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**U.S. Fish and Wildlife Service
Biological Opinion on the
Sutter Power Project;
Dated April 2, 1999**

Sierra Nevada Customer Service Region



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

IN REPLY REFER TO:
1-1-98-F-100

April 2, 1999

Ms. Loreen McMahon
Department of Energy
Western Area Power Administration
114 Parkshore Drive
Folsom, California 95630-4710

Subject: Formal Section 7 Consultation on the Calpine Corporation Sutter Power Plant Project, Sutter County, California

Dear Ms. Loreen McMahon:

This is in response to your April 22, 1998, letter initiating formal consultation with the U.S. Fish and Wildlife Service (Service) on the Calpine Corporation Sutter Power Plant (SPP) Project in Sutter County, California. Your request was received in our office on April 24, 1998. This document represents the Service's biological opinion on the effects of interconnection of the Sutter Power Plant Project with Western Area Power Administration's Keswick-Elverta and Olinda-Elverta 230-kilovolt (kV) transmission line on the threatened giant garter snake (*Thamnophis gigas*), bald eagle (*Haliaeetus leucocephalus*), and Aleutian Canada goose (*Branta canadensis leucopareia*), and the endangered American peregrine falcon (*Falco peregrinus anatum*), 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 determined that the SPP project is not likely to adversely affect Sacramento splittail (*Pogonichthys macrolepidotus*), vernal pool tadpole shrimp (*Lepidurus packardii*), vernal pool fairy shrimp (*Branchinecta lynchi*), Conservancy fairy shrimp (*Branchinecta conservatio*), Hartweg's golden sunburst (*Pseudobahia bahiifolia*), palmate-bracted bird's beak (*Cordylanthus palmatus*), or hairy orcutt grass (*Orcuttia pilosa*).

The findings and recommendations in this consultation are based on: (1) the Biological Assessment for the Sutter Power Plant Project, Sutter County, California, dated April 1998;

(2) the Preliminary Staff Assessment filed jointly by the California Energy Commission (CEC) and the Western Area Power Administration (WAPA), dated July 1998; (3) the Application for Certification for the Sutter Power Plant Project, submitted by Calpine Corporation to the California Energy Commission, dated December 15, 1997; (4) the Sutter Power Plant Effluent Water Quality Modeling Report, dated July 1998; (5) the Sutter Power Plant Effluent Water Temperature Modeling Report, dated July 1998; (6) the Final Staff Assessment/Draft Environmental Impact Statement filed jointly by the CEC and WAPA (the Final Staff Assessment serves as a joint NEPA/CEQA document), received October 30, 1998; and (6) additional oral and written communications between WAPA, CEC, Calpine, their consultants, and the Service. A complete administrative record of this consultation is on file at the Sacramento Fish and Wildlife Office.

Consultation History

The Service provided to WAPA on April 6, 1998, a list of species that may be present or may be affected by the proposed project. WAPA and Calpine provided assessments of the effects of the Sutter Power Plant Project for those listed species likely to occur in the project area. Seasonal wetlands were sampled for federally listed vernal pool crustaceans according to Service-approved protocols (PRT # 796012). The non-listed California linderiella (*Linderiella occidentalis*) and versatile fairy shrimp (*Branchinecta lindahli*) were found on site. The federally listed vernal pool tadpole shrimp, vernal pool fairy shrimp, and Conservancy fairy shrimp were not found during sampling. Botanical surveys were also conducted. California hibiscus (*Hibiscus lasiocarpus*) was detected along the pipeline route within the Sutter NWR, but no federally listed plant species were detected. Sacramento splittail have been documented in the Sutter Bypass and could potentially be affected by poor water quality resulting from power plant effluent discharge into the Sutter Bypass. Calpine's proposed conservation measure incorporating a drycooling system will eliminate effluent discharge and any potential water quality effects to the Sacramento splittail.

WAPA submitted a biological assessment and requested formal consultation on April 22, 1998. The request was received by the Service on April 24, 1998. The Service was aware that the CEC requested additional data on the proposed project's effects on water quality and anticipated receipt of this information by June 30, 1998. The Service reviewed the available water quality information and did not believe the new information would substantially change the analysis of the effects of the action. On June 8, 1998, the Service responded to WAPA's request for initiation of formal consultation with an acknowledgment of receipt of the information necessary to complete formal consultation. The Service also acknowledged that additional time may be required to evaluate the effects of the proposed project if the pending water quality modeling reports revealed the project may affect listed species in a manner or to an extent not previously considered.

The Service reviewed water quality modeling reports received in July of 1998. After review of the water quality modeling reports, the Service determined the additional information revealed that the effluent from the SPP could adversely affect giant garter snakes, Sacramento splittail, and

salmonids, and could increase the risk of avian botulism outbreaks at Sutter National Wildlife Refuge (NWR). Calpine subsequently modified the SPP design to incorporate a dry cooling system that would result in zero discharge. The Service received Calpine's "Mitigation Program Supplement to the Application for Certification for the Sutter Power Plant" on October 9, 1998, that provided new information on the proposed project change to a dry cooling system. Further project review by the CEC also resulted in a revised transmission line route and switchyard location. The Service has reviewed and analyzed the effects of the modified cooling system and subsequent project changes and has incorporated them into this biological opinion.

BIOLOGICAL OPINION

Description of the Proposed Action

WAPA operates and maintains an extensive, high-voltage transmission system to deliver reliable electric power to most of the western half of the United States. Calpine Corporation (Calpine) has requested interconnection with WAPA's Keswick-Elverta and Olinda-Elverta 230-kilovolt (kV) transmission line in association with construction of the Sutter Power Plant (SPP). Calpine's objective for developing the SPP is to sell power to a mix of wholesale and retail customers in the newly deregulated electricity market. Calpine intends to sell power on a short and mid-term basis to customers, and on the spot market. The Service acknowledges that SPP may have growth inducing effects within its service area. However, because of the SPP interconnection with WAPA's transmission system serving a large area, and Calpine's intention to sell electrical power on a short term basis, the location and extent of service area effects of the SPP cannot be determined. To the extent that action areas for future section 7 consultations will overlap with the service area of the SPP, the Service believes these potential indirect, service area effects will be addressed. For example, the Service expects to address many of these effects in future consultations on Central Valley Project (CVP) water contract renewals which will also address growth induced service area effects. To the extent that power from the SPP has service area effects beyond areas also served by CVP water, the location of those effects cannot be determined. For the purposes of this consultation, the action area for the SPP Project is considered to be the Colusa Basin and the Sutter Basin.

The Sutter Power Plant project consists of a 16-acre power plant, an associated 12.9 mile natural gas pipeline, a 4.0 mile transmission line, and a 2.2 acres switching station. The majority of the project is located in Sutter County within the Sutter Basin watershed, east of the Sutter Bypass. The natural gas pipeline route also crosses the Sutter Bypass to the east side of the Sacramento River. A portion of the pipeline route lies west of the Sacramento River within Colusa County and the Colusa Basin.

Power Plant

Site description - The proposed Sutter Power Plant Project is located in Sutter County approximately 36 miles northwest of Sacramento and 7 miles southwest of Yuba City. The project is located on 16 acres of Calpine's existing 77-acre parcel and will be located adjacent to Calpine's existing Greenleaf 1 cogeneration power plant. The facility is bordered on the east by South Township Road and by rice fields on the north, west, and south. Surrounding land use is primarily agriculture consisting of rice, field crops, and orchards. The site is located approximately 2 miles directly east of the Sutter Bypass and the Sutter National Wildlife Refuge (NWR). The Sutter NWR supports seasonal and permanent wetlands, riparian woodlands, and waterways used by anadromous fish and Sacramento splittail. Gilsizer Slough, which is protected by a conservation easement, is located 2 miles to the south. Gilsizer Slough supports emergent wetlands and a population of giant garter snakes. The site is also located within the Sutter Basin watershed and the Pacific Flyway for migratory waterfowl.

Current uses on the 77-acre parcel consist of the 12-acre Greenleaf 1 cogeneration plant, associated storage and office buildings, and roads. Wetlands on the parcel include vernal pools, borrow pits, abandoned mosquito abatement trenches, a perennial mosquito abatement pond, seasonal depressions, and a 6-foot wide canal on the south side of the property. Habitat types on the SPP site consist of 52.8 acres of disturbed annual grasslands, 8.7 acres of seasonal wetlands, 2.0 acres of drainage canals, and 1.2 acres of blackberry brambles. The drainage canals contain emergent wetland vegetation similar to natural waterways and support bullfrogs, crayfish, and mosquitofish. Agricultural drainage canals border the site on all four sides. The grasslands are mowed annually for fire control.

Power plant - The proposed Sutter Power Plant project will be constructed, owned, and operated by Calpine Corporation. Calpine proposes to build a 500 megawatt (MW) natural gas fueled merchant power plant. The proposed project will consist of gas combustion turbines, zero discharge dry cooling towers, two 145-foot tall heat recovery steam generator (HRSG) emission stacks, and asphalt parking lots. The project will require approximately 16 acres of Calpine's existing 77-acre parcel and will be located adjacent to Calpine's existing Greenleaf 1 cogeneration power plant. Access to the project site will be from South Township Road on the east side of the project site.

Water for the SPP will be provided by an on-site well system developed as part of the project. Originally, Calpine proposed using a water cooled system that would require 3,000 gallons of groundwater per minute. The water would circulate twice through the cooling system before being discharged as effluent via surface drainages to the Sutter Bypass. Approximately 1.9 million gallons per day of wastewater would have been discharged to the surrounding agricultural waterways. Calpine has proposed replacing this system with a dry cooling system, greatly reducing the use of groundwater and eliminating effluent discharge. Two 500 gallon per minute wells will be developed. One well will meet facility needs. The second well will provide a back

up. Sanitary waste will be treated by an onsite sewage treatment system. Incorporation of the dry cooling system will reduce groundwater use by 95% from the original proposal of 3000 gallons per minute to 140 gallons per minute. Maximum net ground water use is estimated at

318,000 gallons per day. With incorporation of a dry cooling system, operation of the plant will not result in discharge of effluent to existing surface drainages.

Construction of the SPP is scheduled to begin in the first quarter of 1999. Construction work will include clearing and grading the 16 acre site, bringing in fill material to build up the base of the facility, fencing the construction site, constructing the facility and cooling towers, and constructing and wiring the transmission lines at the site.

Natural Gas Pipeline

Site description - The natural gas pipeline route is located in Sutter and Colusa counties. The route will begin at the SPP, run north on South Township Road for approximately 5,900 feet, and then west to the east side of the Sacramento River across from the town of Grimes, ending with a dehydrator station. Approximately 5,500 feet of the pipeline will cross the Sutter NWR in the Sutter Bypass. The Sutter NWR contains seasonal wetlands, permanent wetlands, and riparian corridors. Outside the Sutter Bypass, the pipeline corridor parallels paved and dirt roads and agricultural fields. Approximately 6.5 miles of the pipeline parallel irrigation canals, which contain wetlands vegetation and prey species such as mosquito fish, carp, bullfrogs, and bullfrog and Pacific treefrog tadpoles.

Additional pipe will also be laid on the west side of the Sacramento River in Colusa County. West of the Sacramento River, approximately 8,000 feet of pipeline will be laid along Poundstone Road in Colusa County south of the town of Grimes. Valley oaks border portions of Poundstone Road. A new dehydrator station will be installed in Colusa County at PG&E's existing Poundstone drip station. The drip station is currently located within land used as pasture. Installation of the dehydrator will require an additional 5,000 square feet of pasture land. The surrounding land use is primarily field crops and pasture.

Natural Gas Pipeline - A new 14.9-mile natural gas pipeline will be constructed to provide fuel to the power plant. The 16-inch gas pipeline will connect to Pacific Gas and Electric's (PG&E) Line 302. The pipeline will run along an existing 13.4-mile gas pipeline that currently provides natural gas to Greenleaf 1. The pipeline will run north on South Township Road and then west along Oswald Road to the northeast side of the Sacramento River, ending with a dehydrator station. The Sacramento River drip station will be expanded by about 5,000 square feet. The pipeline will cross the Sutter Bypass and the Sutter NWR within the 100-foot wide Hughes Road county road easement. The existing dehydrator stations will be expanded to 5,000 square feet to replace an existing drip station. An 8,000-foot 4-inch diameter natural gas pipeline will also be constructed to upgrade the gas gathering system south of Grimes, Colusa County, California.

Construction of the natural gas pipeline is scheduled to begin in the summer of 2000, from May through October. Within the Sutter Bypass and Sutter NWR, construction of the pipeline will require a 25-foot wide construction corridor. The remainder of the pipeline will require a 50-foot wide construction corridor. Approximately 20 irrigation canals may be fitted with temporary culverts to provide continuous water flow. Trenches will be dug underneath the culverts to lay the pipeline. Five larger canals (20-foot wide or larger) will require boring, which will temporarily disturb 0.5 acre on either side of each canal, resulting in 5 acres of disturbance. The pipeline will be bored 30 feet underneath the east and west borrow channels of the Sutter Bypass. Approximately 80 percent of the pipeline will be placed within roadways underneath pavement or gravel. The remaining pipeline will be drilled underneath water channels and placed along the edges of roadways. The 50-foot construction corridor for the pipeline includes 90.2 acres. The majority of the construction corridor consists of roadways and residences. Approximately 4.5 acres consist of agricultural uses and irrigation canals.

Transmission Line and Switching Station

Site description - The transmission line route is located entirely on the east side of the Sutter Bypass in Sutter County and is surrounded by agricultural lands. The new transmission line is planned to be routed south along the west side of South Township Road, then west along O'Banion Road to the east levee of the Sutter Bypass. The line will parallel an existing PG&E line which runs along the east side of South Township Road. The line parallels 3.7 miles of irrigation canals. The route also passes four 10 to 20-foot wide canals that may serve as waterfowl flyways. The route will end at a new switching station at the east levee of the Sutter Bypass approximately 0.5 mile south of the Sutter NWR. The switching station will be located south of O'Bannion Road on property currently farmed for rice. Originally, the route would have crossed Gilsizer Slough, which supports emergent marsh vegetation and a large giant garter snake population. The portion of the revised route along O'Bannion Road now roughly parallels Gilsizer Slough, which is one to two miles to the south. The transmission line lies within the Pacific Flyway and a major wintering area for migratory birds. Two existing transmission lines, a WAPA 230-kV line and a PG&E 500-kV line run parallel to the east side of the Sutter Bypass.

Transmission line - A new 4.0 mile 230 kilovolt (kV) overhead electric transmission line will be built to a new switching station which will interconnect to WAPA's 230-kV electric transmission running along the east side of the Sutter Bypass. The line will require 32 steel transmission towers with cement footings, spaced approximately 750 to 880 feet apart. Power poles will be 106-foot tall single metal poles with upswept arms. Conductor wire spacing will be greater than the wing span of large birds (43 inches on the vertical and 60 inches in the diagonal) to prevent electrocutions. The top ground wire will be fitted with bird flight diverters to make the wires more visible. The transmission line will remove 0.003 acre of farmland from production. The construction of the transmission line will use a 50-foot wide corridor.

Switching station - A new switching station will interconnect to WAPA's 230-kilovolt (kV) electric transmission system. The construction of the switchyard will remove 2.2 acres of farmland from production.

Laydown and parking areas of approximately 0.1 to 0.5 acre each along the gas pipeline and electric transmission line routes will be sited on previously disturbed areas and marked with flagging to minimize disturbance.

Timing and Operations

Construction of the SPP project is expected to take 22 to 24 months, from site preparation to commercial operation. Construction is expected to begin in early 1999 and be completed by late in the year 2000. The SPP Project has an expected life of 30 years. Calpine expects a peak work force of 256 employees on site during construction. Full scale commercial operation is expected to begin by the end of 2000 or early 2001. Calpine will employ 20 full-time plant operators and technicians once the plant is complete. Facility maintenance will include vegetation maintenance for weed abatement and fire control.

Proposed Conservation Measures

Calpine has proposed a program of conservation measures to reduce the effects of the SPP project to special status species, wetlands, and wildlife habitats. These measures include: construction monitoring by designated biologists; worker environmental awareness training; construction zone limits; preconstruction surveys; timing restrictions on construction; modifications of project design, operations, and maintenance; replacement of affected habitat; erosion control and revegetation of disturbed areas; and monitoring plans and reports. For federally listed species, Calpine identified the following specific measures:

Measures for giant garter snake:

1. Replace 4.907 acres of upland giant garter snake habitat at a ratio of 3:1. The replacement habitat will include one acre of aquatic habitat for every two acres of upland habitat. Calpine will provide 4.907 acres of aquatic habitat and 9.814 acres of upland habitat for the giant garter snake. Replacement habitat will be located within the Colusa Basin or Sutter Basin subpopulations of giant garter snake.
2. Established a fund for the acquisition of mitigation credits that will facilitate the purchase, enhancement, and management of habitat by the CEC and natural resource agencies.
3. Provide a biological monitor to conduct preconstruction surveys 24 hours prior to ground moving and vegetation clearing activities.

4. Provide worker environmental awareness training.
5. Avoid all trenching and augering during the giant garter snake inactive period (October 1 through May 1) when giant garter snakes are occupying burrows and are susceptible to earth moving activities.
6. Provide a biologist continually on site during the giant garter snakes' inactive period (October 1 through May 1) if construction proceeds past October 1.
7. Revegetate habitats after construction.
8. Use mowing instead of disking as a fire control method on the Sutter Power Plant site.
9. Construct hibernacula in strategic areas of upland habitat.
10. Use herbicide with no residual or migratory effects.
11. Eliminate potential water quality effects by project change to a dry cooling system that eliminates discharge of effluent from cooling towers.

Measures for migratory birds:

1. Install bird flight diverters to transmission line shield wires and strobe lights on the HRSG stack to minimize bird collision potential.
2. Modify transmission lines that bisect potential foraging areas with colored bird flight diverters to make the wires more visible to birds during flight.
3. Provide suitable space between conducting wires to minimize risk of bird electrocution.
4. Monitor electric transmission line collisions for significant effects.

Measures for wetlands:

1. Construct temporary construction zone fencing around wetlands near construction activities.
2. Route SPP stormwater runoff away from remaining wetlands.
3. Mark and avoid all wetlands within the Sutter NWR.
4. Construct pipeline under or along Hughes Road through the Sutter NWR.

Status of the Species and Environmental Baseline

Giant garter snake

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 giant garter snake before adopting the final rule. The giant garter snake was listed as a threatened species October 20, 1993 (58 FR 54053).

Description - The giant garter snake is one of the largest garter snakes and may reach a total length of at least 64 inches (160 centimeters). Females tend to be slightly longer and proportionately heavier than males. The weight of adult female giant garter snakes is typically 1.1-1.5 pounds (500-700 grams). Dorsal background coloration varies from brownish to olive with a checkered pattern of black spots, separated by a yellow dorsal stripe and two light colored lateral stripes. Background coloration and prominence of black checkered pattern and the three yellow stripes are geographically and individually variable (Hansen 1980). The ventral surface is cream to olive or brown and sometimes infused with orange, especially in northern populations.

Historical and current range - Fitch (1941) described the historical range of the species as extending from the vicinity of Sacramento and Contra Costa Counties southward to Buena Vista Lake, near Bakersfield, in Kern County. Prior to 1970, the giant garter snake was recorded historically from 17 localities (Hansen and Brode 1980). Five of these localities were clustered in and around Los Banos, Merced County. The paucity of information makes it difficult to determine precisely the species' former range. Nonetheless, these records coincide with the historical distribution of large flood basins, fresh water marshes, and tributary streams. Reclamation of wetlands for agriculture and other purposes apparently extirpated the species from the southern one-third of its range by the 1940s -1950s, including the former Buena Vista Lake and Kern Lake in Kern County, and the historic Tulare Lake and other wetlands in Kings and Tulare Counties (Hansen and Brode 1980, Hansen 1980). Surveys over the last two decades have located the giant garter snake as far north as the Butte Basin in the Sacramento Valley.

As recently as the 1970s, the range of the giant garter snake extended from near Burrel, Fresno County (Hansen and Brode 1980), northward to the vicinity of Chico, Butte County (Rossman and Stewart 1987). California Department of Fish and Game (CDFG) studies (Hansen 1988) indicate that giant garter snake populations currently are distributed in portions of the rice production zones of Sacramento, Sutter, Butte, Colusa, and Glenn Counties; along the western border of the Yolo Bypass in Yolo County; and along the eastern fringes of the Sacramento-San Joaquin River delta from the Laguna Creek-Elk Grove region of central Sacramento County southward to the Stockton area of San Joaquin County. This distribution largely corresponds with agricultural land uses throughout the Central Valley.

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 and rice fields, and the adjacent uplands. Giant garter snakes feed on small fishes, tadpoles, and frogs (Fitch 1941, Hansen 1980, Hansen 1988). Essential habitat components consist of: (1) 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 cover and refuge from flood waters during the snake's dormant season in the winter (Hansen 1980).

Foraging ecology - Giant garter snakes are extremely aquatic, are rarely found away from water, forage in the water for food, and will retreat to water to escape predators and disturbance. This species occupies a niche similar to some eastern water snakes (*Nerodia* spp). Giant garter snakes are active foragers, feeding primarily on aquatic prey such as fish and amphibians. Historically, prey likely consisted of Sacramento blackfish (*Orthodon microlepidotus*), thick-tailed chub (*Gila crassicauda*), and red-legged frog (*Rana aurora*). Because these species are no longer available (chub extinct, red-legged frog extirpated from the Central Valley, blackfish declining/in low numbers), the predominant food items are now introduced species such as carp (*Cyprinus carpio*), mosquito-fish (*Gambusia affinis*), bullfrogs (*Rana catesbiana*), and Pacific treefrogs (*Pseudacris regilla*) (Fitch 1941, Rossman et al, 1996).

Reproductive ecology - The breeding season extends through March and April, and females give birth to live young from late July through early September (Hansen and Hansen 1990). Brood size is variable, ranging from 10 to 46 young, with a mean of 23 (Hansen and Hansen 1990). At birth young average about 20.6 cm snout-vent length and 3-5 g. Young immediately scatter into dense cover and absorb their yolk sacs, after which they begin feeding on their own. Although growth rates are variable, young typically more than double in size by one year of age (G. Hansen, pers. comm.). Sexual maturity averages three years in males and 5 years for females (G. Hansen, pers. comm.).

Movements and habitat use - The giant garter snake typically inhabits small mammal burrows and other soil crevices throughout its winter dormancy period (i.e., November to mid-March). Although these areas are generally thought to be above prevailing flood elevations, snakes may not always utilize high ground during their winter dormancy period. The BRD has documented giant garter snakes at the Colusa National Wildlife Refuge overwintering in areas with few high ground retreat sites (Wylie *et al.* 1997). Snakes in another study population at Gilsizer Slough overwintered in a low elevation wetland area, even though higher ground was present nearby. Both of these populations survived flooding and were not displaced from the area. Giant garter snakes also use burrows as refuge from extreme heat during their active period. The BRD (Wylie *et al.* 1997) has documented giant garter snakes using burrows in the summer as much as 165 feet

(50 meters) away from the marsh edge. Overwintering snakes have been documented using burrows as far as 820 feet (250 meters) from the edge of marsh habitat.

During radio-telemetry studies conducted by the BRD giant garter snakes typically moved little from day to day. However, total activity varied widely between individuals. Snakes have been documented moving up to 5 miles (8 kilometers) over the period of a few days (Wylie *et al.* 1997). In agricultural areas, giant garter snakes were documented using rice fields in 19-20 percent of the observations, marsh habitat in 20-23 percent of observations, and canal and agricultural waterway habitats in 50-56 percent of the observations (Wylie *et al.* 1997).

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

The giant garter snake currently is only known from a small number of populations. The status of these populations and the threats to these snakes and their habitats are detailed in the final rule that listed the giant garter snake as threatened (58 FR 54053). A number of land use practices and other human activities currently threaten the survival of the giant garter snake throughout the remainder of its range. Although some giant garter snake populations have persisted at low levels in artificial wetlands associated with agricultural and flood control activities, many of these altered wetlands are now threatened with urban development. Cities within the current range of the giant garter snake that are rapidly expanding include: (1) Chico, (2) Yuba City, (3) Sacramento, (4) Galt, (5) Stockton, (6) Gustine, and (7) Los Banos.

Ongoing maintenance of aquatic habitats for flood control and agricultural purposes eliminate or prevent the establishment of habitat characteristics required by giant garter snakes and can fragment and isolate available habitat, prevent dispersal of snakes among habitat units, and adversely affect the availability of the garter snake's food items (Hansen 1988, Brode and Hansen 1992). Livestock grazing along the edges of water sources degrades habitat quality in a number of ways: (1) eating and trampling aquatic and riparian vegetation needed for cover from predators, (2) changes in plant species composition, (3) trampling snakes, (4) water pollution,

(5) and reducing or eliminating fish and amphibian prey populations. Overall, grazing has contributed to the elimination and reduction of the quality of available habitat at four known locations (Hansen 1982, 1986).

In many areas, the restriction of suitable habitat to water canals bordered by roadways and levee tops renders giant garter snakes vulnerable to vehicular mortality. Fluctuation in rice and agricultural production affects stability and availability of habitat. Recreational activities, such as fishing, may disturb snakes and disrupt basking and foraging activities. Non-native predators, including introduced predatory gamefish, bullfrogs, and domestic cats also threaten giant garter snake populations. While large areas of seemingly suitable giant garter snake habitat exist in the form of duck clubs and waterfowl management areas, water management of these areas typically does not provide summer water needed by giant garter snakes. Although giant garter snakes on national wildlife refuges are relatively protected from many of the threats to the species, degraded water quality continues to be a threat to the species both on and off refuges.

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

Since April of 1995, the BRD has further documented occurrences of giant garter snakes within some of the 13 populations identified in the final rule. The BRD has studied populations of giant garter snakes at the Sacramento and Colusa National Wildlife Refuges within the Colusa Basin, at Gilsizer Slough within the Sutter Basin, and at the Badger Creek area of the Consumnes River Preserve within the Badger Creek-Willow Creek area. These populations, along with the American Basin population of giant garter snakes represent the largest extant populations. With the exception of the American Basin, these populations are largely protected from many of the threats to the species. Outside of these protected areas, giant garter snakes in these population clusters are still subject to all threats identified in the final rule. The remaining nine population clusters identified in the final rule are distributed discontinuously in small isolated patches and are vulnerable to extirpation by stochastic environmental, demographic, and genetic processes. All 13 population clusters are isolated from each other with no protected dispersal corridors. Opportunities for recolonization of small populations which may become extirpated is unlikely given the isolation from larger populations and lack of dispersal corridors between them.

The proposed project occurs within the Sutter Basin and Colusa Basin populations of giant garter snakes. The Sutter, Colusa, and Butte basins make up the Sacramento Valley Recovery Unit identified by the giant garter snake recovery team (USFWS 1998).

Five California Natural Diversity Database (NDDB) locality records are known from the Sutter basin and tributary streams/canals. These locality records include the Snake River, Gilsizer Slough, and various canals within the basin. Gilsizer Slough is a partially channelized natural waterway that runs east-west approximately two miles south of the SPP. The slough is intersected by the Sutter Bypass. Gilsizer Slough supports a population of giant garter snakes and has been a study site for the BRD telemetry study. The BRD estimated that the 1,430-hectare (3,500-acre) Gilsizer Slough study site supported approximately 206 individuals in 1995 and 170 individuals in 1996 (G. Wylie pers. comm. 1998). Giant garter snakes have also been tracked using the East Borrow Ditch within the Sutter Bypass/ Sutter NWR (G. Wylie pers. comm. 1998). Although Gilsizer Slough and the Sutter NWR are relatively protected and support a large population of giant garter snakes, no large protected wetland areas exist outside these two sites. The surrounding Sutter County rice production zone and its associated waterways and drainage canals also support giant garter snakes. Canals and waterways in the vicinity of the SPP site, along the pipeline corridor, and transmission line route provide habitat for the giant garter snake.

Ten NDDB locality records are known from the basin and tributary streams/canals. These records include sightings on Delevan National Wildlife Refuge (NWR), Glenn-Colusa Canal, Colusa Trough, Colusa Basin Drainage Canal, and several tributary streams between the towns of Williams and Maxwell. Currently, Colusa and Sacramento NWRs support populations of giant garter snakes and are study sites for the BRD telemetry study (Glenn Wylie, pers comm; Wylie *et al.* 1997). These represent stable, relatively protected populations of giant garter snakes. However, available information indicates a tenuous connection between localities clustered at the north and south end of the basin.

Other ongoing federal actions in the action area include Bureau of Reclamation (Reclamation) activities under the Central Valley Project Improvement Act to improve water supply to the Sacramento National Wildlife Refuge Complex (SNWRC), SNWRC management activities, and ongoing U.S. Army Corps of Engineers (Corps) flood control projects. Reclamation's refuge will improve water supplies to the Sutter NWR within the Sutter Basin, and Sacramento Delevan, and Colusa NWRs in the Colusa Basin. The project may cause mortalities of giant garter snakes and will result in habitat loss and disturbance. However, Reclamation has consulted with the Service to minimize the effects of their action on listed species, including giant garter snake. The project also will provide the SNWRC with reliable water supplies and more flexibility in management of habitats, including giant garter snake habitat, on the refuges. SNWRC currently is developing management plans to improve availability and quality of habitat for giant garter snakes on the SNWRC and to minimize risk of mortality during maintenance activities. SNWRC also is actively pursuing and participating in restoration projects to benefit giant garter snakes.

Several flood control programs administered by the Corps are ongoing within the Colusa and Sutter Basins. Subsequent to the 1986 flood events, the Corps initiated its Sacramento River Flood Control System Evaluation (SRFCSE) to examine the existing flood control system and to develop remedial repair plans to restore the designed level of protection. Project areas for Phases II, III, and V include the Colusa and Sutter Basins, the Sutter Bypass and its associated levees and drainage system, and drainage and flood control systems within the Colusa Basin. The Corps also assists in flood control through its Public Law 84-99 (PL 84-99) program. The PL 84-99 program is not based on a comprehensive plan, but rather, responds to requests from local sponsoring agencies for assistance. The Sacramento Bank Protection Project also reviews and responds to needs for improved bank protection on the Sacramento River and its tributaries. Currently, the Sacramento Bank Protection Project is investigating a bank protection project on the Colusa Basin Drain, demonstrating that this program may be applied outside the traditional project areas of the mainstream Sacramento River and its tributaries. These ongoing flood control activities include strengthening and repairing levees, stabilizing levee slopes, relocating or redesigning drainage canals, installing toe drains, dredging waterways, and installing rock riprap. Ongoing flood control activities have resulted in loss and disturbance of a variety of habitat types, including emergent marsh, drainage canals, and adjacent uplands used by the giant garter snake. Activities also may result in mortality of giant garter snakes and may not allow adequate time between disturbance events to allow for recovery of habitat. Although the Corps has consulted on previous projects administered under these programs and is expected to continue to do so, the ongoing nature of these activities and the administration under various programs makes it difficult to determine the continuing and accumulative impacts of these activities.

Aleutian Canada goose

The Aleutian goose was federally listed as endangered on March 11, 1967 (32 FR 4001), and reclassified as threatened on December 12, 1990 (55 FR 51112). A detailed account of the taxonomy, ecology, and biology of the Aleutian goose is presented in the approved Recovery Plan for this species (USFWS 1991). Supplemental information on the Aleutian goose is provided below.

The Aleutian Canada goose can be distinguished from most other subspecies of Canada geese by their small size (only cackling Canada geese are smaller) and a ring of white feathers at the base of the black neck in birds older than 8 months. Historically, the Aleutian goose nested on most of the larger islands in the Aleutian Islands and in the Commander and northern Kuril Island chains. When it was listed in 1967, the Aleutian goose was only known to nest on Buldir Island in the western Aleutian Islands. Subsequently, remnant flocks have been found on Chagulak Island in the eastern Aleutians, and Kaliktagik in the Semidi Islands. Recovery efforts in the breeding range presently focus on the Semidi Island, and the western and eastern Aleutian Island flocks.

The Aleutian goose's major migration and wintering areas include coastal areas of Oregon and northern California and California's Sacramento and San Joaquin Valleys. The Aleutian goose

migrates between breeding and wintering areas from August to March. Wintering and migrating Aleutian geese forage in harvested corn fields, newly planted or grazed pastures, or other agricultural fields (e.g., rice stubble and green barley). Lakes, reservoirs, ponds, large marshes, and flooded fields are used for roosting and loafing. In winter, Aleutian geese exhibit a crepuscular foraging pattern, roosting in large flocks during most of the day and night and flying to and from foraging areas during the hours around dawn and dusk.

The decline in numbers of Aleutian geese and the reduction of their breeding range is attributed to predation by arctic fox (*Alopex lagopus*), which were introduced on many Aleutian islands by fur traders during the period 1836-1930 (55 FR 239). The role of migration and wintering habitat loss in the historic decline of Aleutian geese is not well understood. Changing land use practices, including the conversion of cropland pastures to housing and other urban development, and sport and subsistence hunting likely contributed to the historical decline (USFWS 1991).

The approved Recovery Plan describes three criteria to be achieved to consider delisting the Aleutian goose. These criteria include: (1) a minimum overall population of 7,500 individuals and a demonstrated upward trend in population numbers, (2) a minimum nesting population of 50 pairs in three geographic parts of its former range, and (3) protection and management of important migration and wintering habitat for feeding and roosting. Current estimates meet or exceed the first two criteria described in the Recovery Plan (Brad Bortner, USFWS, pers. comm.). Most historic nesting islands are protected and managed, in part, for Aleutian goose recovery by the Alaska Maritime National Wildlife Refuge (USFWS 1991). Long-term protection and recovery efforts on important nesting islands have been greatly successful in expanding the Aleutian goose's breeding range and population numbers. Population estimates of Aleutian geese wintering in California during the winter of 1995-1996 reached 24,000 individuals (Bortner, USFWS, pers. comm. 1996), up from less than 800 geese in spring 1975 (Figure 1). However, the lack of adequately protected migration and wintering habitat for Aleutian geese remains the greatest obstacle to full recovery (USFWS 1991).

Baseline - Aleutian geese forage and roost in suitable habitats throughout the Sacramento Valley, including the Sacramento, Colusa, Butte Sink, and Sutter National Wildlife Refuges and the agricultural fields that surround them. The Butte Sink, in particular, is a major fall staging area for Aleutian geese. Aleutian geese migrate to this location in the fall, remain about 1.5 months, then continue south in December (USFWS 1991). Staging geese roost in flooded fields, ponds, and berms in rice fields in the Butte Sink, and fly out to surrounding agricultural fields to forage on waste grains and beans, and sprouting winter wheat. Agricultural fields adjacent to the applicant's 230kV power lines provide suitable Aleutian goose foraging habitat. Recent surveys documented a mixed-species flock of 1,100 geese, including approximately 100 Aleutian geese, foraging in a fallow rice field north of Hughes Road and east of the Sutter NWR on March 21, 1997 (Calpine 1997, AFC).

American Peregrine Falcon

Species Description and Life History The American peregrine falcon was Federally listed as endangered in 1970 throughout its range in North America which includes the southern portion of Alaska, Canada, the conterminous United States and northern Mexico. Four regional recovery plans were written for the American peregrine falcon: the Alaskan, Canadian, Pacific Coast and Rocky Mountains/Southwest Plans (USFWS 1982a, 1982b, 1984; Erickson *et al.* 1988). These recovery plans describe recovery tasks and provide measurable recovery goals to delist the subspecies. In June 1995, the Service published an advanced noticed of a proposal to remove the American peregrine falcon from the list of threatened and endangered species (60 FR34406). Current data indicate the falcon has recovered throughout its range and the Service is currently preparing a draft proposal to delist the taxon (Robt. Mesta, USFWS, pers comm.).

American peregrine falcons are monogamous. After the loss of a mate, the surviving bird typically remates. Peregrine falcons nest almost exclusively on cliff ledges that are associated with suitable foraging areas. American peregrine falcons have also been observed nesting on man made structures in heavily urbanized areas. American peregrine falcons exhibit nest site fidelity; however, new nest locations are often established if a bird remates. The western population of peregrines does not exhibit true migration, however, winter movements southward do occur, especially in young birds. Wintering individuals frequently reside near large concentrations of migratory waterfowl and/or shorebirds.

The peregrine falcon is one of nature's swiftest and most beautiful birds of prey. The name comes from the Latin word *peregrinus*, meaning "foreigner" or "traveler." It is noted for its speed, grace, and aerial skills. There are three subspecies of the peregrine falcon in North America: (1) American, (2) Arctic, and (3) Peale's.

The American peregrine falcon is a specialized predatory raptor that feeds almost entirely on birds captured in flight. Prey includes any available bird species, ranging in size from ducks to songbirds. Nest sites are typically in ledges or small caves on large cliff faces. The western population of peregrines does not exhibit true migration, however, winter movements southward do occur, especially in young birds.

Peregrine falcons are medium-sized hawks with long pointed wings. Adults have slate blue-gray wings and backs barred with black; pale undersides; white faces with a black stripe on each cheek; and large, dark eyes. Younger birds are darker and browner.

Peregrine falcons are roughly crow-sized---about 15-21 inches long---with a wingspan of about 40 inches. As with many raptors, or birds of prey, females are larger than males. Peregrine falcons live mostly along mountain ranges, river valleys, and coastlines. Historically, they were most common in parts of the Appalachian Mountains and nearby valleys from New England south to Georgia, the upper Mississippi River Valley, and the Rocky Mountains.

Peregrines also inhabited mountain ranges and islands along the Pacific Coast from Mexico north to Alaska and the Arctic tundra.

Peregrine falcons generally reach breeding maturity at 2 years. Usually, the male arrives at a nesting site and begins a series of aerial acrobatic displays to attract a mate. An average clutch of four eggs is laid in the spring, hatching about a month later. Nesting activities begin in March and continue through late June or early July, when young fledge. Following fledging, families may remain at the nest cliff through August or September. Peregrines usually return to the same nesting areas annually but may select different ledges within a 0.5-mile area. Peregrines vigorously defend their nests, although they may abandon them if severely or continuously harassed.

The nest is a scrape or depression dug in gravel on a cliff ledge. Rarely, peregrines will nest in a tree cavity or an old stick nest. Unlike many other animals that cannot coexist with urbanization, some peregrines have readily accepted man-made structures as breeding habitat. For example, skyscraper ledges, tall towers, and bridges serve as the ecological equivalent of a cliff ledge. A conservative estimate of nesting peregrines is 140 nesting pairs in California (Robt. Mesta, USFWS, 1999).

Geographic Distribution and Associated Habitat American peregrine falcons formerly occupied most of California except the deserts during migrations and in winter. The California breeding range has been expanding and includes the Channel Islands, the coast of southern and central California, inland areas in northern California, North Coast Ranges, Klamath and Cascade ranges, and the Sierra Nevada (CDFG 1992).

Suitable cliffs are generally higher than 75 feet and steep enough to exclude ground predators (Monk 1980). Preferred cliff aspects are southeast to southwest (Boyce and White 1980). Because peregrine falcons feed on medium-sized birds taken in flight (Monk 1981), they prefer to nest near marshes, lakes, and rivers that produce or attract an abundance of birds. Upland habitats that occur near nests in California are quite variable and may include oak woodlands, conifer forests, meadows, or brushlands. Peregrine falcons nest on cliffs in a wide variety of habitats. The major habitat requirements include cliffs with suitable nesting ledges usually within 1 mile of a water body and also near an abundant source of prey (Jones and Stokes 1988). Most currently occupied cliff sites are at elevations below 4,000 feet (Shimamoto and Airola 1981).

Reasons for Decline and Threats to Survival: Organochlorine pesticides used in the United States were implicated as the major cause in declines of American peregrine falcon populations. The use of these chemicals peaked in the 1950s and early 1960s, and continued through the early 1970s. The use of DDT was restricted in Canada in 1970 and in the United States in 1972 (37 FR 13369, July 7, 1992). The use of organochlorines can affect peregrines by either direct mortality or by adversely affecting reproduction. Reproductive failure includes eggshell thinning and breakage, addling, hatching failures and abnormal reproductive behaviors by parents

(Risebrough and Peakall 1988). Peregrines nesting in the central California coast range in the 1980s however continued to have elevated concentrations of organochlorines in eggs (Jarman *et al.*, 1993) and hatchability of artificially incubated eggs was below 50 percent (Linthicum, 1989). Peregrine falcons in California continue to have elevated concentrations of organochlorines and eggshell thinning (Welsh, USFWS, pers comm 1997).

Other unnatural mortality factors which could affect populations include shooting, falconry, collisions with transmission lines, electrocutions, contaminated prey species, and disturbance at nest sites. Peregrines are particularly sensitive to disturbance at the nest site during the breeding season. Human disturbance such as rock climbing, blasting, shooting, timber harvest, road construction, or aerial disturbance can cause peregrines to abandon nest sites. Olendorff and Lehman (1986) report peregrine falcon collisions with transmission lines to have a mortality rate of 83 percent. The swift flight of peregrines is thought to be a contributing factor in fatal collisions.

Critical habitat has been designated for American peregrine falcon in Napa and Sonoma counties, California. American peregrine falcons are not known to nest in the SPP project area. However, the project area contains suitable winter foraging habitat.

Bald Eagle

Species Description and Life History. The bald eagle, a bird of aquatic ecosystems, frequents estuaries, large lakes, reservoirs, major rivers, and some seacoast habitats. Mature bald eagles are distinguished by their white head, white tail, and yellow beak; the female of the species is generally larger than the male. Immature birds have a dusky head and tail, and a dark bill. The bald eagle typically reaches sexual maturity at 4-5 years, the species is monogamous and will remate upon the death of a mate. The bald eagle was federally listed as endangered on February 14, 1978 (43 FR 6233) in all of the coterminous United States except Minnesota, Wisconsin, Michigan, Oregon, and Washington, where it was classified as threatened. On August 15, 1995 (60 FR 36010), the bald eagle was down-listed to threatened throughout its range. Critical habitat has not been designated for the bald eagle. The recovery plan for the Pacific population of the bald eagle describes the biology, reasons for decline, and the actions needed for recovery (USFWS 1986).

The Pacific Recovery Region for the bald eagle includes the States of California, Oregon, Washington, Idaho, Montana, Wyoming, and Nevada. Other recovery plans exist for bald eagle populations in the Southeast, Southwest, Northern States, and Chesapeake Bay. Delisting/reclassification of the bald eagle in the Pacific Recovery Region is not dependent on the status of bald eagle populations covered by these other plans (USDI-FWS 1986b). For this reason, the Pacific Recovery Region for the bald eagle will be viewed as a recovery unit for purposes of this consultation.

Foraging Ecology: The bald eagle is a generalized predator/scavenger primarily adapted to edges of aquatic habitats. Typically fish comprise up to 70 percent of the nesting eagle diet with mammals, birds, and some amphibians and reptiles providing the balance of the diet. Wintering eagles forage fish, waterfowl, mammals, and a variety of carrion. Bald eagles can maneuver skillfully and frequently hunt from perches. They are also known to hunt by coursing low over the ground or water.

Historic and Current Distribution: The bald eagle is the only North American representative of the fish or sea eagles, and is endemic to North America. The breeding range of the bald eagle includes most of the continent, but they now nest mainly in Alaska, Canada, the Pacific Northwest states, the Great Lake states, Florida, and Chesapeake Bay. The winter range includes most of the breeding range, but extends primarily from southern Alaska and southern Canada, southward.

As of 1996, about 5,068 occupied bald eagle territories were estimated within its range. Of these, 1,274 (25 percent) were estimated to occur within the Pacific Recovery Region, with estimates of 90 pairs in Idaho, 165 pairs in Montana, and 66 pairs in Wyoming (Jody Millar, Bald Eagle Recovery Coordinator, FWS, pers. comm.). As of 1998, there were 150 occupied territories in California, 354 in Oregon, 638 in Washington, and 1 in Nevada (Maria Boroja, USFWS, pers comm 1999).

The California bald eagle nesting population has increased in recent years from 40 occupied territories in 1977 to 150 occupied territories in 1998 (R. Jurek, personal communication 1999), approximately 1,100 individuals wintered in California in 1998. The majority of nesting eagles occur in the northern one-third of the state, primarily on public lands. Seventy percent of nests surveyed in 1979 were located near reservoirs (Lehman 1979), and this trend has continued, with population increases occurring at several reservoirs since the time of that study. In southern California, nesting eagles occur at Big Bear Lake, Cachuma Lake, Lake Mathews, Nacimiento Reservoir, and San Antonio Reservoir (Zeiner et. al., 1990). The Klamath Basin in northern California and southern Oregon supports the largest wintering population of eagles in the lower 48 states, where up to 400 birds may congregate at one time. Scattered smaller groups of wintering eagles occur throughout the State near reservoirs, and typically in close proximity to large concentrations of overwintering migratory waterfowl. Clear Lake, Lake County, may support up to 60 wintering eagles and is a mercury-impaired water body. San Antonio Reservoir has become an important wintering area for bald eagles. An estimate of 50+ eagles regularly winter there. Lake Nacimiento also supports as many as 14 wintering eagles, and is an identified mercury-impaired water of the State. Women are cautioned against consuming any large mouth bass and no one should eat more than 24 ounces of large mouth bass per month from this lake (Cal EPA public health warnings). The observed increase in populations is believed to be the result of a number of protective measures enacted throughout the range of the species since the early 1970s. These measures included the banning of the pesticide DDT, stringent protection of nest sites, and protection from shooting.

Reasons for Decline and Threats to Survival: The species has suffered population declines throughout most of its range, including California, due primarily to habitat loss, shooting, and environmental pollution (Snow 1973, Detrich 1986, Stalmaster 1987). The use of DDT and its accumulation caused thin shelled eggs in many predatory birds. After the ban of DDT and other organochlorine compounds, the bald eagle populations started to rebound (USDI-FWS 1986a).

Other environmental contaminants represent potentially significant threats to bald eagles. Dioxin, endrin, heptachlor epoxide, mercury, and polychlorinated biphenyls (PCB's) still occur in eagle food supplies; however, their overall effects on eagle populations are poorly understood (USDI-FWS, 1986a).

Bald eagles are sensitive to human disturbances such as recreational activities, home sites, campgrounds, mines, and timber harvest (Thelander 1973, Stalmaster 1976) when roosting, foraging, and nesting areas are located near these sites. The bald eagle is protected under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712) and the Bald Eagle Protection Act of 1940, as amended (16 USC §§ 668-668d).

Olendorff and Lehman (1986) collected reports of bald eagles colliding with transmission lines from around the world and covering the period from 1965-1985. The reported mortality rate for bald eagles was 87 percent. Olendorff and Lehman (1986) suggest that the heavy weight of eagles could be a factor in the higher mortalities for eagles than for other smaller buteos. Olendorff *et al.* (1986) observed eagle flight patterns in wintering areas in the vicinity of proposed transmission line routes in California. Eagles were observed flying through drainages, canyons and saddles, across low ridges, over valleys, and were concentrated above high ridges. Eagles usually flew above 100 feet from the ground (Olendorff *et al.* 1986).

Bald eagles have not been observed nesting in the SPP project area. However, bald eagles winter in the Sacramento Valley. One adult bald eagle was observed foraging over fallow, flooded rice fields along Marcuse Road approximately eight miles south of the SPP project site, and one-half mile west of Highway 99 on February 17, 1997.

Effects of the Proposed Action

The action area for this consultation is the Colusa and Sutter Basins. For the reasons described in the project description above, indirect effects associated with the service area of the SPP will not be addressed in this consultation.

Construction of the Sutter Power Plant and associated facilities will result in the loss of 16.74 acres of annual grasslands, 2.2 acres of rice, 0.1 acre of wheat, 0.1 acre of mature walnut orchard, and 3.0 acres of seasonal wetlands that do not provide habitat for federally listed crustaceans. Approximately 6 acres of grassland habitat, primarily adjacent to irrigation canals will be temporarily disturbed during construction of the gas pipeline and transmission line.

Giant garter snake

Construction of the SPP will result in permanent loss of 2.7 acres of giant garter snake habitat. Giant garter snake habitat on the SPP project site consists of upland habitat adjacent to the agricultural canals. Borrow pits on the SPP site may provide limited seasonal foraging if they remain ponded into April, but are not considered primary habitat necessary to support the giant garter snake. The switchyard also consists of upland habitat adjacent to agricultural canals. Construction of the switchyard will result in permanent loss of 2.2 acres. The switchyard will require 1.9 acres, and an additional 0.3 acre surrounding the switchyard will be kept clear of vegetation. During construction of the transmission line, 0.007 acre of uplands will be permanently lost. The SPP and the associated facilities will result in the permanent loss of 4.907 acres of upland giant garter snake habitat. Calpine will provide 4.907 acres of aquatic habitat and 9.814 acres of upland habitat to offset this loss of habitat.

Construction of the transmission line will result in temporary habitat disturbance. The transmission line will run parallel to 3.7 miles of irrigation canals which provide habitat for the giant garter snake. Transmission line construction will not directly disturb the irrigation canals, but may affect giant garter snakes using the canals.

Construction of the pipeline will temporarily disturb approximately 20 canals that will be culverted and trenched. The pipeline will be drilled and bored under five large canals. Approximately 0.5 acre will be temporarily disturbed on either side of the five large canals, resulting in a total of 5 acres of disturbance. Within the 50-foot construction corridor, there are 2.9 acres of irrigation canals that will be disturbed during boring and trenching. The pipeline will parallel an additional 6.5 miles of irrigation canals. Although only a small portion of these canals lie within the construction corridor, construction activities adjacent to the 6.5 miles of canals may affect giant garter snakes using these canals.

All construction activities occurring in giant garter snake habitat may disturb, harass, injure, or kill giant garter snakes. Construction activities may remove vegetative cover and basking sites necessary for thermoregulation, fill or crush burrows or crevices, divert water from habitat and remove the prey base. Temporary fill or culverting of canals and waterways will remove giant garter snake habitat and may obstruct movement of giant garter snakes. Because giant garter snakes utilize small mammal burrows and soil crevices as retreat sites, giant garter snakes may be crushed, buried, or otherwise injured from construction activities. Snakes may be killed or injured by construction equipment or other vehicles accessing the construction sites. Calpine estimates that 256 workers will be employed during construction of the power plant. Increases in traffic in the project vicinity due to employees accessing work sites will increase the risk of vehicular mortality. The disturbance from construction activities may also cause giant garter snakes to move into areas of unsuitable habitat where they will experience greater risk of predation or other sources of mortality. Silting, fill, or spill of oil or other chemicals could cause loss of prey items on or downstream of the project sites.

Operation of the SPP project, once it is completed, may affect giant garter snakes occupying the project vicinity. The SPP Project has an expected life of 30 years. SPP closure requires review and approval by the CEC, compliance with the Resource Conservation Recovery Act administered by the Environmental Protection Agency, and includes removal of transmission lines, hazardous wastes. The transmission line poles may provide additional perches for raptors that may prey upon giant garter snakes. Calpine estimates operation of the SPP will require 20 full time employees. Traffic on access roads may increase due to employee trips to and from the SPP. Increases in traffic will increase the risk of road mortality of giant garter snakes. Maintenance of the SPP and Greenleaf 1 facilities will include annual mowing and vegetation control which may kill or injure giant garter snakes and reduce vegetative cover. However, Calpine has proposed to mow with mower blades set to six inches or higher. This measure should minimize giant garter snake mortality and leave some cover in place.

Aleutian Canada goose

The proposed project is likely to injure and kill Aleutian Canada geese as a result of in-flight collisions with the 4.0-mile transmission line and HRSG stacks. The Aleutian goose's crepuscular activity patterns make them particularly susceptible to birdstrikes because of poor visibility during twilight hours when flocks of geese fly between preferred roosting and foraging habitats. The likelihood of birdstrikes occurring would be further increased by fog conditions, which commonly occur in the Sacramento Valley in winter, and by disturbance events, which may cause foraging geese to take flight and land repeatedly in the vicinity of the transmission lines and towers. Collisions with powerlines may injure Aleutian geese to such an extent that they can no longer fly, making them more susceptible to predation, disrupting their normal behavior patterns, and preventing them from migrating. The construction of two 145-foot tall HRSG stacks could result in avian collisions, particularly during night flights. Habitat provided by Calpine for the giant garter snake (particularly the upland habitat), and for Swainson's hawk may also benefit Aleutian Canada geese by providing foraging habitat.

Sacramento National Wildlife Refuge Complex staff estimate powerline mortalities at Sutter NWR likely number in the hundreds annually (Williams 1998). Refuge staff did not indicate species composition. However, Aleutian Canada geese are among the species that utilize Sutter NWR. Birds roosting at Sutter NWR make regular nighttime flights to forage in neighboring rice fields. Nighttime flight behavior of waterfowl may increase susceptibility to powerline collisions. Carcasses of birds killed by collision with powerlines may also serve as substrates for avian botulism. Areas along the route that parallel existing distribution lines may present higher risks of collisions due to clustering of lines. Birds clearing the distribution lines may not gain enough height to clear the transmission lines. The highest potential for collisions may be over larger canals because waterfowl may use these waterways as flyways. Hunting may also cause waterfowl to flush, increasing risk of collisions.

Strobe lights on the HRSG stacks may minimize collision potential. Bird flight diverters on shield wires to increase the visibility of transmission lines may reduce collision risks. Bird flight diverters may reduce collisions 57 percent to 89 percent (APLIC 1994). The monitoring program proposed by Calpine is designed to determine whether the transmission lines will cause significant impacts to migratory birds and special status bird species, and whether any remedial actions are necessary. Remedial actions may include additional bird flight diverters, studies to determine causes of avian collisions, or providing off-site habitat.

American Peregrine Falcon and Bald Eagle

The proposed project will not modify any nesting or foraging habitat for either the bald eagle or peregrine falcon. Indirect effects of the proposed action are the presence and impacts of the existing transmission lines and towers and their potential risks to birds. Transmission lines and towers pose potential risks to birds. The most common risks are electrocution from perching on transmission towers and collision with the guide or shield wire or the transmission. The risk of collision can be affected by the location of the line, behavior of the bird species, and weather conditions. Raptors are generally not as prone to collision with power lines, due to their keen eyesight and maneuverability in flight. However, instances have been reported of collisions of both eagles and falcons. Raptors are most vulnerable to collision while pursuing prey, defending territories, during courtship and escaping predators.

The effects of the action that are most likely to result in take of the species are disturbance and collision. Impacts such as these are likely to occur even in the presence of the mitigation as proposed since eagles and falcons must travel along and past the transmission corridor during foraging, seasonal and daily migrations. The towers supporting the conductors often serve as the perch from which many raptors engage in hunting and courtship, and act as ideal nest sites.

The proposed project poses a potential risk of injury or death due to collision because bald eagles and peregrines are expected to fly across the path of the transmission line to reach foraging or roosting areas. This could result in the take of these species.

Strobe lights on the HRSG stacks may minimize collision potential. Spacing of conductor wires greater than the wing span of large birds is expected to reduce the risk of electrocution. Bird flight diverters on shield wires to increase the visibility of transmission lines may reduce collision risks. Bird flight diverters may reduce collisions 57 percent to 89 percent (APLIC 1994). The monitoring program proposed by Calpine is designed to determine whether the transmission lines will cause significant impacts to migratory birds and special status bird species, and whether any remedial actions are necessary.

Critical habitat for the American peregrine falcon is located outside of the project area and so there would be no effects from the project.

Cumulative Effects

Cumulative effects are those impacts of future State, Tribal, county, local agency, and private actions that are reasonably certain to occur. Future Federal actions will be subject to the consultation requirements established in section 7 of the Act. Our agency is aware of other projects currently under review by State, county, and local authorities where biological surveys have documented the occurrence of the federally proposed or listed species. Projects currently under review by State, county, and local authorities include such actions as urban expansion, water transfer projects that may not have a Federal nexus, and continued agricultural development. The cumulative effects of these known actions pose a significant threat to the eventual recovery of these species.

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 giant garter snakes 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 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; and (8) riprapping or lining of canals and stream banks.

Specific cumulative effects related to the proposed action include maintenance activities, which degrade or destroy habitat or cause unpredictable fluctuations in habitat, and market-driven fluctuations in acres of rice cultivation, which may reduce habitat available to giant garter snakes.

Effects of existing power lines in the project area that cause bird strike mortalities are cumulative to the effects of construction of the new transmission line. WAPA has consulted on the effects of its transmission lines; therefore, WAPA lines in the project vicinity are not considered cumulative to the proposed action. However, other existing lines belonging to PG&E are not subject to the consultation requirements established in section 7 of the Act, and therefore represent effects cumulative to the proposed action.

Conclusion

After reviewing the current status of the giant garter snake, bald eagle, American peregrine falcon, and Aleutian Canada goose, the environmental baseline for the action area, the effects of the proposed action and cumulative effects, it is the Sacramento Fish and Wildlife Office's biological opinion that the SPP Project, as proposed, is not likely to jeopardize the continued existence of the giant garter snake, bald eagle, American peregrine falcon, or Aleutian Canada goose. No critical habitat would be adversely modified or destroyed by the proposed action.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, 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 WAPA so that they become binding conditions of any grant or permits issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. WAPA has a continuing duty to regulate the activity covered by this incidental take statement. If WAPA fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

Giant garter snake

The Service anticipates incidental take of giant garter snakes will occur. Giant garter snakes are secretive and notoriously sensitive to human activities. Individual snakes are difficult to detect unless they are observed, undisturbed, at a distance. Most close-range observations represent chance encounters that are difficult to predict. It is not possible to make an accurate estimate of the number of snakes that will be harassed, harmed or killed during construction activities. In instances when take is difficult to detect, the Service estimates take in numbers of species per acre of habitat lost as a result of the action. The Service anticipates that all giant garter snakes inhabiting 4.907 acres of giant garter snake habitat permanently lost as a result of the action will be harassed, harmed, or killed (approximately 2 snakes). The Service anticipates that all giant garter snakes inhabiting approximately 7.9 acres of habitat temporarily disturbed by construction of the pipeline will be harassed, harmed, or killed (approximately 3 snakes). Additionally, all garter snakes inhabiting 10.2 miles of canals and waterways paralleling construction of the transmission line and pipeline will be harassed (approximately 10 snakes). The Service anticipates

that approximately one giant garter snake per year may be harassed, harmed, or killed during operation and maintenance of the proposed project.

Aleutian Canada goose, American peregrine falcon, and bald eagle

The Service anticipates incidental take of bald eagle, American peregrine falcon, and Aleutian Canada geese may occur as a result of implementing the proposed project. Incidental take is possible in two forms. One form is disturbance associated with the maintenance of the transmission line to wintering eagles, falcons, and geese. The second form of take is likely to occur in the form of direct mortality or injury from collision and/or electrocution with the proposed transmission line. Incidental take will be difficult to detect because collisions are difficult to detect, dead or injured birds may be removed by scavengers, and because injured birds may fall or move outside the search area. The Service is unable to quantify the amount or extent of take due to the low likelihood of encountering a dead or injured bird. Therefore, the maximum allowable level of take is estimated at one American peregrine falcon, one bald eagle, and three Aleutian Canada geese during the first year of the project, not to exceed two American peregrine falcon, two bald eagles, and six Aleutian Canada geese over the life of the project.

Effect of the Take

In the accompanying biological and conference opinions, the Sacramento Fish and Wildlife Office has determined that this level of anticipated take is not likely to result in jeopardy to the giant garter snake, Aleutian Canada goose, bald eagle, or American peregrine falcon. No designated critical habitat was considered affected.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize effects of incidental take of giant garter snakes, Aleutian Canada geese, American peregrine falcon, and bald eagle.

Giant garter snake:

1. Harassment, harm, or take of giant garter snakes during construction activities and associated with implementing and operating the SPP project shall be minimized (refer also to Appendix A, Standard Avoidance and Minimization Measures During Construction Activities in Giant Garter Snake Habitat).
2. Impacts of temporary losses and degradation of habitat of giant garter snakes shall be minimized and, to the greatest extent practicable, habitat restored to its pre-project condition. Permanent loss of habitat shall be compensated.

construction activities. Information that should be included in a field report form is provided in Appendix B. The monitoring biologist needs to be available thereafter; if a snake is encountered during construction activities, the monitoring biologist shall have the authority to stop construction activities until appropriate corrective measures have been completed or it is determined that the snake will not be harmed. Giant garter snakes encountered during construction activities should be allowed to move away from construction activities on their own. Capture and relocation of trapped or injured individuals can only be attempted by personnel or individuals with current Service recovery permits pursuant to section 10(a)1(A) of the Act. The biologist shall be required to report any incidental take to the Service immediately by telephone at (916) 979-2725 and by written letter addressed to the Chief, Endangered Species Division, within one working day. The project area shall be re-inspected whenever a lapse in construction activity of two weeks or greater has occurred.

- E. Confine clearing to the minimal area necessary to facilitate construction activities.
 - F. Movement of heavy equipment to and from the project site shall be restricted to established roadways to minimize habitat disturbance.
 - G. The project proponent shall develop and implement measures to minimize the effects of operations and maintenance on giant garter snakes and their habitat (refer to Appendix C, Standard Avoidance and Minimization Measures During Construction Activities in Giant Garter Snake Habitat and Appendix A, Mitigation Criteria for Restoration and/or Replacement of Giant Garter Snake Habitat). Maintenance and operations activities that may affect giant garter snakes include: canal maintenance, weed and vegetation management, transmission line maintenance, and vehicle access.
2. The following terms and conditions implement reasonable and prudent measure number two:
- A. Where feasible, avoid construction activities within 200 feet from the banks of giant garter snake aquatic habitat. Confine construction activities within 200 feet of aquatic giant garter snake habitat to the minimal area necessary. Avoided giant garter snake habitat shall be designated as Environmentally Sensitive Areas and shall be flagged by a qualified biologist approved by the Service and avoided by all construction personnel.
 - B. After completion of construction activities, any temporary fill and construction debris shall be removed and, wherever feasible, disturbed areas shall be restored to pre-project conditions. Restoration work may include replanting emergent

vegetation (refer to Appendix A, Mitigation Criteria for Restoration and/or Replacement of Giant Garter Snake Habitat).

- C. Permanent losses of habitat shall be compensated at the ratio of 3:1 and meet the criteria listed in Appendix A, Mitigation Criteria for Restoration and/or Replacement of Giant Garter Snake Habitat).
 - D. All wetland and upland acres created and provided for the giant garter snake shall be protected in perpetuity by a Service-approved conservation easement or similarly protective covenants in the deed. The conservation easement on the mitigation habitat shall be recorded at the county recording office prior to groundbreaking. The easement/deed, including a title report for the land area, shall be reviewed and approved by the Service prior to recording in the appropriate County Recorders Office(s). A true copy of the recorded easement/deed shall be provided to the Service within 30 days after recordation. Standard examples of deed restrictions and conservation easements are available from the Service upon request.
 - E. WAPA shall ensure compliance with the Reporting Requirements below.
3. The following term and condition implements reasonable and prudent measure number three:
- Consistent with measures and practices provided in the Avian Powerline Line Interaction Committee's 1994 and 1996 State of the Art Handbooks (APLIC 1994 and 1997), WAPA shall ensure:
- A. All transmission lines are equipped with bird flight diverters;
 - B. Suitable spacing is provided between conductor wires to minimize risk of electrocution; and
 - C. Implementation of an avian collision monitoring plan to determine if the transmission lines and HRSG stack cause significant impacts to migratory birds. The Monitoring Plan will identify remedial actions should impacts be determined to be significant.

Reporting Requirements

The Sacramento Fish and Wildlife Office is to be notified within three working days of the finding of any listed species or any unanticipated harm to the species addressed in this biological opinion. The Service contact person for this is the Division Chief for Endangered Species at (916) 979-

2725. Any dead or severely injured giant garter snake, American peregrine falcon, bald eagle, or Aleutian Canada goose shall be transferred to the Fish and Wildlife Service's Law Enforcement Office at 3310 El Camino Avenue, Suite 140, Sacramento, CA; telephone (916) 979-2986.

The Service-approved biologist shall notify the Service immediately if giant garter snakes are found on site as detailed in term and condition 1D, and will submit a report including date(s), location(s), habitat description, and any corrective measures taken to protect the snake(s) found. The Service-approved biologist shall submit locality information to the California Department of Fish & Game (CDFG), using completed California Native Species Field Survey Forms or their equivalent, no more than 90 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' or 15' quadrangle; dates (day, month, year) of field work; number of individuals and life stage (where appropriate) encountered; and a description of the habitat by community-vegetation type.

A post-construction compliance report prepared by the Service approved monitoring biologist shall be forwarded to the Chief, Endangered Species Division, at the Sacramento Fish and Wildlife Office within 60 calendar days of the completion of each project. This report shall detail (i) dates that construction occurred; (ii) pertinent information concerning the applicant's success in meeting project mitigation measures; (iii) an explanation of failure to meet such measures, if any, and recommendations for remedial actions and request for approval from the Service, if necessary; (iv) known project effects on federally listed species, if any; (v) occurrences of incidental take of federally listed species, if any; and (vi) other pertinent information.

Review Requirements

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed project. If during the course of this action, this minimized level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The Federal agencies must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species and the ecosystems upon which they depend. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on

listed species or critical habitat, to help implement recovery plans, or to develop information and data bases.

1. As a Recovery Plan for the giant garter snake is developed, WAPA should assist the Service in its implementation.
2. WAPA should incorporate into bidding documents the enclosed "Standard Avoidance and Minimization Measures for Construction Activities in Giant Garter Snake Habitat" when appropriate.
3. WAPA, in partnership with the Service, should develop maintenance guidelines for WAPA projects that will reduce adverse effects of routine maintenance on giant garter snakes and their habitat. Such actions may contribute to the delisting and recovery of the giant garter snake by preventing degradation of existing habitat and increasing the amount and stability of suitable habitat.
4. WAPA should conduct random ground searches for bird strikes during migration and wintering periods.
5. WAPA should participate in mid-winter bird surveys on the Sutter NWR.
6. WAPA should prepare a comprehensive planning process for future siting and placement of transmission lines that evaluates the effects of transmission lines on sensitive habitats, migratory birds, and special status species.
7. WAPA should fund and participate in research on avian collision and electrocution, cost effective ways of burying transmission lines, and develop alternative transmission methodologies.

In order to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed and proposed species or their habitats, the Sacramento Fish and Wildlife Office requests notification of the implementation of any conservation recommendations.

REINITIATION --CLOSING STATEMENT

This concludes the formal consultation for the proposed Sutter Power Project as outlined in the request for consultation. 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 these opinions; (3) the agency action


Ms. Loreen McMahon

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is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in these opinions; or (4) a new species is listed or critical habitat designated that may be affected by the action.

Please contact Jan Knight or Kelly Hornaday at (916) 979-2120 (Sacramento Valley Branch) if you have any questions regarding this biological opinion.

Sincerely,


62 Cay C. Gonde
Acting Field Supervisor

cc: PARD (ES), Portland, OR
NMFS, Santa Rosa, CA (Attn: Chris Mobley)
Corps of Engineers, Sacramento, CA (Attn: Dave Tedrick)
CDFG, Endangered Species, Sacramento, CA (Attn: Deborah McKee)
CDFG, Region 2, Rancho Cordova, CA (Attn: Larry Eng)
CEC, (Linda Spiegel, Paul Richins)
CH2M Hill (Debra Crowe)

Literature Cited

Anthony, R. G. and F. B. Isaacs. 1983. Characteristics of nesting habitat-mixed conifer type, Oregon. Abstract. Workshops on habitat management for nesting and roosting bald eagles in the western united states. Oregon State University. Corvallis, OR. Unpublished report.

Avian Power Line Interaction Committee (APLIC) 1994. Mitigating Bird Collisions with Power Lines: State of the Art in 1994. Edison Electric Institute. Washington, D.C.

Avian Power Line Interaction Committee (APLIC). 1996. Suggested Practices for Raptor Protection on Lines: The State of the Art in 1996. Edison Electric Institute/Raptor Research Foundation. Washington, D.C.

Biosystems Analysis, Inc. and University of California at Davis Department of Wildlife and Fisheries Biology (UCD-DWF). 1985. Pit 3, 4, and 5 project bald eagle and fish study. Pacific Gas and Electric Company, Department of Engineering Research. San Ramon, CA.

Boyce, D.A. and C. M. White. 1980. Peregrine falcon nesting habitat survey on U.S. Forest Service lands along the west slope of the Sierra Nevada mountains. (Contract #53-9191U9-0-80029.) USDA, Forest Service, Region 5. San Francisco, CA. Unpublished Report.

Brode, J. and G. Hansen. 1992. Status and future management of the giant garter snake (*Thamnophis gigas*) within the southern American Basin, Sacramento and Sutter counties, California. California Department of Fish and Game, Inland Fisheries Division, January 1992.

California Natural Diversity Database (CNDDB). 1996. Natural Heritage Division, California Department of Fish and Game. State of California.

California Department of Fish and Game. 1992. Annual report on the status of California State listed threatened and endangered animals and plants. Resources Agency, Sacramento, CA. 203 pp.

Detrich, P. J. 1978. Bald eagle winter habitat study, Shasta, Trinity, and Tehama counties, California. USDA Forest Service, Shasta-Trinity National Forests. Redding, CA. Unpublished report.

_____. 1986. Status and distribution of the bald eagle in California. M.S. Thesis. California State University, Chico, California.

_____. 1985. The status and distribution of the bald eagle in California. M.S. thesis. California State University. Chico, CA.

_____. 1980. Pit 3, 4, 5 bald eagle study (draft). USDA Forest Service, Shasta-Trinity National Forests. Redding, CA. Unpublished report.

Erickson, R.J., D.A. Benoit, V.R. Mattson, H.P. Nelson, Jr. and E.N. Leonard. 1996. The effects of water chemistry on the toxicity of copper to fathead minnows. *Environmental Toxicology and Chemistry* 15:181-193.

Fitch, H. S. 1941. Geographic variation in garter snakes of the genus *Thamnophis sirtalis* in the Pacific coast region of North America. *American Midland Naturalist*, 26:570-592.

Hansen, G.E. 1982. Status of the giant garter snake (*Thamnophis couchi gigas*) along portions of Laguna and Elk Grove creeks, Sacramento County, California. Report to Sacramento County Planning Dept. 15 pp.

_____. 1988. Review of the status of the giant garter snake (*Thamnophis couchi gigas*) and its supporting habitat during 1986-1987. Final report for Calif. Depart. Fish and Game Contract C-2060. Unpubl. 31 pp.

_____. 1986. Status of the giant garter snake *Thamnophis couchi gigas* (Fitch) in the Southern San Joaquin Valley During 1986. Final report for Calif. Depart. Fish and Game Standard Agreement No. C-1433. Unpubl. 31 pp.

Hansen, R. W. 1980. Western aquatic garter snakes in central California: an ecological and evolutionary perspective. Master of Arts thesis, California State University, Fresno, California, 78 pp.

Hansen, G. E. and J. M. Brode. 1980. Status of the giant garter snake *Thamnophis couchi gigas* (Fitch). California Department of Fish and Game, Inland Fisheries Endangered Species Program Special Publication 80-5, 14 pp.

Hansen, R. W. and G. E. Hansen. 1990. *Thamnophis gigas* (giant garter snake) reproduction. *Herpetological Review*, 21(4): 93-94.

Hinds, N.E.A. 1952. Evolution of the California landscape. Calif. Div. of Mines Bull. No. 158. 240 pp.

Jarman W.M., Burns, S.A. Chang R.R., Stephens, R.D., Norstrom, Simon M. Linthicum J., 1993. Determination of PCDDs, PCDFs, and PCBs in California Peregrine falcons (*Falco peregrinus*) and their eggs. *Env. Tox. and Chem.* 12:105-114.

Jones and Stokes Associates. 1988. Biological assessment of federally-listed threatened and endangered species for the California-Oregon transmission project. Prepared for: Transmission

Agencies of Northern California and Western Area Power Administration. May 1988.

Jurek, R.M. 1994. California bald eagle breeding population survey and trend, 1970-1994. Wildlife Management Division, California Department of Fish and Game. Sacramento, California.

Keister, G. P., Jr. and R. G. Anthony. 1983. Characteristics of bald eagle communal roosts in the Klamath Basin, Oregon and California. *Journal of Wildlife Management* 47:1072-1079.

Lehman, R. N. 1978. An analysis of habitat parameters and site selection criteria for nesting bald eagles in California. Part 1. USDA, Forest Service, Pacific Southwest Region. San Francisco, CA. Unpublished report.

_____. 1979. A survey of selected habitat features of 95 bald eagle nest sites in California. Wildlife Management Branch Report 79-1. California Department of Fish and Game. Sacramento, California.

_____. 1980. An analysis of habitat requirements and site-selection criteria for nesting bald eagles in California. (P.O. No. 43-9158-9-1871.) USDA, Forest Service, Pacific Southwest Region. San Francisco, CA. Unpublished report.

_____. 1983. Breeding status and management of bald eagles in California--1981. (Wildlife Management Branch Administrative Report 83- 1.) Resources Agency, California Department of Fish and Game. Sacramento, CA.

Linthicum, J. ed. 1989. Peregrine falcon monitoring nest management, hack site, and cross fostering efforts. Annual Report. Santa Cruz Predatory Bird Research Group, Santa Cruz, Ca.

Monk, G. 1980. Peregrine falcon inventory - Data analysis and management recommendations. USDI, Bureau of Land Management, Ukiah District Office. Ukiah, CA.

_____. 1981. Peregrine falcon inventory - Data analysis and management recommendations. USDI, Bureau of Land Management, Ukiah District Office. Ukiah, CA.

Olendorff, R.R., R.N. Lehman and P.J. Detrich. 1986. Biological assessment: anticipated impacts of the Geothermal public power line on federally listed threatened or endangered species, with emphasis on bald eagle. 1986. Prepared by Bureau of Land Management, Ukiah, California. 72 pp.

Olendorff, R.R., and R.N. Lehman. 1986. Raptor collisions with utility lines: an analysis using subjective field observations. Pacific Gas and Electric Co., San Ramon, California. 73 pp.

Palmer, R.S. 1988. Handbook of North American birds, Vol. 4, part 1: diurnal raptors.

Smithsonian Institution. Yale University Press. New Haven, Connecticut.

Rossman, D. A. and G. R. Stewart. 1987. Taxonomic reevaluation of *Thamnophis couchi*. Occasional Papers of the Museum of Zoology, Louisiana State University, No. 63, 23 pp.

Rossman, D.A., N.B. Ford, and R.A. Seigel. 1996. The garter snakes: evolution and ecology. University of Oklahoma Press, Norman. 331 pp.

Shimamoto, K. and D.A. Airola (eds.). 1981. Fish and wildlife habitat capability models and special habitat criteria for northeast zone national forests. U.S. Department of Agriculture, Forest Service, Modoc National Forest, Alturas, CA. .

Snow, C. 1973. Habitat management series for endangered species Report No. 5: southern bald eagle and northern bald eagle. U.S. Bureau of Land Management Technical Report No. 171. Available from Documents Section, Federal Center Building 50, Denver, Colorado.

Springer, P. F., G. V. Byrd, and D. Woolington. 1978. Re-establishing Aleutian Canada geese. Pp. 331-338 in S.A. Temple (ed.), Endangered Birds: Management techniques for threatened species. University of Wisconsin Press. Madison, WI.

Stalmaster, M.V. 1987. The bald eagle. Universe Books. New York, New York.

Stalmaster, M.V., and J.R. Newman. 1976. Behavioral responses of wintering bald eagles to human activity. Journal of Wildlife Management 42:506-513.

Steinhart, Peter. 1990. California's Wild Heritage: Threatened and endangered animals in the Golden State. California Department of Fish and Game, Sacramento, CA. 108 pp.

Thelander, C.J. 1973. Bald eagle reproduction in California, 1972-1973. Wildlife Management Branch Report 73-5. California Department of Fish and Game. Sacramento, California.

U.S. Fish and Wildlife Service. 1982. Recovery plan for the Peregrine falcon (Pacific population). Portland, Oregon. 87 pp.

_____. 1986. Pacific bald eagle recovery plan. Portland, Oregon. 163 pp.

_____. 1991. Aleutian Canada Goose Recovery Plan. Region 7, Anchorage, Alaska. 55pp.

_____. 1998. Preliminary Draft Giant Garter Snake Recovery Plan. Portland, Oregon.

Williams, L. 1998. Comments from Larry Williams, Assistant Refuge Manager, Sacramento National Wildlife Refuge Complex, pertaining to biological impacts from proposed power lines of

the Sutter Power Plant Project given at evidentiary hearings on November 10, 1998.

Wolder, M. 1998. Letter dated August 10, 1998 from U.S. Fish and Wildlife Service, Sacramento National Wildlife Refuge Complex, Willows, CA, to the CEC.

Wylie, G. D., M. Cassaza, and J. K. Daugherty. 1997. 1996 Progress report for the giant garter snake study. Preliminary report, USGS, Biological Resources Division.

Zeiner, D.C., W.F. Laudenslayer Jr., K.E. Mayer, M. White, ed. 1990. California's wildlife; California statewide wildlife habitat relationships system, California Department of Fish and Game.

Personal Communications

Boroja, M. U.S. Fish and Wildlife Service, Endangered Species Division, Sacramento, CA.

Bortner, Brad, U.S. Fish and Wildlife Service, Region 1, Portland, Oregon.

Hansen, G., Consulting Environmental Biologist, 3230 Brookwood Road, Sacramento, CA 95821.

Mesta, Robert. Ornithologist. U.S. Fish and Wildlife Service, Ventura Fish and Wildlife Office, California.

Welsh, Daniel. U.S. Fish and Wildlife Service, Environmental Contaminants Division, Sacramento, CA.

Wylie, G. D. USGS, Biological Resources Division, Western Ecological Research Center, Dixon Field Station, Dixon, California.

Standard Avoidance and Minimization Measures During Construction Activities in Giant Garter Snake Habitat

GIANT GARTER SNAKE (*Thamnophis gigas*)

HABITAT TYPE:

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

AVOIDANCE AND MINIMIZATION MEASURES:

Avoid construction activities within 200 feet from the banks of giant garter snake aquatic habitat. Confine movement of heavy equipment to existing roadways to minimize habitat disturbance.

Construction activity within habitat should be conducted between May 1 and October 1. This is the active period for giant garter snakes and direct mortality is lessened, because snakes are expected to actively move and avoid danger. Between October 2 and April 30 contact the Service's Sacramento Fish and Wildlife Office to determine if additional measures are necessary to minimize and avoid take.

Confine clearing to the minimal area necessary to facilitate construction activities. Flag and designate avoided giant garter snake habitat within or adjacent to the project area as Environmentally Sensitive Areas. This area should be avoided by all construction personnel.

Construction personnel should receive Service-approved worker environmental awareness training. This training instructs workers to recognize giant garter snakes and their habitat(s).

24-hours prior to construction activities, the project area should be surveyed for giant garter snakes. Survey of the project area should be repeated if a lapse in construction activity of two weeks or greater has occurred. If a snake is encountered during

construction, activities shall cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. Report any sightings and any incidental take to the Service immediately by telephone at (916) 979-2725.

Any dewatered habitat should remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.

After completion of construction activities, remove any temporary fill and construction debris and, wherever feasible, restore disturbed areas to pre-project conditions. Restoration work may include such activities as replanting species removed from banks or replanting emergent vegetation in the active channel.

Compensate loss and disturbance of giant garter snake habitat according to Table 1. Mitigation ratios are based on the acreage and on the duration of disturbance.

TABLE 1 - SUMMARY OF GIANT GARTER SNAKE PROGRAMMATIC MITIGATION LEVELS

	IMPACTS: DURATION	IMPACTS: ACRES	MITIGATION: COMPENSATION
LEVEL 1	1 season	Less than 20 and temporary	Restoration
LEVEL 2	2 seasons	Less than 20 and temporary	Restoration plus 1:1 replacement
LEVEL 3	More than 2 seasons and temporary Permanent loss	Less than 20 and temporary Less than 3 acres total giant garter snake habitat AND Less than 1 acre aquatic habitat; OR Less than 218 linear feet bank habitat	3:1 Replacement (or restoration plus 2:1 replacement) 3:1 Replacement

Giant garter snake habitat includes 2.0 acres of surrounding upland habitat for every

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

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

Information to Include in a Project Monitoring Report for Giant Garter Snake

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

Report all sightings to the US Fish and Wildlife Service, Sacramento Fish and Wildlife Office at (916) 979-2725, and to the California Department of Fish and Game (CDFG). The monitoring biologist must submit all sightings to CDFG Natural Diversity Data Base (NDDB) using a California Native Species Field Survey Form and provide copies to CDFG and the Service .



Appendix U

**Commission Order Adopting
Revised Presiding Member's
Proposed Decision
Docket No. 97-AFC-2;
Dated March 17, 1999**

Sierra Nevada Customer Service Region

STATE OF CALIFORNIA

Energy Resources Conservation
and Development Commission

In the Matter of:) Docket No. 97-AFC-2
)
 Application for Certification for the) COMMISSION ORDER
 Sutter Power Plant Project) ADOPTING REVISED PRESIDING
) MEMBER'S PROPOSED DECISION

This Commission ORDER adopts the Revised Presiding Member's Proposed Decision (Revised PMPD) and Committee Amendments and Errata to Revised Presiding Member's Proposed Decision (Amendments), in the above-captioned matter. It is based upon the evidentiary record of these proceedings (Docket No. 97-AFC-2) and considers the comments received at the March 17, 1999 Business Meeting. The text of the Revised PMPD contains a summary of the proceedings, the evidence presented, and the rationale for the findings reached and conditions imposed. This ORDER adopts by reference, the text, conditions, compliance verifications, and appendices contained in the Revised PMPD. It adopts specific requirements contained in the Revised PMPD which determine that the proposed facility will be designed, sited, and operated in a manner to protect environmental quality, to assure public health and safety, and be designed to operate in a safe and reliable manner.

This Decision does not grant a license to construct and operate the proposed facility, as specified below. We will consider this matter at our Business Meeting of April 14, 1999.

FINDINGS

The Commission hereby adopts the following Findings in addition to those contained in the text of the Revised PMPD:

1. The Sutter Power Plant Project conforms with the 12-year forecast of statewide and service area electrical power demands and the integrated assessment of need adopted by the Commission in the 1996 *Electricity Report* pursuant to Public Resources Code sections 25305(e) and 25308, and is therefore consistent with the requirements of Title 20, California Code of Regulations, section 1752(a):
2. The Conditions of Certification contained in the Revised PMPD assure that the project will not result in any significant adverse environmental impacts.
3. There are no feasible site alternatives to the project site that would accomplish the project objectives and are environmentally superior to the project as mitigated by the Conditions of Certification in the Revised PMPD.

4. **Implementation of the Conditions of Certification and Compliance Verifications contained in the text of the Revised PMPD will ensure protection of environmental quality, require quality engineering and design, and assure reasonable safe and reliable operation of the facility.**
5. **Subject to the exception noted in Finding 6 which follows, the Conditions of Certification and Compliance Verifications contained in the Revised PMPD, if implemented by Applicant, ensure that the project will be designed, sited, and operated in conformity with applicable local, regional, state and federal standards, ordinances, regulations and laws, including applicable public health and safety standards, and air and water quality standards.**
6. **The project does not presently comply with the Sutter County General Plan and applicable zoning. This non-compliance can be eliminated if the Sutter County Board of Supervisors grants a General Plan amendment and zoning change. The Applicant has pending a request for the required amendment and zoning change.**
7. **The proceedings leading to this ORDER were conducted in conformance with the applicable provisions of the Commission's regulations governing the consideration of an Application for Certification (Cal. Code of Regs., tit. 20, secs. 1700 et seq.) and thereby meet the requirements of Public Resources Code, sections 21000 et seq. and 25500 et seq.**
8. **The Commission ORDER applies only to the Sutter Power Plant Project, including the associated electrical transmission lines, switching stations, the natural gas supply tap line and associated terminals.**
9. **The project's underground natural gas pipeline will cross the Sutter National Wildlife Refuge. It will do so in a manner consistent with the primary use of the refuge and by avoiding all significant environmental effects. The United States Fish and Wildlife Service has granted approval for the project's natural gas pipeline to cross the Sutter National Wildlife Refuge.**

ORDER

Therefore, the Commission ORDERS the following:

1. **The Revised Presiding Member's Proposed Decision as amended, for the Sutter Power Project described in this document is hereby approved as complying with the environmental review provision set forth in the Warren Alquist Act [PRC, sec. 25523(a)], and the California Environmental Quality Act (PRC, sec. 21080.5). It also complies with requirements in the Warren-Alquist Act for review of project engineering**

and design, reasonably safe and reliable operation, and compliance with demand conformance.

2. The approval of the Revised Presiding Member's Proposed Decision is subject to the timely performance of the Conditions of Certification and Compliance Verifications enumerated in the accompanying text and Appendices. The Conditions and Compliance Verifications are integrated with this Decision and are not severable therefrom. While Applicant may delegate the performance of a Condition or Verification, the duty to ensure adequate performance of such may not be delegated.
3. The Commission hereby adopts the Conditions of Certification, Compliance Verifications, and associated dispute resolution procedures as part of this Revised Presiding Member's Proposed Decision in order to implement the compliance monitoring program required by Public Resources Code section 25532.
4. Commission approval of the Revised Presiding Member's Proposed Decision constitutes final environmental review of the project by the Commission as lead agency under the California Environmental Quality Act.
5. Commission approval of the Revised Presiding Member's Report makes all findings required by law with the exception of finding that the proposed facility complies with local land use requirements.
6. After the Sutter County Board of Supervisors makes its decision on the pending General Plan amendment and zoning change, and the formal result of that decision is forwarded to the Commission, the Commission will take final action regarding certification of the project for construction and operation.

Dated: March 17, 1999

ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

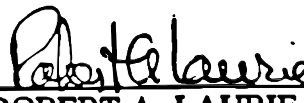


WILLIAM J. KEESE
Chairman

-OPPOSED-
DAVID A. ROHY, Ph.D.
Vice Chair



JANANNE SHARPLESS
Commissioner



ROBERT A. LAURIE
Commissioner



MICHAL C. MOORE
Commissioner