, Sacramento County, California;
- Copy of the biological opinion (1-1-01-F-0043), for the *South Sacramento County Streams Project*, Sacramento County, California.

July 31, 2007 Service received *Additional Information in Support of Section 7 Consultation Packet* from ECORP which included:

- Giant garter snake upland habitat assessment;
- Copy of FOIA request for copies of wetland delineations reports that have been prepared in the vicinity of the project, dated May 7, 2007;
- Copy of the response to the FOIA request from Carl Korman, USACE, dated June 14, 2007;
- Copy of relevant portions of the wetland delineation for the Freeport Regional Water Project, Freeport Regional Water Authority Alignment, prepared by Jones and Stokes, dated February 15, 2006.

August 24, 2007 Justin Cutler (Service) received electronic mail request for a meeting regarding the project from Adam Ballard (ECORP).

September 19, 2007 Justin Cutler (Service) sent an electronic mail to Adam Ballard (ECORP) that he, Justin, had taken a new position within the Service and would no longer be assigned to the project; in addition Mr. Cutler requested that the biological assessment be revised to include the following:

- GGS- Clear description of impact; quantify direct, indirect, and permanent vs. temporary impacts; a detailed compensation proposal for the loss of habitat; address the interrelated or interdependent actions such as compensatory mitigations;
- VP Crustaceans- Assess and quantify the indirect effects (within 250 feet) of construction activities;
- Provide GIS/CAD data requested in a projected format, preferably in a shapefile format with projection information.

November 6, 2007 Service received the revised *Biological Assessment* for the project from ECORP.

March 5, 2008 The project was assigned to Richard Montgomery (Service).

BIOLOGICAL OPINION

Description of the Proposed Action

The FTA and the RT, propose to extend LRT service from the existing Meadowview Station for approximately 4.3 mi to Cosumnes River College in Sacramento County, California. The proposed project will begin at Meadowview Road at the Union Pacific Railroad (UPRR) grade crossing and will extend southward along the existing UPRR right-of-way (ROW) to Morrison Creek, where it will turn to the west following the creek along its westerly bank to the confluence with Union House Creek (Beacon Creek). At the confluence of Morrison Creek and Union House Creek, the alignment turns eastward onto the Sacramento Regional County Sanitation District (SRCSD) Bufferlands, and then parallels Union House Creek to Bruceville Road at Cosumnes River College (CRC). From the intersection of Bruceville Road and Cosumnes River Boulevard (CRB), the project footprint will turn south to a terminus on the CRC campus. The proposed project will additionally include the construction of four LRT stations and associated facilities. A large part of the track alignments will be supported on new raised earth embankments. The Morrison Creek and Franklin station areas, including associated platforms and parking lots, will be constructed on raised embankments. Station facilities will include concrete platforms with modest passenger amenities, parking lots, and landscaping. During earth moving activities the conventional equipment used will include scrapers, dump trucks, bulldozers, compactors, water trucks, and graders. In addition, the following equipment will be used in construction of the stations to be built: asphalt paver, concrete trucks, concrete pumper, and small crane or boom truck.

The proposed project alignment crosses several streets within the City of Sacramento requiring roadway improvements. These are Meadowview Road (Rd), Franklin Boulevard (Blvd), Center Parkway (Pkwy) and College Entrance Rd. These improvements will include profile adjustments, drainage improvements, roadway widening, traffic signal modification, and the installation of crossing arm gates and signals, and grade crossing panels.

A new entrance will be constructed at the Franklin Station off of the CRB following the extension of CRB. If the CRB extension project is delayed, an interim entrance road will be constructed at intersection of Franklin Blvd and CRB.

At Center Pkwy it is assumed that CRB will not be widened prior to construction of this project. An interim bus turnout area and "kiss-and-ride" drop-off area is proposed for this project on the north side of CRB, immediately west of Center Pkwy for the Center parkway Station. A 12-foot wide multi-use path is to be constructed on the north side of the LRT, and will be used by maintenance vehicles, bicyclists, and pedestrians. The bridge structure on Center pkwy over Union House Creek is to be widened on both sides to accommodate bus turnouts.

A number of key utilities exist along the alignment including high voltage overhead transmission lines, gas lines, and several fiber optic telephone facilities. Based on the utility information gathered, various utility modifications and relocations have been identified as a result of the proposed project.

The proposed project will include two concrete LRT bridges. One will span Morrison Creek and the UORR freight tracks. The other is a grade separation flyover spanning CRB. In addition, there will be two pedestrian bridge structures over Union House Creek; one at the Franklin Station and the other between Franklin Blvd and Center Pkwy. There are two optional LRT grade separation bridges proposed at Meadowview Rd. and at Franklin Blvd. Foundations for the pedestrian bridges are expected to be concrete filled, drilled-hole piles. The superstructures for the larger bridges are to be reinforced post-tensioned concrete. The larger equipment needed for construction will include a pile auger drill rig, concrete trucks, concrete pumps, dump trucks, excavator, back hoe, and small and large cranes.

A number of short retaining walls will be required to retain the earth embankments at limited locations along the project. Additionally, sound walls will be constructed along selected locations of the alignment. Equipment necessary to construct these features will include delivery trucks, forklifts or small cranes, cement trucks, and concrete pumps.

The overhead catenary system will consist of spaced steel poles with electrical wiring suspended between the poles in order to provide electrical power to the rail vehicles. The poles are typically supported in concrete pier foundations. The traction power system is comprised of prefabricated buildings that will be positioned adjacent to the tracks and contain equipment that provides power to the catenary system. The power is transmitted to the overhead catenary system by means of underground cables. The substation buildings will be mounted on slab foundations at the same level as the surrounding ground. The equipment that will be needed for these features will include an auger drill rig, small crane, concrete trucks, concrete pumps, rail mounted delivery trucks, and power winches.

The train control and communication systems will comprise a network of cables connected to track circuits and points of communication, such as substations and passenger stations. The cables will run along the length of the route, supported by the catenary poles and connected to equipment by way of underground conduits. Cables and equipment will be installed using rail mounted and road vehicles with bucket attachments and power winches.

Proposed Conservation Measures.

The FTA and RT propose to minimize and avoid construction impacts through the use of Best Management Practices (BMP) and procedures that have been established for the construction of large-scale public works projects. The following are proposed *Minimization and Avoidance Procedures* for the project:

1. Precautions to prevent pollution of streams, waterways, and other bodies of water during construction;
2. Dust control through watering of appropriate surfaces;
3. Clearing and grubbing procedures that specify that only trees and plants designated for removal shall be removed;

4. Excavation techniques to ensure the stability of subsurface materials as well as retention of excavated materials within the construction areas;
5. Construction within wetlands will be avoided during the rainy season to prevent excess siltation and sedimentation;
6. Materials and fluids generated by construction activities will be placed at least 100 feet (ft) from wetland areas or drainages until they can be disposed of at a permitted site;
7. After construction activities are complete, any temporary fill or construction debris shall be removed from disturbed areas will be restored to their pre-project conditions;
8. All natural communities, wetland areas, and potential habitat for listed species located outside the construction zone that could be affected by construction activities will be temporarily fenced off using high visibility fencing and designated as Environmentally Sensitive Areas (ESAs) to prevent accidental intrusion by workers and/or construction equipment. The fencing will be inspected and maintained on a regular basis throughout the construction process and will only be removed when construction of the project is completed;
9. A Service-approved biological monitor will inspect construction-related activities daily at the project site, where threatened and endangered species may occur, to ensure that there is no unauthorized take of federally listed species or destruction of their habitat. The monitor will have the authority to stop construction activities that may result in unauthorized take of federally listed species or destruction of their habitat until appropriate corrective measures have been implemented. The monitor will be responsible for immediately reporting any sightings of federally listed species within the project area or unauthorized impacts to the Service;
10. An environmental awareness program will be developed and implemented for construction personnel, including contractors. The training will include information on special-status species that may occur within or adjacent to work areas, the required avoidance and minimization measures to avoid take of these species and their habitats, and potential penalties for not complying with the requirements; and
11. The number and size of access roads and staging areas, and the total area of project activities will be restricted to the minimum necessary for the duration of the project construction activities. Stockpiling of construction materials, portable equipment, vehicles, etc. will be confined to the construction staging areas. Movement of heavy equipment to and from the project area will be restricted to established roadways to minimize disturbance. Project-related vehicles shall observe a 20-mile per hour speed limit within construction areas, except on City and County roads and on County, State, and Federal highways. All heavy equipment, vehicles, and supplies will be stored at the designated staging area at the end of each work period.

Giant garter snake

A total of approximately 0.001 ac (44 square feet) of aquatic habitat will be permanently affected by the project due to construction of the UPRR flyover at the confluence of Morrison Creek and Union House Creek. In addition, approximately 0.05 acre of aquatic habitat will be temporarily affected during construction activities associated with the UPRR flyover at that same location. Project related permanent and temporary impacts to potential upland habitat are 0.46 ac for permanent, and 8.39 ac temporary impacts. Project-related impacts to upland habitat will occur at various locations along the project including the UPRR flyover, the pedestrian access bridge at Deer Lake Drive, and in the vicinity of the modified detention basin.

Project-Related Impacts to Potential Giant Garter Snake Habitat (acres)			
Aquatic Habitat		Upland Habitat	
Permanent Impact	Temporary Impact	Permanent Impact	Temporary Impact
0.001	0.05	0.46	8.39

Pursuant to the *Programmatic Formal Consultation* (1-1-97-F-0149) for GGS, the following compensation measures will be implemented:

1. GGS habitat permanently impacted by the project will be compensated for at a 3:1 ratio.
2. All compensation habitats must include both upland and aquatic habitat components. Upland and aquatic habitat components will be compensated at a 2:1 ratio of upland acres to aquatic acres of habitat (2 upland acres for every 1 acre of aquatic).
3. Temporarily impacted GGS habitat will be restored and compensated for at a 1:1 ratio.

Giant Garter Snake Habitat; Impacted and Compensation (acres)			
Permanent Impacts			Compensation Acreage (3:1)
Aquatic Habitat	Upland Habitat	Total	
0.001	0.46	0.461	1.383
Temporary Impacts			(1:1)
0.05	8.39	8.44	8.44

Avoidance and minimization measures:

1. Avoid construction activities within 200 ft from the banks of GGS 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 (the active period for this species). Construction activities within 200 ft from the banks of aquatic habitat should be avoided during GGS inactive season.

3. Construction personnel will receive Service-approved worker environmental awareness training.
4. The project area will be surveyed by a Service-approved biologist for GGS 24-hours prior to construction activities. The survey will be repeated if a lapse in construction activity of two weeks or greater occurs. If a GGS is encountered during construction, activities will cease until appropriate corrective measures have been completed or it has been determined that GGS will not be harmed. Only Service-permitted individuals may handle GGS. Report any sightings and any incidental take to the Service immediately by telephone.
5. Any dewatered habitat should remain dry for at least 15 consecutive days after April 15 and prior to any excavating or filling of the dewatered habitat.
6. Confine clearing to the minimal area necessary to facilitate construction activities
7. Flag and designate avoided GGS habitat within and adjacent to the project areas as ESAs. The ESAs should be avoided by all construction personnel.
8. After completion of construction activities, remove any temporary fill and construction debris and, wherever feasible, restore disturbed areas to pre-project conditions.

Vernal Pool Branchiopods

The project is located within the recognized range of the listed vernal pool branchiopods, vernal pool fairy shrimp and vernal pool tadpole shrimp, and potential habitat is present on-site and in the immediate vicinity of the project. In the Bio Op for the Interstate 5/ Cosumnes River Blvd Interchange Project (1-1-04-F-0363) (Service 2005), the Service determined that vernal pool fairy shrimp and vernal pool tadpole shrimp are reasonably certain to inhabit the proposed project's action area (which overlaps portions of the South Sacramento Corridor Phase 2 project site), based on the known occurrences of these two species in wetlands throughout the SRCSB Bufferlands and the occurrence of potential habitat for these species on-site. Therefore, the presence of vernal pool fairy shrimp and vernal pool tadpole shrimp is assumed within the South Sacramento Corridor Phase 2 project site within features on-site that represent potential habitat and potential project-related effects are mitigated accordingly.

Project-Related Affects to Potential Vernal Pool Branchiopod Habitat (acres)		
Potential Vernal Pool Branchiopod Habitat	Directly Affected	Indirectly Affected
	0.14	0.99

Direct impacts to vernal pool branchiopod habitat by the project will be compensated for through the combination of preservation and creation/restoration components as follows:

- Preservation Component: for every acre of directly and indirectly impacted habitat, two acres (2:1 ratio) will be preserved at a Service-approved conservation bank, or, based on

Service evaluation and approval of site specific conservation values, three acres (3:1 ratio) of vernal pool habitat may be preserved on the project site or on another non-bank site as approved by the Service.

- **Creation/Restoration Component:** For every acre of habitat directly impacted, at least one acre (1:1 ratio) of vernal pool creation credit will be dedicated within a Service-approved conservation bank, or, based on a Service evaluation of site-specific conservation values, two acres of vernal pool habitat will be created and monitored on the project site or on another non-bank site as approved by the Service.

Indirect impacts to habitat by the project will be compensated for as follows: For every acre of indirectly impacted habitat, two acres (2:1 ratio) will be preserved at a Service-approved conservation bank, or, based on Service evaluation of site-specific conservation values, three acres (3:1 ratio) of vernal pool habitat may be preserved and monitored on the project site or on another non-bank site as approved by the Service.

Affected, Preservation, and Creation Acreages for Impacts to Potential Vernal Pool Branchiopod Habitat				
Directly Impacted			Indirectly Impacted	
Impacted Acreage	Preservation Component (2:1)	Creation/Restoration Component (1:1)	Impacted Acreage	Preservation Component (2:1)
0.14	0.28	0.14	0.99	1.98

Action Area

The action area is defined in 50 CFR § 402.02, as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” For the proposed action, the Service considers the action area to be the existing and proposed new roadway and right-of-way (ROW). The proposed project is located in southern Sacramento County, California, within the southwestern portion of the Sacramento Valley, within the Lower Sacramento Watershed. The proposed project will span a length of 4.3 mi beginning at the Meadowview Rd UPRR grade crossing and terminating at the Cosumnes River College campus. The land use for the area is dominated by suburban development, the Sacramento Regional County Sanitation District (SRCSD) Bufferlands, and right-of-ways. The proposed project is within the U.S. Geological Survey (USGS) Quadrangle (quad) of Florin (496B); T 7N, R 5E, Sections 7, 8, 14, 15, 16, 17, 22, and 23; UTM 634054E, 4259196N.

Status of the Species

Giant garter snake

Listing. The Service published a proposal to list the giant garter snake as an endangered species on December 27, 1991 (56 FR 67046). The Service reevaluated the status of the snake before adopting the final rule, which listed as a threatened species on October 20, 1993 (58 FR 54053).

Description. The giant garter snake is one of the largest garter snakes species reaching a total length of approximately 64 inches (162 centimeters). Females tend to be slightly longer and proportionately heavier than males. Generally, the snakes have a dark dorsal background color with pale dorsal and lateral stripes, although coloration and pattern prominence are geographically and individually variable (Hansen 1980; Rossman *et al.* 1996).

Historical and Current Range. Giant garter snakes formerly occurred throughout the wetlands that were extensive and widely distributed in the Sacramento and San Joaquin Valley floors of California (Fitch 1940; Hansen and Brode 1980; Rossman and Stewart 1987). The historical range of the snake is thought to have extended from the vicinity of Chico, Butte County, southward to Buena Vista Lake, near Bakersfield, in Kern County (Fitch 1940; Fox 1948; Hansen and Brode 1980; Rossman and Stewart 1987). Early collecting localities of the giant garter snake coincide with the distribution of large flood basins, particularly riparian marsh or slough habitats and associated tributary streams (Hansen and Brode 1980). 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 lake beds (Hansen 1980; Hansen and Brode 1980).

Upon federal listing in 1993, the Service identified 13 separate populations of giant garter snakes, with each population representing a cluster of discrete locality records (Service 1993). The 13 populations largely coincide with historical flood basins and tributary streams throughout the Central Valley: (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/White Slough, (10) East Stockton--Diverting Canal & Duck Creek, (11) North and South Grasslands, (12) Mendota, and (13) Burrel/Lanare.

The known range of the giant garter snake has changed little since the time of listing. In 2005, giant garter snakes were observed at the City of Chico's wastewater treatment facility, approximately ten miles north of what was previously believed to be the northernmost extent of the species' range (D. Kelly pers. comm. 2006; E. Hansen pers. comm. 2006). The southernmost known occurrence is at the Mendota Wildlife Area in Fresno County. No sightings of giant garter snakes south of Mendota Wildlife Area within the historic range of the species have been made since the time of listing (Hansen 2002).

Essential Habitat Components. Endemic to wetlands in the Sacramento and San Joaquin valleys, the giant garter snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, and other waterways and agricultural wetlands, such as irrigation and drainage canals, rice fields and

the adjacent uplands (Service 1999). 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 over-wintering habitat with escape cover (vegetation, burrows) and underground refugia (crevices and small mammal burrows) (Hansen 1988). Snakes are typically absent from larger rivers and other bodies of water that support introduced populations of large, predatory fish, and from wetlands with sand, gravel, or rock substrates (Hansen 1988; Hansen and Brode 1980; Rossman and Stewart 1987). Riparian woodlands do not provide suitable habitat because of excessive shade, lack of basking sites, and absence of prey populations (Hansen 1988).

Foraging Ecology. Giant garter snakes are the most aquatic garter snake species and are active foragers, feeding primarily on aquatic prey such as fish and amphibians (Fitch 1941). Because the giant garter snake's historic prey species are either declining, extirpated, or extinct, the predominant food items are now introduced species such as carp (*Cyprinus carpio*), mosquitofish (*Gambusia affinis*), larval and sub-adult bullfrogs (*Rana catesbiana*), and Pacific chorus frogs (*Pseudacris regilla*) (Fitch 1941; Hansen 1988; Hansen and Brode 1980, 1993; Rossman et al. 1996).

Reproductive Ecology. The giant garter snake breeding season extends through March and April, and females give birth to live young from late July through early September (Hansen and Hansen 1990). 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).

Movements and Habitat Use. The giant garter snake is highly aquatic but also occupies a terrestrial niche (Service 1999; Wylie et al. 2004a). The snake typically inhabits small mammal burrows and other soil and/or rock crevices during the colder months of winter (i.e., October to April) (Hansen and Brode 1993; Wylie et al. 1995; Wylie et al. 2003a), and also uses burrows as refuge from extreme heat during its active period (Wylie et al. 1997; Wylie et al. 2004a). While individuals usually remain in close proximity to wetland habitats, the Biological Resource Division of the U.S. Geological Survey (BRD) has documented snakes using burrows as much as 165 feet (50 meters) away from the marsh edge to escape extreme heat, and as far as 820 feet (250 meters) from the edge of marsh habitat for over-wintering habitat (Wylie et al. 1997).

In studies of marked snakes in the Natomas Basin, snakes moved about 0.25 to 0.5 miles (0.4 to 0.8 kilometers) per day (Hansen and Brode 1993). Total activity, however, varies widely between individuals; individual snakes have been documented to move up to 5 miles (8 kilometers) over a few days in response to dewatering of habitat (Wylie et al. 1997) and to use up to more than 8 miles (12.9 kilometers) of linear aquatic habitat over the course of a few months. Home range (area of daily activity) averages about 0.1 mile² (25 hectares) in both the Natomas Basin and the Colusa National Wildlife Refuge (NWR) (Wylie 1998a; Wylie et al. 2002), yet can be as large as 14.5 miles² (3744 hectares) (Wylie and Martin 2004).

Rice fields have become important habitat for giant garter snakes, particularly associated canals and their banks for both spring and summer active behavior and winter hibernation (Hansen 2004; Wylie 1998b). While within the rice fields, snakes forage in the shallow water for prey, utilizing rice plants and vegetated berms dividing rice checks for shelter and basking sites (Hansen and Brode 1993). In the Natomas Basin, habitat used consisted almost entirely of irrigation ditches and established rice fields (Wylie 1998a; Wylie *et al* 2004a), while in the Colusa NWR, snakes were regularly found on or near edges of wetlands and ditches with vegetative cover (Wylie *et al.* 2003a). Telemetry studies also indicate that active snakes use uplands extensively, particularly where vegetative cover exceeds 50 percent in the area (Wylie 1998b).

Predators. Giant garter snakes are killed and/or eaten by a variety of predators, including raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*), opossums (*Didelphis virginiana*), bull frogs (*Rana catesbiana*), hawks (*Buteo* sp.), egrets (*Casmerodius albus*, *Egretta thula*), river otters (*Ludra canadensis*), and great blue herons (*Ardea herodias*) (Dickert 2003; Wylie *et al.* 2003c; G. Wylie pers. comm. 2006). Many areas supporting snakes have been documented to have abundant predators; however, predation does not seem to be a limiting factor in areas that provide abundant cover, high concentrations of prey items, and connectivity to a permanent water source (Hansen and Brode 1993; Wylie *et al.* 1995).

Reasons for Decline and Threats to Survival. The current distribution and abundance of the giant garter snake is much reduced from former times (Service 1999). Prior to reclamation activities beginning in the mid- to late-1800s, about 60 percent of the Sacramento Valley was subject to seasonal overflow flooding providing expansive areas of snake habitat (Hinds 1952). Now, less than 10 percent, or approximately 319,000 acres (129,000 hectares), of the historic 4.5 million acres (1.8 million hectares) of Central Valley wetlands remain (U.S. Department of Interior 1994), of which very little provides habitat suitable for the giant garter snake. 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 (Hansen 1980; Hansen and Brode 1980).

Valley flood wetlands are now subject to cumulative effects of upstream watershed modifications, water storage and diversion projects, as well as urban and agricultural development. The Central Valley Project (CVP), the largest water management system in California, created an ecosystem altered to such an extent that remaining wetlands depend on highly managed water regimes (U.S. Department of Interior 1994). Further, the implementation of CVP has resulted in conversion of native habitats to agriculture, and has facilitated urban development through the Central Valley (Service 1999). For instance, residential and commercial growth with the Central Valley is consuming an estimated 15,000 acres of Central Valley farmland each year (American Farmland Trust 1999), with a project loss of more than one million acres by the year 2040 (USGS 2003). Environmental impacts associated with urbanization include loss of biodiversity and habitat, alternation of natural fire regimes, fragmentation of habitat from road construction, and degradation due to pollutants. Further,

encroaching urbanization can inhibit rice cultivation (J. Roberts pers. comm. 2006). Rapidly expanding cities within the snake's range include Chico, Yuba City, the Sacramento area, Galt, Stockton, Gustine, and Los Banos.

Ongoing maintenance of aquatic habitats for flood control and agricultural purposes eliminates or prevents the establishment of habitat characteristics required by snakes (Hansen 1988). Such practices 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). For example, tilling, grading, harvesting and mowing may kill or injure giant garter snakes (Wylie *et al.* 1997). Biocides applied to control aquatic vegetation reduce cover for the snake and may harm prey species (Wylie *et al.* 1995). Rodent control threatens the snake's upland estivation habitat (Wylie *et al.* 1995; Wylie *et al.* 2004a). Restriction of suitable habitat to water canals bordered by roadways and levee tops renders snakes vulnerable to vehicular mortality (Wylie *et al.* 1997). Rolled erosion control products, which are frequently used as temporary berms to control and collect soil eroding from constriction sites, can entangle and kill snakes (Stuart *et al.* 2001; Barton and Kinkead 2005). Livestock grazing along the edges of water sources degrades water quality and can contribute to the elimination and reduction of available quality snake habitat (Hansen 1988; E. Hansen, pers. comm. 2006), and giant garter snakes have been observed to avoid areas that are grazed (Hansen 2003). Fluctuation in rice and agricultural production affects stability and availability of habitat (Paquine *et al.* 2006; Wylie and Casazza 2001; Wylie *et al.* 2003b, 2004b).

Other land use practices also currently threaten the survival of the snake. Recreational activities, such as fishing, may disturb snakes and disrupt thermoregulation and foraging activities (E. Hansen pers. comm. 2006). 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 the species (Beam and Menges 1997; Dickert 2005; Paquin *et al.* 2006).

Nonnative predators, including introduced predatory game fish, bullfrogs, and domestic cats, can threaten snake populations (Dickert 2003; Hansen 1986; Service 1993; Wylie *et al.* 1995; Wylie *et al.* 2003c). Nonnative competitors, such as the introduced water snake (*Nerodia fasciata*) in the American River and associated tributaries near Folsom, may also threaten the giant garter snake (Stitt *et al.* 2005).

The disappearance of giant garter snakes from much of the west side of the San Joaquin Valley was approximately contemporaneous with the expansion of subsurface drainage systems in this area, providing circumstantial evidence that the resulting contamination of ditches and sloughs with drainwater constituents (principally selenium) may have contributed to the demise of giant garter snake populations. Dietary uptake is the principle route of toxic exposure to selenium in wildlife, including giant garter snakes (Beckon *et al.* 2003). Many open ditches in the northern San Joaquin Valley carry subsurface drainwater with elevated concentrations of selenium, and green sunfish (*Lepomis cyanellus*) have been found to have concentrations of selenium within the range of concentrations associated with adverse effects on predator aquatic reptiles (Hopkins *et al.* 2002; Saiki 1998). Studies on the effects of selenium on snakes suggest that snakes with high

selenium loads in their internal organs can transfer potentially toxic quantities of selenium to their eggs (Hopkins *et al.* 2004) and also demonstrate higher rates of metabolic activity than uncontaminated snakes (Hopkins *et al.* 1999).

Status with Respect to Recovery. The draft recovery plan for the giant garter snake subdivides its range into three proposed recovery units (Service 1999): (1) Sacramento Valley Recovery Unit; (2) Mid-Valley Recovery Unit; (3) San Joaquin Valley Recovery Unit; and (4) South Valley Recovery Unit.

The Sacramento Valley Unit at the northern end of the species' range contains sub-populations in the Butte Basin, Colusa Basin, and Sutter Basin (Service 1999; Service 2006). Protected snake habitat is located on State refuges and refuges of the Sacramento National Wildlife Refuge (NWR) Complex in the Colusa and Sutter Basins. Suitable snake habitat is also found in low gradient streams and along waterways associated with rice farming. This northernmost recovery unit is known to support relatively large, stable sub-populations of giant garter snakes (Wylie *et al.* 1995; Wylie *et al.* 1997; Wylie *et al.* 2002; Wylie *et al.* 2003a; Wylie *et al.* 2004a). Habitat corridors connecting subpopulations, however, are either not present or not protected, and are threatened by urban encroachment.

The Mid-Valley Unit includes sub-populations in the American, Yolo, and Delta Basins (Service 1999; Service 2006). The status of Mid-Valley sub-populations is very uncertain; each is small, highly fragmented, and located on isolated patches of limited quality habitat that is increasingly threatened by urbanization (E. Hansen 2002, 2004; Service 1993; Wylie 2003; Wylie and Martin 2004; Wylie *et al.* 2004b; Wylie *et al.* 2005; G. Wylie pers. comm. 2006).

The American Basin sub-population, although threatened by urban development, receives protection from the Metro Air Park and Natomas Basin Habitat Conservation Plans, which share a regional strategy to maintain a viable snake sub-population in the basin.

The San Joaquin Valley Unit, which includes sub-populations in the San Joaquin Basin, formerly supported large snake populations, but numbers have severely declined, and recent survey efforts indicate numbers are extremely low compared to Sacramento Valley sub-populations (Dickert 2002, 2003; Hansen 1988; Williams and Wunderlich 2003; Wylie 1998a). Giant garter snakes currently occur in the northern and central San Joaquin Basin within the Grassland Wetlands of Merced County and the Mendota Wildlife Area of Fresno County; however, these sub-populations remain small, fragmented, and unstable, and are probably decreasing (Dickert 2003, 2005; G. Wylie pers. comm., 2006).

The South Valley Unit included sub-populations in the Tulare Basin, however, agricultural and flood control activities are presumed to have extirpated the snake from the Tulare Basin (Hansen 1995). Comprehensive surveys for this area are lacking and where habitat remains, the giant garter snake may be present.

Since 1995, BRD has studied snake sub-populations at the Sacramento, Delevan, and Colusa NWRs and in the Colusa Basin Drain 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 of the Delta Basin, and in the Natomas Basin within the American Basin (Hansen 2003, 2004; Wylie 1998a, 1998b, 2003; Wylie *et al.* 1995; Wylie *et al.* 2002; Wylie *et al.* 2003a, 2004a; Wylie *et al.* 2003b, 2004b). These areas contain the largest extant giant garter snake sub-populations. Outside of protected areas, however, snakes are still subject to all threats identified in the final rule. The other sub-populations are distributed discontinuously in small, isolated patches, and are vulnerable to extirpation by stochastic environmental, demographic, and genetic processes (Goodman 1987).

The draft recovery criteria require multiple, stable sub-populations within each of the three recovery units, with sub-populations well-connected by corridors of suitable habitat. This entails that corridors of suitable habitat between existing snake sub-populations be maintained or created to enhance sub-population interchange to offset threats to the species (Service 1999). Currently, only the Sacramento Valley Recovery Unit is known to support relatively large, stable giant garter snake populations. Habitat corridors connecting sub-populations, even in the Sacramento Valley Recovery Unit, are either not present or not protected. Overall, the future availability of habitat in the form of canals, ditches, and flooded fields are subject to market-driven crop choices, agricultural practices, and urban development, and are, thus, uncertain and unpredictable.

Vernal Pool Branchiopods

The vernal pool tadpole shrimp and vernal pool fairy shrimp were listed as endangered and threatened, respectively, on September 19, 1994. Complete descriptions of these species are found in 59 FR 48136, the final rule listing these species under the Act. These branchiopods are restricted to vernal pools and swales and other seasonal aquatic habitats. The vernal pool fairy shrimp is found in California and southern Oregon, and the vernal pool tadpole shrimp is found in California. Eng *et al.* (1990) and Simovich *et al.* (1992) provide further details about their life history and ecology. The Service did not designate any critical habitat for the vernal pool crustaceans in Sacramento County. Although the Service designated critical habitat for the vernal pool fairy shrimp in San Joaquin County, none will be affected by the proposed project.

Life history of vernal pool tadpole shrimp - The vernal pool tadpole shrimp has dorsal compound eyes, a large shield-like carapace that covers most of its body, and a pair of long cercopods at the end of its last abdominal segment (Linder 1952; Longhuist 1955; Pennak 1989). It is primarily a benthic animal that swims with its legs down. Vernal pool tadpole shrimp climb or scramble over objects, and plow along bottom sediments as they forage for food. Its diet consists of organic detritus and living organisms, such as fairy shrimp and other invertebrates (Pennak 1989; Fryer 1987). The females deposit their eggs on vegetation and other objects on the pool bottom. Tadpole shrimp eggs are known as cysts, and during the dry months of the year, they lie dormant in the dry pool sediments (Lanaway 1974; Ahl 1991).

The life history of the vernal pool tadpole shrimp is linked to the environmental characteristics of its vernal pool habitat. After winter rains fill the pools, dormant vernal pool tadpole shrimp cysts may hatch in as little as four days (Ahl 1991, Rogers *in litt.* 2001), and tadpole shrimp may

become sexually mature within three to four weeks after hatching (Ahl 1991; Helm 1998; King 1996). A portion of the cysts hatch immediately and the rest remain dormant in the soil to hatch during later rainy seasons (Ahl 1991). The vernal pool tadpole shrimp is a relatively long-lived species (Ahl 1991), and will generally survive for as long as their habitats remain inundated, sometimes for six months or more (Ahl 1991, Gallagher 1996, Helm 1998). Adults are often present and reproductive until the pools dry up in the spring (Ahl 1991; Simovich *et al.* 1992). Mature adults may be present in pools until the habitats dry up in the spring (Ahl 1991, Gallagher 1996; Simovich *et al.* 1992).

Life history of vernal pool fairy shrimp - Vernal pool fairy shrimp have delicate elongate bodies, large stalked compound eyes, no carapace, and 11 pairs of phyllo-pods, or gill-like structures that also serve as legs. The swim or glide gracefully upside-down by means of complex, wavelike beating movements. Fairy shrimp feed on algae, bacteria, protozoa, rotifers, and detritus. The second pair of antennae in fairy shrimp adult males are greatly enlarged and specialized for clasping the females during copulation. The females carry eggs in an oval or elongate ventral brood sac. The eggs are either dropped to the pool bottom or remain in the brood sac until the female dies and sinks. The dormant cysts are capable of withstanding heat, cold, and prolonged desiccation, and they can remain viable in the soil for decades after deposition. When the pools refill in the same or subsequent seasons, some, but not all, of the cysts may hatch. The cyst bank in the soil may therefore be comprised of cysts from several years of breeding (Donald 1983). The early stages of the fairy shrimp develop rapidly into adults. The vernal pool fairy shrimp can mature quickly, allowing populations to persist in short-lived shallow pools (Simovich *et al.* 1992). In pools that persist for several weeks to a few months, fairy shrimp may have multiple hatches during a single season (Helm 1998; Gallagher 1996).

Vernal Pool Ecology and Species Adaptations - The hydrology that maintains the pattern of inundation and drying characteristic of vernal pool habitats is complex. Vernal pool habitats form in depressions above an impervious soil layer (duripan) or rock substrate. After winter rains begin, this impervious layer prevents the downward percolation of water and creates a perched water table causing the depression (or pool) to fill. Due to local topography and geology, the depressions are generally part of an undulating landscape, where soil mounds are interspersed with basins, swales, and drainages (Nikiforoff 1941, Holland and Jain 1978). These features form an interconnected hydrological unit known as a vernal pool complex. Although vernal pool hydrology is driven by the input of precipitation, water input to vernal pool basins also occurs from surface and subsurface flow from the swale and upland portions of the complex (Zedler 1987, Hanes *et al.* 1990, Hanes and Stromberg 1998). Surface flow through the swale portion of the complex allows vernal pool species to move directly from one vernal pool to another. Upland areas are a critical component of vernal pool hydrology because they directly influence the rate of vernal pool filling, the length of the inundation period, and the rate of vernal pool drying (Zedler 1987, Hanes and Stromberg 1998). Upland areas associated with vernal pools are also an important source of nutrients to vernal pool organisms (Wetzel 1975). Vernal pool habitats derive most of their nutrients from detritus that is washed into the pool from adjacent uplands, and these nutrients provide the foundation for the vernal pool aquatic community food chain.

Both of the vernal pool crustaceans addressed in this biological opinion have evolved unique physical adaptations to survive in vernal pools. Vernal pool environments are characterized by a short inundation phase during the winter, a drying phase during the spring, and a dry phase during the summer (Holland and Jain 1978). The timing and duration of these phases can vary significantly from year to year, and in some years vernal pools may not inundate at all. In order to take advantage of the short inundation phase, vernal pool crustaceans have evolved short reproduction times and high reproductive rates. The listed crustaceans generally hatch within a few days after their habitats fill with water, and can start reproducing within a few weeks (Eng *et al.* 1990, Helm 1998, Eriksen and Belk 1999). Vernal pool crustaceans can complete their entire life cycle in a single season, and some species may complete several life cycles. Vernal pool crustaceans can also produce numerous offspring when environmental conditions are favorable. Some species may produce thousands of cysts during their life spans.

To survive the prolonged heat and desiccation of the vernal pool dry phase, vernal pool crustaceans have developed a dormant stage. The dormant egg, or cyst, can withstand temperatures near boiling (Carlisle 1968), fire (Wells *et al.* 1997), freezing, and anoxic conditions without damage to the embryo. The cyst wall cannot be affected by digestive enzymes, and can be transported in the digestive tracts of animals without harm (Horne 1967). Most fairy shrimp cysts can remain viable in the soil for a decade or longer (Belk 1998). Because the cyst contains a well developed embryo, the animal can quickly develop into a fully mature adult. This allows vernal pool crustaceans to reproduce before the vernal pool enters the dry phase, sometimes within only a few weeks (Helm 1998, Eriksen and Belk 1999). In some species, cysts may hatch immediately without going through a dormant stage, if they are deposited while the vernal pool still contains water. These cysts are referred to as quiescent, and allow the vernal pool crustacean to produce multiple generations in a single wet season as long as their habitat remains inundated.

Distribution of vernal pool tadpole shrimp - Vernal pool tadpole shrimp are found only in ephemeral freshwater habitats in California. The vernal pool tadpole shrimp is known from 168 occurrences in the Central Valley (CNDDDB 2004), ranging from east of Redding in Shasta County south to Fresno County, and from a single vernal pool complex located in the San Francisco Bay National Wildlife Refuge in Alameda County. It inhabits vernal pools containing clear to highly turbid water, ranging in size from 5 square meters (54 square feet) in the Mather Air Force Base area of Sacramento County, to the 36-hectare (89-acre) Olcott Lake at Jepson Prairie in Solano County. Although vernal pool tadpole shrimp are found on a variety of geologic formations and soil types, Helm (1998) found that over 50 percent of vernal pool tadpole shrimp occurrences were on High Terrace landforms and Redding and Corning soils.

Based on genetic differences, King (1996) separated vernal pool tadpole shrimp populations into two distinct groups. One group was comprised of animals inhabiting the floor of the Central Valley, near the Sacramento and San Joaquin Rivers. The other group contained vernal pool tadpole shrimp from sites along the eastern margin of the valley. King (1996) concluded that these two groups may have diverged because cyst dispersal by overland flooding historically connected populations on the valley floor, while populations on the eastern margin of the valley were not periodically connected by large scale flooding, and were therefore historically more

isolated. When dispersal of these foothill populations occurred, it was probably through different mechanisms such as migratory birds. King (1996) also found that populations in eastern Merced County, in the vicinity of the Flying M Ranch and the proposed University of California Merced campus, were very different from all other populations studied. She concluded, particularly because it is found on very ancient soils, that this group may have been isolated from other populations very early.

Distribution of vernal pool fairy shrimp - Vernal pool fairy shrimp are found only in ephemeral freshwater habitats in California and Southern Oregon. The vernal pool fairy shrimp is known from 342 occurrences extending from the Stillwater Plain in Shasta County through most of the length of the Central Valley to Pinnacles in San Benito County (Eng *et al.* 1990; Fugate 1992; Sugnet and Associates 1993; CNDDDB 2004). Five additional, disjunct populations exist: one near Soda Lake in San Luis Obispo County; one in the mountain grasslands of northern Santa Barbara County; one on the Santa Rosa Plateau in Riverside County; one near Rancho California in Riverside County; and one on the Agate Desert near Medford, Oregon. Three of these isolated populations each contain only a single pool known to be occupied by the vernal pool fairy shrimp. The vernal pool fairy shrimp inhabits vernal pools with clear to tea-colored water, most commonly in grass- or mud-bottomed swales, basalt flow depression pools in unplowed grasslands, or even sandstone rock outcrops or alkaline vernal pools.

Although the vernal pool crustaceans addressed in this biological opinion are not often found in the same vernal pool at the same time, when coexistence does occur, it is generally in deeper, longer lived pools (Eng *et al.* 1990; Thiery 1991; Gallagher 1996; Simovich 1998). In larger pools, vernal pool crustacean species may be able to coexist by utilizing different physical portions of the vernal pool or by eating different food sources (Daborn 1978; Mura 1991; Hamr and Appleton 1991; Thiery 1991), or by hatching at different temperatures or developing at different rates (Thiery 1991; Hathaway and Simovich 1996).

Dispersal - The primary historic dispersal method for the vernal pool tadpole shrimp and vernal pool fairy shrimp likely was large scale flooding resulting from winter and spring rains which allowed the animals to colonize different individual vernal pools and other vernal pool complexes (J. King, pers. comm., 1995). This dispersal is currently non-functional 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 may now be the primary dispersal agents for vernal pool tadpole shrimp and vernal pool fairy shrimp. The eggs of these branchiopods are either ingested (Krapu 1974; Swanson *et al.* 1974; Driver 1981; Ahl 1991) and/or adhere to the legs and feathers where they are transported to new habitats. Cysts may also be dispersed by a number of other species, such as salamanders, toads, cattle, and humans (Eriksen and Belk 1999).

Vernal pool crustaceans are often dispersed from one pool to another through surface swales that connect one vernal pool to another. These dispersal events allow for genetic exchange between pools and create a population of animals that extends beyond the boundaries of a single pool. Instead, populations of vernal pool crustaceans are defined by the entire vernal pool complex in which they occur (Simovich *et al.* 1992, King 1996). These dispersal events also allow vernal

pool crustaceans to move into pools with a range of sizes and depths. In dry years, animals may only emerge in the largest and deepest pools. In wet years, animals may be present in all pools, or in only the smallest pools. The movement of vernal pool crustaceans into vernal pools of different sizes and depths allows these species to survive the environmental variability that is characteristic of their habitats.

Reasons for Decline and Threats to Survival - The genetic characteristics of these species, as well as ecological conditions, such as watershed continuity, indicate that populations of vernal pool crustaceans are defined by pool complexes rather than by individual vernal pools (Fugate 1992). Therefore, the most accurate indication of the distribution and abundance of these species is the number of inhabited vernal pool complexes. The pools and, in some cases, pool complexes supporting these species may be small. Human-caused and unforeseen natural catastrophic events such as long-term drought, non-native predators, off-road vehicles, pollution, berming, and urban development, threaten their extirpation at some sites. Vernal pool fairy shrimp and vernal pool tadpole shrimp continue to be threatened by all of the factors which led to the original listing of this species, primarily habitat loss through agricultural conversion and urbanization (CNDDDB 2004).

Environmental Baseline

Giant Garter Snake

Delta Basin. The proposed project is located within the Delta Basin snake population, in the Mid Valley Recovery Unit (Service 1999). Twenty-five CNDDDB (2007) records are known from the Delta Basin. These records include Laguna Creek, Morrison Creek, Snodgrass Slough, Beach Lake, the creeks of the City of Elk Grove, Badger and Willow Creeks, Cosumnes River Preserve, Caldoni Marsh, White Slough, Duck Creek and other locations within the Basin. During a field reconnaissance in April 2002, a giant garter snake was observed on the southwestern levee of Webb Tract. Since then, habitat evaluations and snake surveys have been conducted on Webb Tract and Beacon Island (Patterson 2004; Patterson and Hansen 2003).

Potential snake habitat in the area exists in the form of contiguous linear irrigation canals and ditches. However, although both islands possess the essential snake habitat components, two years of surveys resulted in no further sightings capture of GGS.

Recent genetic work on giant garter snake population structure indicates three genetic entities within the species which follow the pattern of subdivision revealed by the snake's mitochondrial DNA and color pattern variants: north, central, and south (Paquin 2001; Paquin *et al.* 2006). Interestingly, evidence of historical gene flow between northern and southern populations exists; however, mitochondrial DNA data reveal that the central population, analogous to the Delta Basin, is genetically isolated from both northern and southern populations. High frequencies of unique mitochondrial DNA haplotypes in the central population increase the conservation value for the Delta Basin, particularly as a source for GGS genetic diversity.

Laguna and Morrison Creek, Duck Creek, the Elk Grove creeks, as well as Beach Lake, Snodgrass Slough, Caldoni Marsh, White Slough and associated tributaries, are important GGS habitat and movement corridors for the animal. Such waterways and associated wetlands provide vital permanent aquatic and upland habitat for GGS in areas with otherwise limited habitat. The recovery strategy for the GGS includes maintenance and/or creation of habitat corridors between existing sub-populations to enhance population interchange and offset threats to the species (USFWS 2003).

According to the CNDDDB (2007), the nearest snake record to the proposed project site is within 1 mile (1.6 kilometer), and there are an additional five CNDDDB records within 5 mi (8 km) from the proposed project footprint. GGS have been documented to move up to 5 mi (8 km) over a few days in response to dewatering of habitat (Wylie *et al.* 1997) and to us up to more than 8 mi (12.9 km) of linear aquatic habitat over the course of a few months (Wylie and Martin 2004). The action area contains habitat components that can be used by the snake for feeding, resting, mating, and other essential behaviors, as well as for a movement corridor. These occurrences are hydrologically connected with the proposed project site through Laguna and Morrison Creeks. Because of the biology and ecology of the snake, the presence of suitable habitat within the proposed project, and observations of the species, the Service has determined that the snake is reasonably certain to occur within the action area.

Factors Affecting GGS within the Action Area

The overall status of the giant garter snake has not improved since its listing. Based on scarcity of suitable habitat and limited population size, at listing, threats to the Delta Basin population were considered imminent (Service 1993). The status of the Delta Basin sub-population has been, and continues to be, impacted by past and present Federal, state, private, and other human activities.

A number of State, local, private, and unrelated Federal actions have occurred within the action area and adjacent regions 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. Projects affecting the environment in and around the action area include the improvement of the Northgate Boulevard/Arden-Garden Connector Intersection, the widening of Bond Road, construction of the Interstate 5/Consumnes River Boulevard Interchange, the Freeport Regional Water Diversion project, the Rivermont Drive Bridge project, the Rio Vista Northwest Wastewater Treatment project, the widening of Calvine Road, and the Kramer Ranch North project. In the past ten years, the Service has authorized take resulting in the permanent loss of more than 21 acres (9 hectares) of aquatic and 53 acres (22 hectare) of upland snake habitat, as well as temporary alteration of over 1,700 acres (688 hectares) of aquatic and 650 acres (263 hectares) of upland snake habitat in the Delta Basin.

Numerous recent development projects have been constructed in or near snake habitat in the rapidly developing areas in and around the cities of Sacramento, Elk Grove, Galt, and Stockton. Urban and commercial development results in direct habitat loss and also may expose snakes to secondary effects including water pollution from urban run-off and increased vehicular mortality,

both of which act in concert with rapid habitat loss and degradation to further threaten the snake in the Delta Basin. Also, development promotes road widening and bridge replacements, such as those authorized under section 7, which result in direct alteration of snake habitat. Most documented snake localities and/or movement corridors have been adversely impacted by development, including freeway construction, flood control projects, and commercial development. Further, several former localities are known to have been lost and/or depleted to that extent that continued viability is in question (Brode and Hansen 1992). The scarcity of remaining suitable habitat, flooding, stochastic processes, and continued threats of habitat loss pose a severe imminent threat to giant garter snakes in the Delta Basin.

Ongoing agricultural and flood control activities in the Delta Basin may decrease and degrade the remaining snake habitat affecting the environmental baseline for the snake. Such activities are largely not subject to section 7 consultation. Although rice fields and agricultural waterways can provide valuable seasonal foraging and upland 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 2003). On-going maintenance of agricultural waterways can also eliminate or prevent establishment of snake habitat, eliminate food resources for the snake, and fragment existing habitat and prevent dispersal of snakes (Service 2003).

Flood control and maintenance activities which can result in snake mortality and degradation of habitat include levee construction, stream channelization, and rip-rapping of streams and canals (Service 2003). Flood control programs are administered by the U.S. Army Corps of Engineers (Corps), and the Corps has typically consulted on previous projects and is expected to continue to do so for future projects. The ongoing nature of these activities and the administration under various programs, however, makes it difficult to determine the continuing and accumulative effects of these activities.

In addition to projects already discussed, projects affecting the environment in and around the action area include transportation projects with Federal, county, or local involvement. The Federal Highway Administration and/or the Corps have consulted with the Service on the issuance of wetland fill permits for several transportation-related projects within the Delta Basin that affected snake habitat. The direct effect of these projects is often small and localized, but the effects of transportation projects, which improve access and therefore indirectly affect snakes by facilitating further development of habitat in the area and by increasing snake mortality via vehicles, are not quantifiable.

Vernal Pool Branchiopods

Historically, vernal pools and vernal pool complexes occurred extensively throughout the Sacramento Valley of California. Conversion of vernal pools and vernal pool complexes, however, has resulted in a 91 percent loss of vernal pool resources in California (State of California 2003d). By 1973, between 60 and 85 percent of the area within the Central Valley that once supported vernal pools had been destroyed (Holland 1978). In subsequent 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. For example, between 1987 and 1992, 467 acres of wetlands within the Sacramento area were filled pursuant to Nationwide Permit 26 (Service 1992). A majority of those wetlands losses involved vernal pools, the endemic habitat of the vernal pool tadpole shrimp, the vernal pool fairy shrimp and slender and Sacramento Orcutt grasses. It was estimated in 1988 that within 20 years human activities would destroy 60 to 70 percent of the remaining vernal pools (Coe 1988). Holland (1998) estimated that almost three-quarters of vernal pool habitats in the Central Valley of California had been lost by 1997. Along the Central California coast, at least 90% of historic vernal pools have been destroyed, and most remaining vernal pools have been degraded (Farren and Pritchett 1988). In southern California, estimated loss of vernal pool habitat ranges from 95 to 100% (Bauder 1987, Oberbauer 1990, Zedler 1990, Bauder and McMillan 1998).

In addition to direct habitat loss, the two shrimp populations have been and continue to be highly fragmented throughout their ranges due to conversion of natural habitat for urban and agricultural uses. Fragmentation results in small isolated shrimp populations. Ecological theory predicts that such populations will be highly susceptible to extirpation due to chance events, inbreeding depression, or additional environmental disturbance (Gilpin and Soulé 1988; Goodman 1987a, b). If an extirpation event occurs in a population that has been fragmented, the opportunities for re-colonization would be greatly reduced due to physical (geographic) isolation from other (source) populations.

Human population growth in Sacramento County has steadily increased. On the average, Sacramento County has experienced an annual population increase of 1.38 percent for the period between 1991 and 1999 (Service 2000). For the period between 1990 and 2000, population growth in Sacramento County increased 17.5 percent (State of California 2002). This annual growth appears to be increasing, as demonstrated by the 2.63 percent and 2.2 percent increases in population growth in 2001 and 2002, respectively (State of California 2003a, 2003b). Increased housing demand and urban development accompany the population growth in Sacramento County. Between 1990 and 2000, housing units in Sacramento County increased by 1.37 percent annually (State of California 2000, 2003c). Population growth and concomitant housing demand and subsequent vernal pool resource development are projected to continue. Population projections for Sacramento County are expected to increase above 2000 levels by 19.7 percent in 2010, by 28 percent in 2015, and by 37.5 percent in 2020 (State of California 2001).

Sacramento County represents important, high quality habitat for the two shrimp populations by providing large, nearly contiguous areas of relatively undisturbed vernal pool habitat. Sacramento County contains the greatest number of occurrences of vernal pool tadpole shrimp within the range of the species, and also is one of the two counties with the greatest number of occurrences of vernal pool fairy shrimp within the range of the species. Sacramento County contains 58 (17 percent) out of the total of 342 reported occurrences of vernal pool fairy shrimp, and 58 (34 percent) out of the total of 173 reported occurrences of vernal pool tadpole shrimp (CNDDB 2004). Further, Sugnet and Associates (1993) reported that of 3,092 "discrete populations" checked, only 345 locations, or about 11 percent of all locations checked, were found to support the vernal pool tadpole shrimp. Of these 345 locations supporting the vernal pool tadpole shrimp, 219 (63 percent) were in Sacramento County. Further, of the

3,092 locations checked, 178 locations (6 percent) were found to support the vernal pool fairy shrimp. Of this total, 63 locations (35 percent) were within Sacramento County.

The vernal pool tadpole shrimp and vernal pool fairy shrimp are imperiled by a variety of human-caused activities. Their habitats have been lost through direct destruction and modification due to filling, grading, disking, leveling, and other activities. In addition, vernal pools have been imperiled by a variety of anthropogenic modifications to upland habitats and watersheds. These activities, primarily urban development, water supply/flood control projects, land conversion for agriculture, off-road vehicle use, certain mosquito abatement measures, and pesticide/herbicide use can lead to disturbance of natural flood regimes, changes in water table depth, alterations of the timing and duration of vernal pool inundation, introduction of non-native plants and animals, and water pollution. These indirect effects can result in adverse effects to vernal pool species

A number of State, local, private, and unrelated Federal actions have occurred within the project area and adjacent region affecting the environmental baseline of these species. Some of these projects have been subject to prior section 7 consultation. Based on an informal review, the Service has issued approximately 157 biological opinions to Federal agencies on proposed projects in Sacramento County that have adversely affected the shrimp species since the two species were proposed to be listed in 1994. This total does not reflect the formal consultations that were withdrawn, those that are suspended, and those that have insufficient information to conclude an effects analysis, those that were amended, or ones that the Service issued a conference opinion. No State of California actions that have taken place within Sacramento County have adversely affected the species in the action area. Although these proposed projects in Sacramento County have eliminated vernal pools and vernal pool complexes, the offsetting compensating measures are designed to minimize the effects of take of these species resulting in both negative and positive effects to the species. Thus, the trend for the two vernal pool species within the county is most likely static.

The actions listed above have resulted in both direct and indirect impacts to vernal pools within the region, and have contributed to the loss of vernal pool tadpole shrimp and vernal pool fairy shrimp populations. Although a reduction of the two shrimp populations has not been quantified, the acreage of lost habitat continues to grow.

In south Sacramento County, the Urban Services Boundary (USB) is a planning boundary that coincides with the areas north of the Cosumnes River/Deer Creek drainage system. Between 1993 and 2000, an estimated 14,950 acres were converted to urban development within the USB (pers. comm., D. Gifford, 2004), based on an analysis of the California Department of Water Resources mapping data. An independent analysis of urban growth in Sacramento County estimated that an estimated 22,000 acres were converted between 1990 and 2000, averaging 2,200 acres per year (pers. comm., Richard Radmacher, Sacramento County, 2004). As of 1998 (the most recent year for which vernal pool mapping from aerial photographs is available), there remained an estimated 23,533 acres of vernal pool grasslands within the USB, supporting approximately 946 acres of wetted vernal pool acreage (pers. comm., Lora Konde, California Department of Fish and Game, 2003).

Vernal pool complexes, occurring north of the Cosumnes River/Deer Creek drainage and within the USB, contain a high density of occupied pool of both vernal pool tadpole shrimp and vernal pool fairy shrimp. There are 31 known occurrences of vernal pool tadpole shrimp inside the USB, compared to 17 occurrences outside the USB (CNDDDB 2003). There are 25 known occurrences of vernal pool fairy shrimp inside the USB, compared to 18 occurrences outside the USB (CNDDDB 2003). The data from the CNDDDB do not reflect additional reported records in the Sunrise-Douglas area, where 137 occurrences of vernal pool tadpole shrimp and 46 occurrences of vernal pool fairy shrimp, and 2 occurrences of Orcutt grasses (2 slender Orcutt grass and 4 Sacramento Orcutt grass) are reported (pers. comm., Arnold Roessler, Service, 2004).

The vernal pools in Sacramento County are classified as young-terrace, old-terrace, and mudflow types (Jones & Stokes 1990). The vernal pools on the proposed project site are classified as the old-terrace type and are located on soils associated with Laguna geologic formation. Old-terrace is a rapidly disappearing habitat type in Sacramento County that consists of ancient river channel deposits that were laid down from 600,000 to more than one million years ago by the American River. By comparison, young-terrace formation dates from 100,000 to 200,000 years ago. Old-terrace formation generally has a higher density of vernal pools, deeper pools, and a greater number of special status plants and crustaceans than young-terrace formations. Some special status species found in old-terrace pools may have evolved from species inhabiting shores of ancient lakes in the Central Valley. Old-terrace pools may have served as refugia for these species as the lakes disappeared (Jones & Stokes, 1990). Sacramento County contains an estimated 764 wetted acres of vernal pools on low terrace, 1,390 wetted acres of vernal pools on high terrace, and 189 wetted acres of vernal pools on volcanic mudflow vernal pools.

There are two predominant soil types found within south Sacramento County. The Valley Springs soil type typifies Gill Ranch. Vernal pools found within the Valley Springs soil type are the young-terrace formation. Young-terrace formations, because they have a higher slope gradient, tend to have fewer vernal pools that are typically smaller and shallower. These vernal pools also are inundated for shorter durations. These factors typically result in lower species diversity. Generally, the larger the vernal pool on this soil type, the higher its biotic diversity. Vernal pool fairy shrimp, vernal pool tadpole shrimp, and Sacramento Orcutt grass are less likely to occur in young-terrace formation vernal pools found on Valley Springs soils (Holland, pers. comm. 2004).

The Laguna geologic formation and its associated soils entirely characterize the Sunrise Douglas Community Plan Area. Vernal pools found within this soil type are old-terrace types. Old-terrace types, because they have a lower slope gradient, tend to have pools that are larger, deeper, and clearer. These pools are inundated for longer periods, but dry and refill less often than the Valley Springs soil type. Generally, the smaller the vernal pool on this soil type, the higher its invertebrate diversity. Although vernal pool fairy shrimp occur in pools on both soil types, but more frequently in pools on Laguna soils. Vernal pool tadpole shrimp are found almost exclusively in old-terrace formation vernal pools found on Laguna soils.

Several areas containing old-terrace formation have been protected for their high quality vernal pool habitat and high concentration of special status species populations by the Sacramento

Valley Conservancy (SVC). This potential preserve area, the SVC's Vernal Pool Prairie Preserve, would cover 2,000 to 3,000 acres and supports a variety of special status plants and animals on relatively undisturbed grasslands containing young and old terrace formations and northern hardpan vernal pools. Within the proposed Prairie Preserve, areas already protected include the Arroyo Seco Mitigation Bank, the Excelsior 184 parcel, and the Sacramento County-owned Multi Cultural Park; outside of the proposed Prairie Preserve, the Sunrise Douglas Preservation Bank, and a portion of Howard Ranch are protected.

There are 342 records of vernal pool fairy shrimp and 173 records of vernal pool tadpole shrimp recorded in the CNDDDB for the entire state of California (CNDDDB 2004). Of these records, 58 vernal pool fairy shrimp records and 58 vernal pool tadpole shrimp records are from Sacramento County (CNDDDB 2004). Vernal pool fairy shrimp and vernal pool tadpole shrimp have both been observed in wetlands throughout the Sunrise Douglas area.

Species Presence in the Bufferlands - Vernal pool fairy shrimp and vernal pool tadpole shrimp have both been observed in wetlands throughout the SRCSD's Bufferlands (Jones & Stokes 2002a), within which a portion of the proposed project is located. In the rapidly developing county of Sacramento, the Bufferlands provide a large area of open space and phenomenal wildlife habitat. Over 375 ac of wetlands, including 247 ac of managed seasonal wetlands, can be found on the 2,650 ac Bufferlands complex. Over 20 ac of delineated vernal pools, which harbor federally listed vernal pool branchiopods, are also found in this complex. Based on this information as well as the fact that vernal pool habitat for listed vernal pool branchiopods occurs in the immediate area of the proposed project, the Service has determined that there is a high likelihood that the vernal pool tadpole shrimp and vernal pool fairy shrimp inhabit the proposed project's action area.

Effects of the Proposed Action

Giant Garter Snake

The proposed project will result in temporary effects to approximately 0.05 acre of aquatic and 8.39 acres of upland GGS habitat. The proposed project will permanently affect approximately 0.001 acre of aquatic and 0.46 acre of upland GGS habitat. Construction activities associated with the proposed project occurring in GGS upland and aquatic habitat may harm, harass, injure, or result in the mortality of GGS. These effects may be aggravated by the initiation of construction activities in the midst of GGS reproductive season. If any dewatering of portions of Morrison Creek is required, this could directly affect GGS through the loss of reproductive, basking, and foraging habitat. Further construction activities, including excavation and movement of large equipment, will remove vegetation cover and basking sites, fill or crush burrows or crevices, and decrease the prey base, and may result in the direct disturbance, displacement, injury, and/or mortality of GGS. Earthwork activities, earth surface modifications, and the staging of equipment and vehicles will temporarily disturb upland habitats and/or obstruct GGS movement. GGS may be killed or injured by construction equipment or other vehicles accessing the project site. Restoration and re-vegetation of the project site would minimize adverse effects resulting from the temporary loss of vegetative cover. The proponents

have proposed a number of conservation measures, such as timing restrictions and worker education programs, which would minimize the effects of the proposed project on GGS.

Indirect effects are caused by or are a result of the proposed action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside the area directly affected by the action. Indirect effects to GGS relative to the proposed project include the temporary displacement and reduction of aquatic prey due to construction activities as well as from increased sedimentation, oils, and other hazardous materials from access roads and staging areas which could wash into drainages. Disturbance from construction activities may also cause GGS to move into and across areas of unsuitable habitat where they may be prone to higher rates of mortality from vehicles and predation.

Vernal Pool Crustaceans

The proposed project will indirectly affect 0.99 acre, and will directly affect 0.14 acre of vernal pool crustacean habitat. Potential direct effects include temporary and permanent construction related impacts to potential habitat and potential take of individuals if the species occurs within the habitat. As currently defined, the proposed project will not impact the vernal pool on the SRCSD Bufferlands, or the seasonal wetlands at Cosumnes River College. However, the proposed project will directly and permanently impact a seasonal wetland (0.14 acre) located southeast of the confluence of Morrison Creek and Union House Creek. If any part of an aquatic feature that represents potential vernal pool crustacean habitat is proposed for impact, the entire feature is considered directly affected. Temporary construction-related impacts to the remaining potential vernal pool crustacean habitat will be avoided.

Habitat indirectly affected includes all habitat supported by destroyed upland areas and swales, and all habitat otherwise damaged by loss of watershed, human intrusion, introduced species, and pollution caused by the proposed project. Pursuant to this, potential vernal pool crustacean habitat that occurs within 250 ft (76 m) of construction activities may be considered indirectly affected.

Project-related activities will occur within 250 ft (76 m) of the remaining seasonal wetland features located southeast of the confluence of Morrison Creek and Union House Creek and the vernal pool within the SRCSD Bufferlands. Although project-related activities will occur within 250 ft (76 m) of the seasonal wetlands at Cosumnes River College, no impacts were assessed for these features. At this location, the proposed project alignment occurs along the north side of Cosumnes River Blvd, until the point where it passes over Cosumnes River Blvd and touches down southeast of the seasonal wetlands along Bruceville Rd.

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.

Several large projects are occurring or proposed to occur in the Bufferlands (SRCSD 2000, 2003; Jones & Stokes 2003). These include: 1) SRCSD's Lower Northwest Interceptor Project; 2) SRCSD's Sacramento Force Main, which is a portion of the lower Northwest Interceptor Project; 3) SRCSD's Laguna Interceptor Extension Project; 4) the Interstate-5 / Cosumnes River Blvd Interchange Project, which is in the alignment of the South Sacramento Corridor Phase 2 Project; 5) Freeport's Regional Water Project; 6) Sacramento Municipal Utility District's 24-Inch Natural Gas Pipeline Project; 7) the Delta Sores Project; and 8) the Stone Family Trust Project. These various projects will contribute to cumulative losses of habitat for federally-listed species such as the GGS, VELB, and vernal pool crustaceans across their range, particularly in south Sacramento County. While these activities may alter the habitats of the GGS, VELB, and vernal pool crustaceans and can potentially harass, harm, injure, or kill these species, because they have a federal nexus, they will be subject to section 7 consultations, and, therefore, will be conducted in accordance with standard avoidance and minimization measures for listed species.

Giant Garter Snake

Additionally, an undetermined number of future land use conversions and routine agricultural practices are not subject to Federal permitting processes and may alter the habitat or increase incidental take of GGS, and are, therefore cumulative to the proposed project. These additional cumulative effects include: 1) unpredictable fluctuations in aquatic habitat due to water management; 2) dredging and clearing of vegetation from irrigation canals; 3) discing or mowing upland habitat; 4) increased vehicular traffic on access roads adjacent to aquatic habitat; 5) use of burrow fumigants on levees and other potential upland refugia; 6) human intrusion into habitat; 7) diversion of water; 8) rip-rapping or lining of canals and stream banks; and 9) use of plastic erosion control netting (Stuart *et al.* 2001). Specific cumulative effects related to the proposed project include maintenance activities and/or increased potential for vandalism during, and after construction, which may degrade or destroy habitat or cause unpredictable fluctuations in habitat. Furthermore, the valley floor wetlands, which are preferred habitat of the GGS, are subject to the cumulative effects of upstream watershed modifications, water storage and diversion projects, as well as urban and agricultural development. The majority of all natural habitats have been lost and an unquantifiable small percentage of semi-natural wetlands remain extant. Only a small percentage of extant wetlands currently provides habitat suitable for the GGS.

Vernal Pool Crustaceans

Because the vernal pool tadpole shrimp and the vernal pool fairy shrimp are endemic to vernal pools in the Central Valley, coastal ranges, and a limited number of sites in the Transverse Range and Santa Rosa Plateau of California, the Service anticipates that a wide range of activities will affect these species. Such activities include, but are not limited to: 1) urban development; 2) water projects; 3) flood control projects; 4) highway projects; 5) utility projects; 6) chemical contaminants; and 7) conversion of vernal pools to agricultural use. Many of these activities will be reviewed under section 7 of the Act as a result of the Federal nexus provided by section 404 of the Federal Water Pollution Control Act, as amended (Clean Water Act).

The proposed project is located in a region where future destruction of vernal pool crustacean habitat is anticipated. Sacramento County will continue to develop within the county's sphere of influence. This development will result in increased direct loss of vernal pool habitat. Development in the vicinity of the proposed project is expected to result in further destruction of habitat for the listed vernal pool crustaceans. Continued loss of vernal pool habitat throughout the region could conceivably affect the genetic diversity of the local populations of listed vernal pool crustaceans. Any loss of genetic diversity can have significant effects on a population's ability to respond to environmental change over time (Frankel and Soule' 1981).

Conclusion

Analytical Framework for the Jeopardy/No Jeopardy Determination

The following analysis relies on four components to support the jeopardy/no jeopardy determination for the species that may be affected by the proposed project: 1) the *Status of the Species*, which evaluates the species' range-wide condition, the factors responsible for that condition, and its survival and recovery needs; 2) the *Environmental Baseline*, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the role of the action area in the species' survival and recovery; 3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and 4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the species. In accordance with the implementing regulations for section 7 and Service policy, the jeopardy/no jeopardy determination is made in the following manner: the effects of the proposed Federal action are evaluated with the aggregate effects of everything that has led to the species' current status and, for non-Federal activities in the action area, those actions likely to affect the species in the future, to determine if, given the aggregate of all of these effects, implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the species in the wild.

The following analysis places an emphasis on using the range-wide survival and recovery needs of the species and the role of the action area in meeting those needs as the context for evaluating the effects of the proposed Federal action combined with other relevant effects. In short, a non-jeopardy determination is warranted if the proposed action is consistent with maintaining the role of habitat and the species population in the action area for the survival and recovery of the species.

After reviewing the current status of the giant garter snake, the valley elderberry longhorn beetle, the vernal pool tadpole shrimp, and the vernal pool fairy shrimp, the environmental baselines for the action area covered by this biological opinion, the effects of the proposed project, and the cumulative effects, it is the Service's biological opinion that the proposed South Sacramento Corridor Project, as proposed, is not likely to jeopardize the continued existence of these four species. Because no critical habitat has been designated for GGS, none will be affected by the proposed project. The proposed project is not likely to destroy or adversely modify designated critical habitat for the VELB because no critical habitat for this species has been designated or

proposed within the action area of the proposed project. The proposed project is not likely to destroy or adversely modify designated critical habitat for either the vernal pool tadpole shrimp or the vernal pool fairy shrimp because no critical habitat for these species has been designated or proposed within the action area of the proposed project.

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. The Sacramento Regional Transit District, acting on the behalf of the Federal Transit Administration, has a continuing duty to regulate the activity covered by this incidental take statement. If the RT (1) fails 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 anticipates incidental take of GGS will be difficult to detect or quantify for the following reasons:

- GGS are cryptically colored, secretive, and known to be sensitive to human activities.
- GGS avoid detection by retreating to burrows, soil crevices, vegetation, and other cover.
- Individual GGS are difficult to detect unless they are observed, undisturbed, at a distance.

- Most close-range observations represent chance encounters that are difficult to predict.

It is not possible to make an accurate estimate of the number of GGS that would be harassed, harmed, or killed during construction activities, including in staging areas, canal banks, soil borrow areas, and roads carrying vehicular traffic to and from borrow areas. In instances when take is difficult to detect, the Service may estimate take in numbers of species per acre of habitat lost or degraded as a result of the action. Therefore, the Service anticipates that all GGS inhabiting the 0.51 acre of aquatic habitat and 8.85 acres of upland habitat on the proposed project site may be harassed or harmed by loss and destruction of habitat as a result of the project.

Vernal Pool Crustaceans

Construction activities associated with the proposed project will indirectly affect 0.99 acre, and directly affect 0.14 acre of seasonal wetland and result in the take of the vernal pool tadpole shrimp and the vernal pool fairy shrimp. The Service anticipates incidental take of these two listed vernal pool crustaceans will be difficult to detect or quantify for the following reasons:

- The aquatic nature of the organisms and their relatively small body size makes the finding of a dead specimen unlikely.
- Losses may be masked by seasonal fluctuations in numbers and other causes.
- The species occurs in habitat that makes them difficult to detect.

Due to the difficulty in quantifying the number of vernal pool fairy shrimp and vernal pool tadpole shrimp that will be killed as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of vernal pool crustacean habitat that will become unsuitable for the listed species due to indirect affects as a result of the proposed project. Therefore, the Service estimates that all vernal pool fairy shrimp and vernal pool tadpole shrimp inhabiting 1.13 acres of vernal pool crustacean habitat will become harassed, harmed, injured, or killed as a result of the proposed project.

Upon implementation of the following reasonable and prudent measures, incidental take associated with the proposed project on the two vernal pool crustaceans in the form of harm, harassment, or death from habitat loss, injury, or direct mortality, and incidental take associated with the proposed project on GGS in the form of harm or harassment from habitat loss, will become exempt from the prohibitions described under section 9 of the Act for direct and indirect effects. The incidental take associated with the proposed project is hereby exempted from prohibitions of take under section 9 of the Act.

Effect of the Take

In the accompanying biological opinion, the Service has determined that this level of anticipated take is not likely to result in jeopardy to the GGS, VELB, the vernal pool tadpole shrimp, and/or

the vernal pool fairy shrimp. No critical habitat has been designated for the GGS; therefore none will be affected. The proposed project is not likely to destroy or adversely modify designated critical habitat for the VELB because no critical habitat for this species has been designated or proposed within the action area of the proposed project. The proposed project is not likely to destroy or adversely modify designated critical habitat for either the vernal pool tadpole shrimp or the vernal pool fairy shrimp because no critical habitat for these species has been designated or proposed within the action area of the proposed project.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the effects of take on the listed species that may be affected by the proposed project:

1. Take in the form of harassment and/or harm of the GGS, VELB, and vernal pool crustaceans during construction activities and associated with implementing the project shall be minimized.
2. The permanent and temporary loss and degradation of habitats of the GGS, VELB, and vernal pool crustaceans shall be confined to the proposed project site, and minimized and restored to the greatest extent practicable.

Terms and Conditions

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

1. The following terms and conditions implement reasonable and prudent measure number one (1):
 - a. The project proponents shall minimize the potential for harm, harassment, and direct mortality of GGS, VELB, and vernal pool crustaceans resulting from project-related activities by implementation of the project, including the conservation measures as described in the original (September 2006) and the revised (November 2007) Biological Assessments (Parsons) and as appearing in the project description of this biological opinion.
 - b. The applicants shall include a copy of this biological opinion within its solicitations for design and construction of the proposed project making the primary contractor responsible for implementing all requirements and obligations included within the Bio Op, and to educate and inform all other contractors involved in the project as to the requirements of the Bio Op. A copy of the solicitations containing the Bio Op also will be provided to the Division Chief,

Endangered Species Program, Valley Branches, at the Sacramento Fish and Wildlife Field Office.

- c. At least 30 days prior to initiating construction activities, the project proponents shall submit the names and resumes of the biological monitor(s) for the proposed project for Service approval.
- d. A Worker Environmental Awareness Training Program for construction personnel shall be conducted by the Service-approved biologist for all construction workers, including contractors, prior to the commencement of construction activities. The program shall provide workers with information on their responsibilities with regard to GGS, VELB, and vernal pool crustaceans, an overview of the life-history of these species, information on take prohibitions, protections afforded these animals under the Act, and an explanation of the relevant terms and conditions of this Bio Op. Written documentation of the training must be submitted to the Service within thirty (30) days of the completion of the training. As needed, training shall be conducted in Spanish for Spanish language speakers.
- e. Construction activity within GGS habitat shall be conducted between May 1 and October 1. This is the active period for GGS and direct mortality is lessened, because snakes are expected actively move and avoid danger. If it appears that construction activity may go beyond October 1, the project proponents shall contact the Service as soon as possible, but not later than September 15 of the year in question, to determine if additional measures are necessary to minimize take. Construction within 200 ft from the banks of GGS aquatic habitat will be avoided during the snake's inactive season (October 2 through April 30).
- f. Project construction within 100 ft of elderberry shrubs shall be prohibited during the VELB emergence and mating period (March 15 through June 15) to eliminate any indirect effects of construction on VELB or its eggs. If at the time that construction activities commence for the project, it is found that any elderberry shrubs will be impacted by the proposed project (*i.e.*, a construction schedule change), then the project proponents will be required to reinitiate, and address those impacts.
- g. If aquatic habitat for GGS is required to be dewatered then it must be dewatered 15 days prior to the initiation of construction activities. If complete dewatering is not possible, potential GGS prey (*i.e.*, fish, frogs, and tadpoles) will be removed so that snakes and other wildlife are not attracted to the construction area.
- h. At most 24-hours prior to the commencement of construction activities, the project site shall be surveyed for GGS by a Service-approved biologist. The biologist will provide the Service with a written report that adequately documents the monitoring efforts within 24-hours of commencement of construction

activities. The project area shall be re-inspected by the monitoring biologist whenever a lapse in construction activity of two weeks or greater has occurred.

- i. A Service-approved biologist shall inspect construction-related activities at the proposed project site to ensure that no unauthorized take of federally-listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse affects to GGS, VELB, and vernal pool crustaceans. Furthermore, the biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a GGS is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. GGS encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist will notify the Service immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist will be required to report any take of listed species to the Service immediately by telephone at (916) 414-6600 and by electronic mail or written letter addressed to the Division Chief, Endangered Species Program, Valley Branches, within three (3) working days of the incident.
- j. Measures consistent with Best Management Practices (BMPs), including Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP), will be implemented to minimize effects to GGS during construction. Best management practices will be implemented to prevent sedimentation from entering ESAs and to reduce erosion, dust, noise, and other deleterious aspects of construction related activities. These BMPs may include, but are not limited to, silt fencing, temporary berms, restrictions on cleaning equipment in or near ESAs, installation of vegetative strips, and temporary sediment disposal. Runoff from dust control and hazardous materials will be retained on the construction site and prevented from flowing into the ESAs.
- k. Tightly woven fiber netting or similar material will be used for erosion control and other purposes at the project site to ensure that the GGS does not get trapped or become entangled. This limitation shall be communicated to the contractor through the use of special provisions included in the bid solicitation package.
- l. During construction operations, the number of access routes, number and size of staging areas, and the total area of the proposed project activity will be limited to the minimum necessary. Routes and boundaries will be clearly demarcated. Movement of heavy equipment to and from the project site will be restricted to established roadways to minimize habitat disturbance. Project-related vehicles shall observe a 20-mile-per-hour speed limit within construction areas, except on County roads and on State and Federal highways. This is particularly important during periods when GGS may be sunning or moving on roadways. All heavy

equipment, vehicles, and supplies will be stored at the designated staging area at the end of each work period.

- m. During construction operations, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas and exclusive of the ESAs. The applicant will ensure contamination of habitat does not occur during such operations. All workers will be informed of the importance of preventing spills and appropriate measures to take should a spill occur.
 - n. To eliminate an attraction to predators of GGS, all food-related trash items, such as wrappers, cans, bottles, and food scraps, must be disposed of in closed containers and removed at the end of each work day from the entire project site.
 - o. No application of herbicides, insecticides, and/or other chemical agents shall occur within 100-feet of elderberry plants or where they might drift or wash into the area of any elderberry plants.
 - p. The FTA will ensure that activities that are inconsistent with the maintenance of the suitability of vernal pool crustacean habitat and the associated on-site watershed are prohibited. These include, but are not limited to: 1) the alteration of existing topography that may alter hydrology into habitat for Federally-listed vernal pool species; 2) the placement of any new structures within suitable habitat; 3) dumping, burning, and/or burying of rubbish, garbage, or any other wastes and fill materials; 4) the placement of stormwater drains; 5) fire protection activities not required to protect existing structures at the proposed project site; and 6) use of pesticides or other toxic chemicals.
 - q. The project proponent shall require documentation from the contractor that aggregate, fill, or borrow material provided for the proposed project was obtained in compliance with the Act. Evidence of compliance with the Act shall be demonstrated by providing the resident engineer with one of the following: 1) a letter from the Service stating that the use of the borrow pit will not result in the incidental take of listed-species; 2) an incidental take permit for contractor-related activities issued by the Service pursuant to section 10(a)(1)(B) of the Act; 3) a biological opinion or letter concurring with a *Not likely to Adversely Affect* determination issued by the Service to the Federal agency having jurisdiction over contractor-related services; 4) a letter from the Service concurring with the *No Effect* determination for contractor-related activities; or 5) contractor submittal of information to the resident engineer indicating compliance with the State Mining and Reclamation Act (SMARA) and provision of County land use permits and California Environmental Quality Act (CEQA) clearance.
2. The following terms and conditions implement reasonable and prudent measures number two (2):

- a. The project proponents shall minimize the potential for harm, harassment, and direct mortality of GGS, VELB, and vernal pool crustaceans resulting from project-related activities by implementation of the project, including the conservation measures as described in the original (September 2006) and the revised (November 2007) Biological Assessments (Parsons) and as appearing in the project description of this biological opinion.
- b. Prior to the initiation of construction activities, the project proponent shall conduct a survey to assess the status of existing elderberry shrubs within the project site, if any. If elderberry shrubs are discovered within the project site, then the project proponents shall reinitiate consultation with the Service in order to analyze and assess any possible impacts to VELB regarding the proposed project.
- c. The project proponents shall ensure that temporary loss of GGS, VELB, and vernal pool crustacean habitat is confined to the proposed project site.
- d. Prior to the commencement of construction activities, high visibility fencing will be erected around the habitats of these federally-listed species to identify and protect these designated ESAs from encroachment of personnel and equipment. These areas will be avoided by all construction personnel. The fencing will be inspected before the start of each work day and maintained by the project proponents until completion of the project. The fencing may be removed only when the construction of the project is completed.
 - i. Fencing will be established at least 200 feet from the edge of aquatic GGS habitat.
 - ii. Fencing will be established at a minimum setback of 20 feet from the dripline of each elderberry shrub within 100 feet of the proposed project alignment that are not to be removed and transplanted. There will be no physical alterations of any type within the area enclosed by the fencing.
 - iii. Fencing will be established at a minimum distance of 50 feet from the edge of the "seasonal wetlands" that are potential habitat for vernal pool crustaceans.
- e. Signs will be posted every 50 feet along the edge of the ESAs, with the following information: "This area is habitat of federally-threatened and/or endangered species, and must not be disturbed. These species are protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of construction.

- f. A post-construction walkthrough will be conducted to assess whether any damage occurred to vegetation within the buffer areas. Damage may include accidental cutting of vegetation or visible physical damage to roots, stems, and leaves. If damage is observed, vegetation within the buffer areas will be restored with appropriate native plant species. Erosion control measures and exotic weed abatement measures shall be implemented. If unanticipated damage is done to elderberry shrubs, the Service will be notified and appropriate compensation will be implemented.
- g. After construction activities are complete, any temporary fill or construction debris will be removed and disturbed area restored to their pre-project conditions. An area subject to “temporary” disturbance includes any area that is disturbed during the project, but that, after project completion, will not be subject to further disturbance and has the potential to be re-vegetated.
 - i. As described in the revised BA and the project description of this Bio Op, the project proponents will restore all GGS habitats subject to temporary ground disturbances, including storage and staging areas and temporary roads. This includes 8.39 acres of GGS upland habitat and 0.05 acre of GGS aquatic habitat. These areas shall be re-contoured, if appropriate, and re-vegetated with appropriate locally-collected native plant species to promote restoration of the area to pre-project conditions. Appropriate methods and plant species used to re-vegetate such areas will be determined on a site-specific basis in consultation with the Service and the CDFG. Restoration work may include replanting emergent vegetation. Refer to the Service’s *Guidelines for the Restoration and/or Replacement of Giant Garter Snake Habitat* (USFWS 1997). A written report shall be submitted to the Service within ten (10) working days of the completion of construction at the project site.
- h. The project proponents will maintain and monitor the project site for one (1) year following the completion of construction and restoration activities. Monitoring reports documenting the restoration effort should be submitted to the Service upon the completion of the restoration implantation and one (1) year after the restoration implementation. Monitoring reports should include photo-documentation, when restoration was completed, what materials were used, specified plantings, and justifications of any substitutions to the Service-recommended guidelines.
- i. The FTA shall ensure compliance with the reporting requirements.
- j. As described in the revised BA (Parsons 2007) and appearing in the project description of this Bio Op, prior to the commencement of construction activities

the project proponent shall compensate for the temporary and permanent loss of habitat of GGS and vernal pool crustaceans, as follows:

- i. Prior to the initiation of construction activities, the project proponent will purchase the equivalent of 9.823 acres of GGS habitat credits from a Service-approved conservation bank servicing the area where the proposed project effects occur. This purchase shall compensate for 8.44 acres of temporarily affected GGS habitat and 1.383 acres of permanently affected GGS habitat. All temporary effects will be compensated at a 1:1 ratio, and all permanent effects will be compensated at a 3:1 ratio.
- ii. Prior to the initiation of construction activities, the project proponents will compensate for impacts to vernal pool crustacean habitat by the proposed project through the purchase of the equivalent of 2.26 acres of preservation credits, and 0.14 acre of creation/restoration credits from a Service-approved conservation bank, or combination of banks, servicing the area where the proposed project effects occur. If a conservation bank can not be found that offers creation/restoration credits servicing the area that includes the proposed project, then, with Service approval, the project proponents may be allowed to purchase the creation/restoration credits from a conservation bank that's service area does not include the proposed project. In the choice of conservation bank from which the project proponents purchase credits, priority should be given to the closest banks to the proposed project.

Reporting Requirements

Any contractor or employee who, during routine operations and maintenance activities, inadvertently kills or injures a listed species of wildlife must immediately report the incident to their representative. The Service is to be notified within one (1) working day of the finding of any dead or injured listed wildlife species or any unanticipated take of the species addressed in this biological opinion. Injured giant garter snakes shall be treated and cared for by a licensed veterinarian or other qualified person. The Service contact persons are the Division Chief, Valley Branches, Endangered Species Program at (916) 414-6620 and the Resident Agent-in-charge at (916) 414-6660. Any killed snakes that have been taken shall be properly preserved in accordance with the Natural History Museum of Los Angeles County policy of accessioning (i.e., 10% formalin in a quart jar or freezing). Preserved specimens shall be delivered to the Service's Law Enforcement Office at 2800 Cottage Way, W-2605, Sacramento, California, 95825-1846.

The Service-approved biologist shall notify the Service within one (1) working day if any listed species are found on site, and shall submit a report including the date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The Service-approved biologist shall submit locality information to the CDFG, using completed 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 a

photocopy of a portion of the 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-minute 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 Service-approved biologist shall also provide a high quality copy of this information to the California Fish and Game, 1807 13th Street, Sacramento, California, 95814, phone (916) 445-0045.

The Sacramento Fish and Wildlife Field Office is to be notified within one (1) working day of the finding of any dead or injured listed wildlife species or any unanticipated take of the species addressed in this biological opinion. Any other federally listed or candidate species found on or adjacent to the project area must be reported within three (3) working days of its finding. The Service contact person for this is the Division Chief, Valley Branches, Endangered Species Program at (916) 414-6620. Any dead or severely injured VELB found (adult, pupae, or larvae) shall be deposited in the Entomology Department of the California Academy of Sciences. The Academy's contact is the Senior Curator of Coleoptera at (415) 750-7239. All observations of VELB, live, injured, or dead, or fresh beetle exit holes shall be recorded on California Natural Diversity Data Base (CNDDB) field sheets and sent to CDFG, Wildlife Habitat Data Analysis Branch, 1416 Ninth Street, Sacramento, CA 95814.

The project proponents shall submit a post-construction compliance report prepared by the monitoring biologists to the Sacramento Fish and Wildlife Field Office within thirty (30) calendar days of the completion of construction activity. This report shall detail the following: 1) dates that construction occurred; 2) pertinent information concerning the success of the project in meeting conservation measures; 3) an explanation of failure to meet such measures, if any, and recommendations for remedial actions and request for approval from the Service, if necessary; 4) known project effects on any of the species addressed in this biological opinion, if any; 5) occurrence of incidental take of any of the species addressed in this biological opinion, if any; and 6) other pertinent information.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purpose 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 FTA should work with the Service to address significant, unavoidable environmental effects resulting from projects proposed by non-Federal parties.
2. The FTA should assist the Service in implementing the draft, and, when completed, the final Recovery Plan for the giant garter snake.
3. The FTA should assist the Service in the implementation of recovery efforts for the valley elderberry longhorn beetle.

4. The FTA should assist the Service in the implementation of the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*.
5. The FTA, in partnership with the Service, should develop maintenance guidelines for FTA projects that will reduce adverse effects of routine maintenance on listed species and their habitats. Such action may contribute to the recovery and delisting of these species by preventing degradation of existing habitat and increasing the amount and stability of suitable habitat.

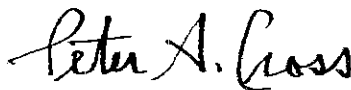
In order for the Service to be kept informed of actions minimizing or avoiding effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION-CLOSING STATEMENT

This concludes formal consultation on the proposed South Sacramento Corridor Phase 2 Project in Sacramento County, 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 regarding this biological opinion on the proposed South Sacramento Corridor Phase 2 Project, please contact Richard Montgomery or the Chief, Sacramento Valley Branch, at the letterhead address or at telephone 916/414-6630.

Sincerely,



Kenneth D. Sanchez
Acting Field Supervisor

cc:

Elizabeth Hughes, Parsons Corporation
Diane Nakano, Sacramento Regional Transit District
Adam Ballard, ECORP Consulting, Inc.

Enclosures:

Selected Review criteria for Conservation Banks and Section 7 Offsite Compensation.

GIS Metadata Form

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Valley Elderberry Longhorn Beetle

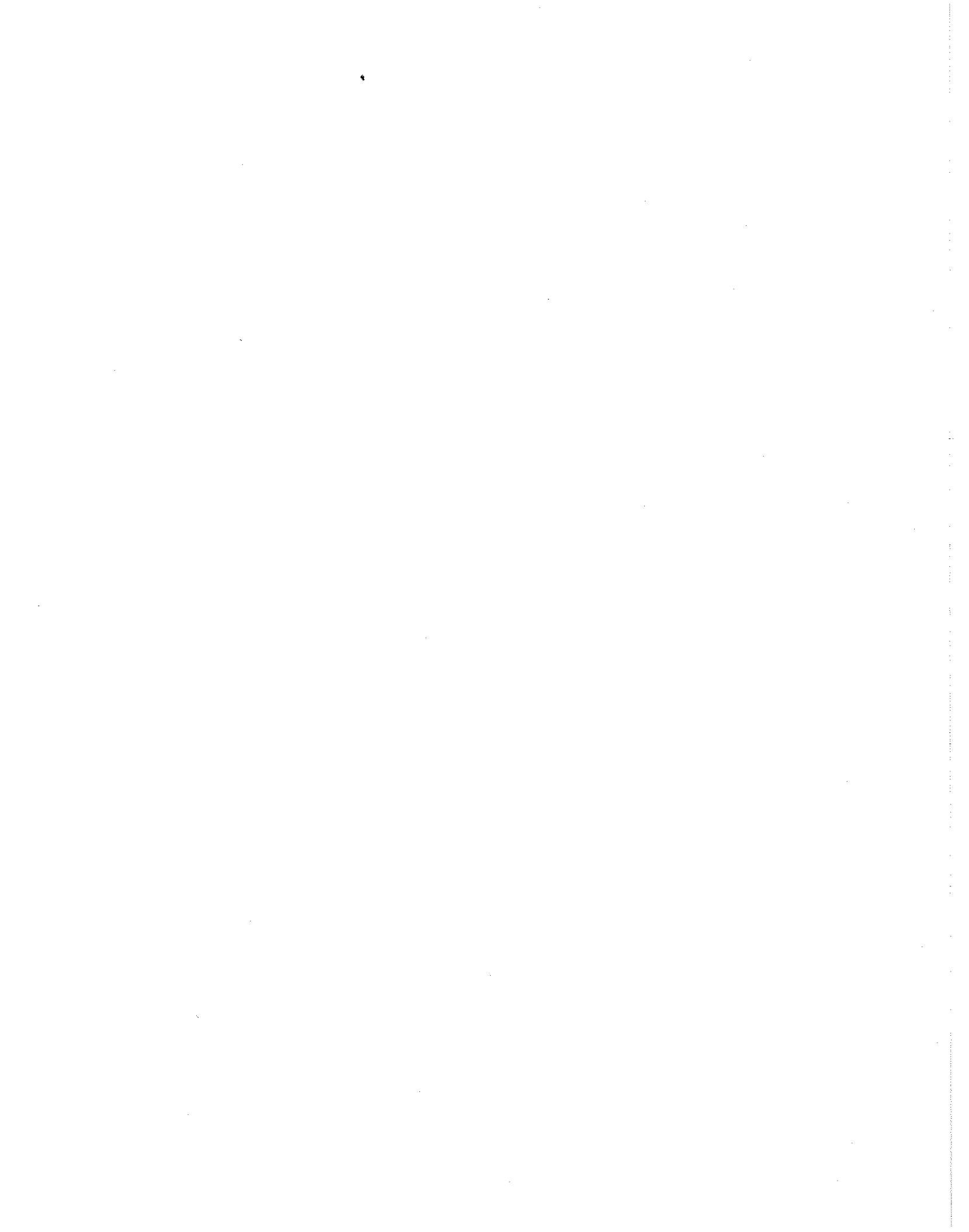
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**Selected Review Criteria for
Conservation Banks and Section 7 Off Site Compensation**

Rev. April 11, 2006

This list is not a comprehensive list, but gives a substantial number of the basic considerations and requirements necessary to establish protection for properties designated as compensation for project impacts.

In many instances, 'Service-approval,' as stated below, may be replaced with 'Agency-approval,' where other government agencies are involved, such as in Conservation Banking (eg. USACE, CDFG, EPA).

Property Assurances and Conservation Easement

Title Report (Preliminary at proposal, and Final Title Insurance at recordation)

1. Who holds fee title to property? Should be Bank Owner/Project Applicant. If not, there may be liability and contracting issues.
2. Are there any liens or encumbrances (existing debts or easements) on the property?
 - a. Review necessary supporting instruments to evaluate liens and encumbrances. Property owner should submit a "Property Assessment and Warranty" which discusses each and every exception listed on the Preliminary and Final Title Insurance Policies, evaluating any potential impacts to the conservation values that could result from the exceptions (see below).
3. Could any of these liens or encumbrances potentially interfere with either biological/habitat values or ownership? If existing easements can potentially interfere with the conservation values/habitat of the property, those portions of the land should be removed from the Conservation Easement (CE), and deducted from the total number of credits or acres attributed to the site.
4. A Subordination Agreement is necessary if there is any outstanding debt on the property. Review Subordination Agreement for adequacy – the lending bank or other lien holder must agree to fully subordinate to each lien or encumbrance.

Legal Description and Parcel Map

1. Ensure accuracy of map, location and acreage protected under CE.
2. Both the map and the legal description should explain the boundaries of the Bank and/or boundaries of each individual Bank phase or individual project compensation sites. Individual project compensation sites should *not* have "leftover" areas for later use.

Conservation Easement

1. Should use current USFWS CE template;
2. Who will hold the easement?
 - a. Must have third-party oversight by a qualified non-profit or government agency. Qualifications include:
 - i. Organized under IRC 501(c)(3),

- ii. Qualified under CA Civil Code § 815
 - iii. Bylaws, Articles of Incorporation, and biographies of Board of Directors on file at, and approved by, USFWS
 - 1. Must meet requirements of USFWS, including 51% disinterested parties on the Board of Directors
3. If not using the USFWS template, applicant should specify objections they have to the template as provided, and may substantially delay processing as they will require Solicitor review. Alternate CE's must be approved by the USFWS prior to recording.
 4. Other (non-template) CE's should include, at a minimum, language to:
 - a. **USFWS must be third-party beneficiary** or add language throughout the document in all appropriate places that will assure USFWS the right to enforce, inspect, and approve any and all uses and/or changes under the CE prior to occurrence (including land use, biological management or ownership). The alternative of adding language is difficult because we are not signatories to the CE, so you should make sure it is done through the Solicitor's Office.
 - b. Reserve all mineral, air and water rights under CE as necessary to maintain and operate the Bank in perpetuity [USFWS § 2(D)]
 - c. Ensure all future development rights are forfeited.
 - d. Ensure all prohibited uses contained in USFWS CE template are addressed.
 - e. Link the CE, the Management Plan, and the Endowment Trust fund within the document (e.g. note that each exists to support the others, and where each of the documents can be located if a copy is required).
 5. There are probably many more specific concerns – should compare the content of each of the sections of the current USFWS CE to see where discrepancies lie, and to insert necessary language, particularly, but not exclusively, per:
 - a. Rights of Grantee
 - b. Remedies
 - c. Injunctive Relief
 - d. Enforcement Discretion
 - e. Costs and Liabilities
 - f. Taxes
 - g. Hold Harmless
 - h. No Hazardous Materials Liability
 - i. Assignment and Transfer
 - j. Amendment
 - k. Funding
 - l. Warranty
 - m. Additional Interests

Property Assessment and Warranty

1. A summary and full explanation of all exceptions remaining on the title must be included, with a statement that the owner/Grantor accepts responsibility for all lands being placed under this CE as available for the primary purposes of



the easement, as stated in the easement, and assures that these lands have a free and clear title and are available to be placed under the CE.

Environmental Site Assessment – Phase I

1. Check for clear report
2. If there are issues – a proposal to address the issues should be included; remediation may be necessary

Service Area

1. Service Area for a Conservation Bank is based upon biological criteria, and must be approved by USFWS.
2. Documents should then include a map designating the proposed/approved Service Area, and a text description of the same area.

Restoration or Development Plan

1. Full plans for any habitat construction *must* be USFWS-*approved*, and all permits in place, *prior* to the start of construction of the habitat

Management Plan

1. Must be reviewed and approved by the USFWS for each individual Bank, or individual mitigation project, for target species baseline, adequacy of management and monitoring, and reporting requirements and schedules in perpetuity, etc.
2. Management Plan should also describe funding mechanisms, schedule, and reporting for the long term funding of the property
3. Appendices should include biological surveys, wetland delineation and USACE verification letter, and any required permitting information
4. A copy of the final Management Plan must be either recorded with the CE, or the CE must state in its body that the current management plan can be obtained upon request from any signatory wildlife agency.

Economic Analysis

1. Must be based upon the *final, approved* management plan.
2. Must include provision to adjust for CPI annually.
3. Must be based on appropriate, attainable, long-term interest rate.
4. Must address/account for all of the required funds (as below).

Performance Security, Contingency Security and Endowment Fund

All funds must be held, managed, accessed, expended and released according to agency-approved methods and procedures. There are a variety of requirements for each fund. Following is a general overview:

1. All funds must be held by qualified, Service-approved, non-profit organization or government agency [see requirements under CE, §2(a), above]
2. A full description of the trust account and investment methods must be agency-approved. All funds must be held according to minimum standards for assuring

- maximum success in earning potential, and with assurances for no loss of principal
3. Disbursements or releases from each of the funds must be for documented expenditures, as they occur
 4. A full economic analysis must be included to demonstrate how each of the required funding amounts was determined. This analysis must be approved by the agencies as being full, complete and adequate
 5. A schedule and plan (including target date and full amount on that date) for funding each of the accounts must be submitted for approval

Agreement Contract

This would include a "Conservation Bank Agreement," "Bank Enabling Instrument," or other consolidating agreement that ties all of the associated documents together.

Some general, basic (certainly not all-inclusive) concerns to include are:

1. Conservation Easement must be approved by any agencies involved prior to recording, and a recorded copy must be submitted to the agencies prior to the compensation taking effect in any way.
2. For an individual site, each of the primary documents – the CE, management plan and endowment trust – must reference the other two documents to link them together to fully address the compensation.
3. If not a Conservation Bank, individual project compensation should be addressed fully (within or by each document) as individual projects.
4. Responsible party (property owner) must be identified (and a valid party to the contract) as responsible for all funding, management, monitoring, and reporting of Bank or Compensation Site, in perpetuity.
5. Transfer and Assignment of property should be according to §9.0 of USFWS Bank Agreement template, or approved by USFWS
6. Any agreement must include remedies for any disputes per §10.0 of the USFWS Conservation Bank Agreement.
7. Applications for individual compensation sites must not include any "leftover" pre-approved acreages for future projects. Any future projects must be addressed individually.

**Sacramento Fish and Wildlife Office
Metadata Form**

USFWS File Number 81420-2008-F- _____

Reference Number from Letter _____

Project Title: _____

Descriptive title with project name (Ninth Hole Project boundary)

Information Originator: _____

Who is creating the data (Contractor's name, company name, address, phone number, email address).

Purpose: _____

For whom or what project is the data being created (i.e. applicant).

Information Creation Date: _____ Date or dates.

Data Status: _____ Complete / To be updated.

Process Step: _____

How was the data created or collected? What is the estimated positional accuracy and what is accuracy based on? (GPS, Aerial photo resolution, etc.)

File Format: _____ Shape file, IFW, etc.

Projection and Datum: _____ UTM Zone 10 or 11, NAD83

Attribute Information: _____

Information (If applicable): Data dictionary for any attribute definitions.

Data Provided In: _____ Email, CD, DVD

Metadata guidelines may be accessed at www.fgdc.gov

