United States Department of the Interior

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Memorandum

To: Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

From: Assistant Field Supervisor, Endangered Species Program, Sacramento, California

Subject: Formal Consultation Regarding the Starwood Power – Midway, LLC Peaking Power Project, Fresno County, California

This letter is in response to a request from the applicant Starwood Power – Midway, LLC (SPM) for the U.S. Fish and Wildlife Service's (Service) assistance with the Starwood Power – Midway, LLC Peaking Power Project (proposed project) while providing for the protection of federally listed species. The SPM signed a Memorandum of Understanding (MOU) on July 25, 2007, with the Service. The MOU outlines the specific conservation measures the SPM will implement to conserve the endangered San Joaquin kit fox (*Vulpes macrotis mutica*) (kit fox) and to avoid jeopardy to this species consistent with the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531). The MOU also formalizes the Service's agreement to facilitate a Federal nexus for the purposes of conducting consultation pursuant to section 7 of the ESA, as described in its implementing regulations (50 CFR 402).

The Service has determined that the proposed project is likely to adversely affect the kit fox; therefore, this document represents the Service's biological opinion on the effects of the proposed project on the kit fox, in accordance the Act. No critical habitat is present for any federally-listed species, therefore none will be adversely modified or destroyed.

The findings and recommendations in this consultation are based on: (1) a June 5, 2007, *Starwood Power – Midway, LLC Peaking Power Project Biological Assessmet* prepared by URS Corporation, (2) emails dated between January 2007, through July 2007, (3) and other information available to the Service.

Consultation History

February 15, 2007: Representatives of the Service and California Energy Commission (CEC), held a meeting to discuss the proposed Starwood Power-Midway Project (Midway) and potential impacts related to the kit fox.

February 23, 2007: Susan Jones of the Service, CEC, Starwood Power, and URS held a conference call to discuss potential project impacts related to the kit fox.

March 21, 2007: Susan Jones conducted a site visit at the Midway Project site.

April 9, 2007: Susan Jones of the Service, Starwood Power, and URS held a conference call to discuss the MOU, Biological Assessment (BA) and Biological Opinion (BO) process and schedule for the Midway Project. URS sent the Service Biological Resources Section of the Midway AFC, as well as Responses to CEC Data Requests that involve the kit fox.

April 3, 2007: The Service sent sample documents to assist in the preparation in the Midway Project MOU, and BA documents.

April 13, 2007: The Service attended the CEC data response and issue resolution workshop held for the Midway Project.

June 7, 2007: URS sent the Service the Draft MOU and BA documents for review and comment.

BIOLOGICAL OPINION

Description of the Proposed Action

The project site, located in the unincorporated area of western Fresno County, is described as the Southwest Quarter of Section 5, Township 15 South, Range 13 East, on the United States Geological Survey (USGS) Quadrangle map. The assessor's parcel number (APN) is 027-060-78S. West Panoche Road lies just north of the site. The nearest intersections are West Panoche Road and South Fairfax Avenue approximately one mile to the northeast, and West Panoche Road and Interstate 5 (I-5) approximately 2 miles to the southwest. The surrounding area is predominantly used for agriculture with two existing power generation facilities nearby as well as the Pacific Gas & Electric (PG&E) Substation.

The proposed plant will be located on a 5.6-acre site within a 128-acre parcel. The plant site is leased by SPM from the property owners and has been used since 2001 as a storage yard for CalPeak Power. Portions of the 128-acre parcel, not used for electric generation facilities or storage, are currently in agricultural production with pomegranate trees.

Off-site improvements associated with the project include approximately 300 feet of electric transmission line to tie into the PG&E Substation, a 1,200-foot underground, 3-inch water pipeline connecting the project to the existing CalPeak Panoche plant well, 200 feet of new gas transmission line and a gas metering set that will tap into the existing PG&E gas trunkline. On-site project components include a 20-foot by 1,400-foot graded gravel and asphalt roadway to access the plant equipment, a 25,000 square-foot evaporation pond that would be utilized for on-site stormwater retention as well as Reverse Osmosis (RO) wastewater discharge, approximately

600 feet of on-site gas line after the PG&E metering set, and the construction area, including laydown and parking.

The Midway project includes the plant site and all of the described on-site and off-site improvements.

Project Milestones

The major construction schedule milestones are to begin engineering, design, and Procurement from February through June 2008, Construction should begin from June 2008 to April 2009, and performance testing is estimated to begin between April to June 2009.

Project Design

The Midway project will consist of two (2) FT8-3 SwiftPac CTG units installed in a simple cycle power plant arrangement. Nominal plant power rating will be 120 MW. The two (2) FT8-3 CTG units will be part of a power plant that will also include the following Balance of Plant (BOP) equipment/systems:

- One (1) CTG Main Step-up transformer (13.8/115 kV).
- An SCR/CO catalyst system that will be implemented on both CTG units to provide post-combustion emissions control. The facility will include an aqueous ammonia storage and delivery system in support of the SCR catalyst system.
- A Water Treatment system starting with a RO unit will feed a demineralizer to provide high-purity water to the gas turbines for water injection / inlet fogging. Water injection will be utilized for control of NOx emissions during combustion. Inlet fogging will be utilized to provide cooling of inlet air. The water treatment system will include one (1) 75,000 gallon Raw Water Storage Tank, an RO unit, a Mobile Water Treatment system (i.e., Demineralizer Trailers on a pad), two (2) 75,000 gallon Demineralized (DI) Water Storage Tanks, and a forwarding system to deliver the demineralized water to the gas turbines.
- A Natural Gas Fuel system that will supply natural gas to the gas turbines in a manner that meets the required engine specifications (i.e., pressure, flow, quality). The project will tie into the existing 6" diameter fuel natural gas supply pipeline for the CalPeak Panoche plant, which in turn ties into the PG&E main gas truckline running along West Panoche Road. A separate meter and 6" line will supply Midway with natural gas.
- A Compressed Air system that will provide clean, dry air to the gas turbines, BOP instrumentation, and BOP servicing areas. This system will include two (2) air compressor skids and one (1) dryer skid.
- A Plant Drain System that will include a 3,000 gallon Oil Water Separator (OWS) to collect oily waste from equipment/containment areas (transformer containment areas, air compressor/dryer skid and CEMS enclosures) and the GT Drain Tank, an Above-Ground Storage Tank (AST), that will collect waste from the CTG units. Water from the OWS will be discharged to the evaporation pond. Oils collected in the OWS will be sent off-site for

disposal. CTG waste will first be collected in a sump and then pumped to the AST. Waste in the AST will be sent off-site for disposal.

- A Site Stormwater Drainage system that will handle drainage of rainwater from non-equipment locations.
- A lined evaporation pond that will collect discharge wastewater from the RO Unit and the OWS.

Fuel Gas Supply

At full load, each FT8-3 SwiftPac CTG unit requires an approximately 625 MMBtu (Million British Thermal Units)/hr HHV (High Heating Value) of natural gas for a plant total demand of 1,250 MMBtu/hr. The project will connect to an existing PG&E high-pressure gas trunk line, which currently serves the CalPeak Panoche plant site, located north of the Midway site. To tap into the existing PG&E gas trunkline, Midway will install approximately 800 feet of 6-inch diameter gas transmission line and a new gas metering set along the length of the western perimeter of the site.

Water Supply and Discharge

The Midway site has three equally viable sources for supply water: 1) water from the well at the adjacent CalPeak Panoche plant; 2) irrigation return flow water from the local farming operation's agricultural backwash pond (Baker Farming Company, LLC); or 3) water from a new deep well. Water needs include NOx control (98 gallons per minute [GPM]), inlet fogging (40 GPM) and intermittent service water (5GPM). Water will be treated using a RO system, followed by a demineralizer.

Safety water requirements include eye wash stations in hazardous chemical areas. The safety water will be supplied by self-contained water units. Potable drinking water will be supplied by a bottled water purveyor.

Wastewater from Midway will consist of RO reject water and OWS discharge that is non-hazardous. Process wastewater will be conveyed to the evaporation pond on the east side of the Midway site. The OWS will collect oily waste from the main and auxiliary transformer containment areas, the air compressor/dryer skid, the CEMS enclosures, and the generator floor drains via gravity drain. The OWS will remove the oily waste from the collected stormwater. The non-hazardous, cleansed water from the OWS would then be discharged to the evaporation pond. Oils and chemicals collected in the OWS will be stored on-site until it is transported off-site to a hazardous waste disposal facility for treatment and disposal.

Transmission Facilities

A new 300-foot, 115kV short line will be constructed from the dead-end structure on the Midway site and will tie into the CalPeak Panoche/PG&E interconnection line which leads to the 115kV switchyard and dead end structure at the PG&E Substation. Line design will take into account a

90 degree orientation differential between the Midway dead-end structure and the CalPeak Panoche/PG&E tie-line. Intermediate structures will be installed as required. Line clearances over roads and under existing lines will conform to all applicable standards and requirements. The dead end structure and, if deemed necessary, any intermediate line supports will have foundations designed to meet seismic criteria applicable to the site.

Site Access

Site access from West Panoche Road would be provided via a 20-foot wide access roadway easement adjacent (east of) the PG&E Substation. From a proposed entrance gate, which would be located just south of West Panoche Road, the proposed access roadway would be graded gravel and run for approximately 250 feet south and east to the site. At the project site the proposed roadway would become asphalt, with a vehicle turnaround area providing access to the project equipment. The asphalt portion of the proposed roadway would be approximately 1,150 feet.

Site Layout

The plant facilities have been arranged for optimum use of the property as well as to ensure ease of maintenance and operation. Off-site improvements associated with the project include an approximate 300-foot electric transmission line to tie into the PG&E Substation, a 1,200-foot underground water pipeline connecting the project to the existing CalPeak Panoche plant well adjacent to the project site, 200 feet of new gas transmission line and a gas metering set which will tap into the existing PG&E gas trunkline.

Project Construction

Construction of the Midway project includes site preparation, foundation construction, erection of major equipment and structures, installation of piping, electrical systems, control systems, and start-up/testing. These construction activities are expected to require approximately 10 months. The schedule commences when the Owner issues a notice to proceed and is completed when the project is commercially operational. Table 1 presents the major construction milestones.

Construction will conclude with start-up and testing activities, which will continue until the entire facility is capable of reliable operation within permit requirements and good operating practice. All of the systems and subsystems in each unit will be tested and adjusted, first individually and then combined with others, before the project is deemed ready for startup. Mobile trailers or similar suitable facilities (e.g., modular offices) will be used as construction offices for owner, contractor, and subcontractor personnel. Construction parking will be within existing site boundaries. Construction access will be from West Panoche Road. There will be adequate parking space for construction personnel and visitors during construction on site. As part of the site access road construction previously described, an adjacent gravel laydown area will also be constructed. In addition to the laydown area, other areas within the site boundary may also be used as off-load and staging during construction. All laydown and storage areas are

wholly within the site perimeter and once construction is complete will be within site security perimeter fencing. Post-construction, the gravel laydown area will be used for parking as needed. Materials and supplies will be delivered to the site by truck. Truck deliveries of construction materials and equipment will generally occur on weekdays between 6:00 a.m. and 6:00 p.m. however, some larger heavy load deliveries may be delivered outside those hours. Site access will be controlled for personnel and vehicles.

Conservation Measures

Conservation measures are designed to benefit or promote the recovery of general and special status species as an integral part of the proposed action. These actions will be taken by the SPM to minimize or compensate for project effects on the kit fox. These conservation measures include actions taken prior to the initiation of consultation and actions which the SPM have committed to complete.

As part of the project, SPM proposes to implement a number of avoidance, minimization, and conservation measures that would be applicable and common to all species. These measures are intended to reduce, ameliorate, and/or avoid potential adverse effects on the kit fox. The avoidance and minimization measures that follow are expected to augment other project-related environmental commitments, best management practices (BMPs), and mitigation measures that would be required under separate Federal and State laws, regulations, and executive orders.

Impacts to kit fox habitat will be offset through the purchase of conservation credits at the Kreyenhagen Hills conservation bank. Total compensation has been determined based on the area permanently impacted (16.8 acres) at a ratio of 1.1:1, and 0.3 to 1 acres for areas temporarily impacted (9.0 acres).

The minimization and avoidance measures provided below are proposed as part of the proposed action. These measures are intended to address potential adverse affects on federally listed species that are known to occur within the study area or have the potential to occur. They have been developed through coordination with agency staff, including the Service, CDFG, and CEC.

1. Impacts to kit fox habitat will be offset through a contribution to a local conservation bank. Pursuant to discussions with Service, total compensation has been determined based on the area permanently impacted (5.6), SPM will purchase 6 conservation credits. This contribution will occur at Kreyenhagen Hills conservation bank. This contribution will occur at Kreyenhagen Hills conservation bank, or by fee title acquisition or purchase of a conservation easement on a service-approved parcel, following all the requirements in *Selected Review Criteria for Conservation Banks and Section 7 Offsite Compensation April 11, 2006 (enclosed).*

2. Project-related vehicles shall observe a 20-mph speed limit in all project areas, except on county roads and State and Federal highways; this is particularly important at night when kit foxes are most active. To the extent possible, night-time construction should be minimized. Off-road traffic outside of designated project areas should be prohibited.

3. To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of a project, all excavated, steep-walled holes or trenches more than 2 feet deep shall be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the procedures under number 13 of this section must be followed.

4. Kit foxes are attracted to den-like structures such as pipes and may enter stored pipe becoming trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe should not be moved until the Service has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved once to remove it from the path of construction activity, until the fox has escaped.

5. All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in closed containers and removed at least once a week from a construction or project site.

6. No firearms shall be allowed on the project site.

7. To prevent harassment, mortality of kit foxes or destruction of dens by dogs or cats, no pets will be permitted on project sites.

8. Use of rodenticides and herbicides in project areas will be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds should observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other State and Federal legislation, as well as additional project-related restrictions deemed necessary by the Service. If rodent control must be conducted, zinc phosphide should be used because of proven lower risk to kit fox.

9. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped individual. The representative will be identified during the employee education program. The representative's name and telephone number shall be provided to the Service.

10. An employee education program shall be conducted. The program will consist of a brief presentation by persons knowledgeable in kit fox biology and legislative protection to explain endangered species concerns to contractors, their employees, and military and

agency personnel involved in the project. The program will include the following: a description of the kit fox and its habitat needs; a report of the occurrence of kit fox in the project area; an explanation of the status of the species and its protection under the Endangered Species Act; and a list of measures being taken to reduce impacts to the species during project construction and implementation. A fact sheet conveying this information should be prepared for distribution to the above-mentioned people and anyone else who may enter the project site. The program will be conducted in languages other than English, as appropriate.

11. Upon completion of the project, all areas subject to temporary ground disturbances, including storage and staging areas, temporary roads, pipeline corridors, etc. will be re-contoured if necessary, and revegetated to promote restoration of the area to pre-project conditions. An area subject to "temporary" disturbance means any area that is disturbed during the project, but that after project completion will not be subject to further disturbance and has the potential to be revegetated. Appropriate methods and plant species used to revegetate such areas should be determined on a site-specific basis in consultation with the Service, California Department of Fish and Game (CDFG), and revegetation experts.

12. In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or the Service should be contacted for advice.

13. Any contractor, employee, or military or agency personnel who inadvertently kills or injures a San Joaquin kit fox shall immediately report the incident to their representative. This representative shall contact the CDFG and the Service immediately in the case of a dead, injured or entrapped kit fox. The CDFG contact for immediate assistance is State Dispatch at (916) 445-0045. They will contact the local warden or biologist.

14. The Sacramento Fish and Wildlife Office and CDFG will be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during project related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The Service contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers given below. The CDFG contact is Mr. Ron Schlorff at 1416 9th Street, Sacramento, California 95814, (916) 654-4262.

15. Limits of grading and construction activities should be clearly delineated so that no vegetation outside the delineated grading limits would be disturbed by construction personnel or equipment. Project personnel will drive only on existing roads outside of construction limits.

16. SPM will implement the Best Management Practices identified in the project specific Storm Water Pollution Prevention Plan (SWPPP).

17. In order to comply with the Migratory Bird Treaty Act and relevant sections of the CDFG Code (e.g., 3503, 3503.4, 3504, 3505, et seq.), any vegetation clearing would take place outside of the typical avian nesting season (i.e., February 1st – August 31st), to the maximum extent practical. If this is not possible, prior to ground-disturbing activities, construction, and so forth within the study area, a qualified biologist will conduct and submit a migratory nesting bird and raptor survey report. A qualified biologist is an individual with sufficient education and field experience in local California ecology and biology to adequately identify local plant and wildlife species. The survey shall occur not more than 72 hours prior to initiation of Project activities and any occupied passerines and/or raptor nests occurring within or adjacent to the study area will be delineated. To the maximum extent practicable, a minimum buffer zone from occupied nests will be maintained during physical ground-disturbing activities. Once nesting has been determined to cease, the buffer may be removed.

18. SPM will retain the services of a Biological Monitor who will be responsible for overseeing project environmental protection measures. All encounters with listed species will be reported to the Biological Monitor, who will record the following information: species name; location (narrative and maps) and dates of observations; general condition and health, including injuries and state of healing; diagnostic markings, including identification numbers or markers; and locations moved from and to (if appropriate).

Status of the Species

San Joaquin kit fox

The San Joaquin kit fox was listed as an endangered species on March 11, 1967 (Service 1967) and was listed by the State of California as a threatened species on June 27, 1971. *The Recovery Plan for Upland Species of the San Joaquin Valley, California* (Recovery Plan) includes this canine (Service 1998).

In the San Joaquin Valley before 1930, the range of the kit fox extended from southern Kern County north to Tracy, San Joaquin County, on the west side, and near La Grange, Stanislaus County, on the east side (Grinnell *et al.* 1937; Service 1998). Historically, this species occurred in several San Joaquin Valley native plant communities. In the southernmost portion of the range, these communities included Valley Sink Scrub, Valley Saltbush Scrub, Upper Sonoran Subshrub Scrub, and Annual Grassland. Kit foxes also exhibit a capacity to utilize habitats that have been altered by man. The animals are present in many oil fields, grazed pasturelands, and "wind farms" (Cypher 2000). Kit foxes can inhabit the margins and fallow lands near irrigated row crops, orchards, and vineyards, and may forage occasionally in these agricultural areas (Service 1998). The kit fox seems to prefer more gentle terrain and decreases in abundance as terrain ruggedness increases (Grinnell *et al.* 1937; Morrell 1972; Warrick and Cypher 1998).

The kit fox is often associated with open grasslands, which form large contiguous blocks within the eastern portions of the range of the animal. The listed canine also utilizes oak savanna and some types of agriculture (e.g. orchards and alfalfa), although the long-term suitability of these

habitats is unknown (Jensen 1972; Service 1998). In eastern Merced County, the lands between the urban corridor along Highway 99 and the open grasslands to the east are a mixture of orchards and annual crops, mostly alfalfa. Orchards occur in large contiguous blocks in the northwest portions of the study area and at scattered locations in the southwest portions. Orchards sometimes support prey species if the grounds are not manicured; however, denning potential is typically low and kit foxes can be more susceptible to coyotes predation within the orchards (Orloff 2000). Alfalfa fields provide an excellent prey base (Woodbridge 1987; Young 1989), and berms adjacent to alfalfa fields sometimes provide good denning habitat (Orloff 2000). Kit foxes often den adjacent to, and forage within, agricultural areas (Bell 1994; Scott-Graham 1994). Although agricultural areas are not traditional kit fox habitat and are often highly fragmented, they can offer sufficient prey resources and denning potential to support small numbers of kit foxes.

Adult kit foxes are usually solitary during late summer and fall. In September and October, adult females begin to excavate and enlarge natal dens (Morrell 1972), and adult males join the females in October or November (Morrell 1972). Typically, pups are born between February and late March following a gestation period of 49 to 55 days (Egoscue 1962; Morrell 1972; Spiegel and Tom 1996; Service 1998). Mean litter sizes reported for kit foxes include 2.0 on the Carrizo Plain (White and Ralls 1993), 3.0 at Camp Roberts (Spencer *et al.* 1992), 3.7 in the Lokern area (Spiegel and Tom 1996), and 3.8 at the Naval Petroleum Reserve (Cypher *et al.* 2000). Pups appear above ground at about age 3-4 weeks, and are weaned at age 6-8 weeks. Reproductive rates, the proportion of females bearing young, of adult kit foxes vary annually with environmental conditions, particularly food availability. Annual rates range from 0-100%, and reported mean rates include 61% at the Naval Petroleum Reserve (Cypher *et al.* 2000), 64% in the Lokern area (Spiegel and Tom 1996), and 32% at Camp Roberts (Spencer *et al.* 1992). Although some yearling female kit foxes will produce young, most do not reproduce until age 2 years (Spencer et al. 1992; Spiegel and Tom 1996; Cypher *et al.* 2000). Some young of both sexes, but particularly females may delay dispersal, and may assist their parents in raising in the following year's litter of pups (Spiegel and Tom 1996). The young kit foxes begin to forage for themselves at about four to five months of age (Koopman *et al.* 2000; Morell 1972).

Although most young kit foxes disperse less than 5 miles (Scrivner *et al.* 1987a), dispersal distances of up to 76.3 miles have been documented for the kit fox (Scrivner *et al.* 1993; Service 1998). Dispersal can be through disturbed habitats, including agricultural fields, and across highways and aqueducts. The age at dispersal ranges from 4-32 months (Cypher 2000). Among juvenile kit foxes surviving to July 1 at the Naval Petroleum Reserve, 49% of the males dispersed from natal home ranges while 24% of the females dispersed (Koopman *et al.* 2000). Among dispersing kit foxes, 87% did so during their first year of age. Most, 65.2%, of the dispersing juveniles at the Naval Petroleum Reserve died within 10 days of leaving their natal home den (Koopman *et al.* 2000). Some kit foxes delay dispersal and may inherit their natal home range.

Kit foxes are reputed to be poor diggers, and their dens are usually located in areas with loose-textured, friable soils (Morrell 1972; O'Farrell 1984). However, the depth and complexity of their dens suggest that they possess good digging abilities, and kit fox dens have been observed

on a variety of soil types (Service 1998). Some studies have suggested that where hardpan layers predominate, kit foxes create their dens by enlarging the burrows of California ground squirrels (*Spermophilus beecheyi*) or badgers (*Taxidea taxus*)(Jensen 1972; Morrell 1972; Orloff *et al.* 1986). In parts of their range, particularly in the foothills, kit foxes often use ground squirrel burrows for dens (Orloff *et al.* 1986). Kit fox dens are commonly located on flat terrain or on the lower slopes of hills. About 77 percent of all kit fox dens are at or below midslope (O'Farrell 1983), with the average slope at den sites ranging from 0 to 22 degrees (California Department of Fish and Game 1980; O'Farrell 1983; Orloff *et al.* 1986). Natal and pupping dens are generally found in flatter terrain. Common locations for dens include washes, drainages, and roadside berms. Kit foxes also commonly den in human-made structures such as culverts and pipes (O'Farrell 1983; Spiegel 1996a).

Natal and pupping dens may include from two to 18 entrances and are usually larger than dens that are not used for reproduction (O'Farrell *et al.* 1980; O'Farrell and McCue 1981). Natal dens may be reused in subsequent years (Egoscue 1962). It has been speculated that natal dens are located in the same location as ancestral breeding sites (O'Farrell 1983). Active natal dens are generally 1.2 to 2 miles from the dens of other mated kit fox pairs (Egoscue 1962; O'Farrell and Gilbertson 1979). Natal and pupping dens usually can be identified by the presence of scat, prey remains, matted vegetation, and mounds of excavated soil (i.e. ramps) outside the dens (O'Farrell 1983). However, some active dens in areas outside the valley floor often do not show evidence of use (Orloff *et al.* 1986). During telemetry studies of kit foxes in the northern portion of their range, 70 percent of the dens that were known to be active showed no sign of use (e.g., tracks, scats, ramps, or prey remains)(Orloff *et al.* 1986). In another more recent study in the Coast Range, 79 percent of active kit fox dens lacked evidence of recent use other than signs of recent excavation (Jones and Stokes Associates 1997).

A kit fox can use more than 100 dens throughout its home range, although on average, an animal will use approximately 12 dens a year for shelter and escape cover (Cypher *et al.* 2001). Kit foxes typically use individual dens for only brief periods, often for only one day before moving to another den (Ralls *et al.* 1990). Possible reasons for changing dens include infestation by ectoparasites, local depletion of prey, or avoidance of coyotes (*Canis latrans*). Kit foxes tend to use dens that are located in the same general area, and clusters of dens can be surrounded by hundreds of hectares of similar habitat devoid of other dens (Egoscue 1962). In the southern San Joaquin Valley, kit foxes were found to use up to 39 dens within a denning range of 320 to 482 acres (Morrell 1972). An average den density of one den per 69 to 92 acres was reported by O'Farrell (1984) in the southern San Joaquin Valley.

Dens are used by kit foxes for temperature regulation, shelter from adverse environmental conditions, and escape from predators. Kit foxes excavate their own dens, use those constructed by other animals, and use human-made structures (culverts, abandoned pipelines, and banks in sumps or roadbeds). Kit foxes often change dens and may use many dens throughout the year; however, evidence that a den is being used by kit foxes may be absent. Kit foxes have multiple dens within their home range and individual animals have been reported to use up to 70 different dens (Hall 1983). At the Naval Petroleum Reserve, individual kit foxes used an average of 11.8 dens per year (Koopman *et al.* 1998). Den switching by the kit fox may be a function of predator

avoidance, local food availability, or external parasite infestations (e.g., fleas) in dens (Egoscue 1956).
The diet of the kit fox varies geographically, seasonally, and annually, based on temporal and spatial variation in abundance of potential prey. In the portion of their geographic range that includes Merced County, known prey species of the kit fox include white-footed mice (*Peromyscus* spp.), insects, California ground squirrels, kangaroo rats (*Dipodomys* spp.), San Joaquin antelope squirrels, black-tailed hares (*Lepus californicus*), and chukar (*Alectoris chukar*) (Jensen 1972, Archon 1992), listed in approximate proportion of occurrence in fecal samples. Kit foxes also prey on desert cottontails (*Sylvilagus audubonii)*, ground-nesting birds, and pocket mice (*Perognathus* spp.).

The diets and habitats selected by coyotes and kit foxes living in the same areas are often quite similar. Hence, the potential for resource competition between these species may be quite high when prey resources are scarce such as during droughts, which are quite common in semi-arid, central California. Competition for resources between coyotes and kit foxes may result in kit fox mortalities. Coyote-related injuries accounted for 50-87 per cent of the mortalities of radio collared kit foxes at Camp Roberts, the Carrizo Plain Natural Area, the Lokern Natural Area, and the Naval Petroleum Reserves (Cypher and Scrivner 1992; Standley *et al.* 1992).

Kit foxes are primarily nocturnal, although individuals are occasionally observed resting or playing (mostly pups) near their dens during the day (Grinnell *et al.* 1937). Kit foxes occupy home ranges that vary in size from 1.7 to 4.5 square miles (White and Ralls 1993). A mated pair of kit foxes and their current litter of pups usually occupy each home range. Other adults, usually offspring from previous litters, also may be present (Koopman *et al.* 2000), but individuals often move independently within their home range (Cypher 2000). Average distances traveled each night range from 5.8 to 9.1 miles and are greatest during the breeding season (Cypher 2000).

Kit foxes maintain core home range areas that are exclusive to mated pairs and their offspring (White and Ralls 1993, Spiegel 1996b, White and Garrott 1997). This territorial spacing behavior eventually limits the number of foxes that can inhabit an area owing to shortages of available space and per capita prey. Hence, as habitat is fragmented or destroyed, the carrying capacity of an area is reduced and a larger proportion of the population is forced to disperse. Increased dispersal generally leads to lower survival rates and, in turn, decreased abundance because greater than 65 percent of dispersing juvenile foxes die within 10 days of leaving their natal range (Koopman *et al.* 2000).

Estimates of fox density vary greatly throughout its range, and have been reported as high as 1.3 animals per square mile in optimal habitats in good years (Service 1998). At the Elk Hills in Kern County, density estimates varied from 1.86 animals per square mile in the early 1980s to 0.03 animals per square mile in 1991 (Service 1998). Kit fox home ranges vary in size from approximately 1 to 12 square miles (Spiegel *et al.* 1996; Service 1998). Knapp (1978) estimated that a home range in agricultural areas is approximately 1 square mile. Individual home ranges overlap considerably, at least outside the core activity areas (Morrell 1972; Spiegel *et al.* 1996). Mean annual survival rates reported for adult kit foxes include 0.44 at the Naval Petroleum Reserve (Cypher *et al.* 2000), 0.53 at Camp Roberts (Standley *et al.* 1992), 0.56 at the Lokern

area (Spiegel and Disney 1996), and 0.60 on the Carrizo Plain (Ralls and White 1995). However, survival rates widely vary among years (Spiegel and Disney 1996; Cypher *et al.* 2000). Mean survival rates for juvenile San Joaquin kit foxes (<1 year old) are lower than rates for adults. Survival to age 1 year was 0.14 at the Naval Petroleum Reserve (Cypher *et al.* 2000), 0.20 at Camp Roberts (Standley *et al.* 1992), and 0.21 on the Carrizo Plain (Ralls and White 1995). For both adults and juveniles, survival rates of males and females are similar. San Joaquin kit foxes may live to ten years in captivity (McGrew 1979) and 8 years in the wild (Berry et al. 1987), but most kit foxes do not live past 2-3 years of age.

The status (i.e., distribution, abundance) of the kit fox has decreased since its listing in 1967. This trend is reasonably certain to continue into the foreseeable future unless measures to protect, sustain, and restore suitable habitats, and alleviate other threats to their survival and recovery, are implemented. Threats that are seriously affecting kit foxes are described in further detail in the following paragraphs.

Loss of Habitat

Less than 20 percent of the habitat within the historical range of the kit fox remained when the subspecies was listed as federally-endangered in 1967, and there has been a substantial net loss of habitat since that time. Historically, kit foxes occurred throughout California's Central Valley and adjacent foothills. Extensive land conversions in the Central Valley began as early as the mid-1800s with the Arkansas Reclamation Act. By the 1930's, the range of the kit fox had been reduced to the southern and western parts of the San Joaquin Valley (Grinnell *et al.* 1937). The primary factor contributing to this restricted distribution was the conversion of native habitat to irrigated cropland, industrial uses (e.g., hydrocarbon extraction), and urbanization (Laughrin 1970, Jensen 1972; Morrell 1972, 1975). Approximately one-half of the natural communities in the San Joaquin Valley were tilled or developed by 1958 (Service 1980).

This rate of loss accelerated following the completion of the Central Valley Project and the State Water Project, which diverted and imported new water supplies for irrigated agriculture (Service 1995). Approximately 1.97 million acres of habitat, or about 66,000 acres per year, were converted in the San Joaquin region between 1950 and 1980 (California Department of Forestry and Fire Protection 1988). The counties specifically noted as having the highest wildland conversion rates included Kern, Tulare, Kings and Fresno, all of which are occupied by kit foxes. From 1959 to 1969 alone, an estimated 34 percent of natural lands were lost within the then-known kit fox range (Laughrin 1970).

By 1979, only approximately 370,000 acres out of a total of approximately 8.5 million acres on the San Joaquin Valley floor remained as non-developed land (Williams 1985, Service 1980). Data from the CDFG (1985) and Service file information indicate that between 1977 and 1988, essential habitat for the blunt-nosed leopard lizard, a species that occupies habitat that is also suitable for kit foxes, declined by about 80 percent – from 311,680 acres to 63,060 acres, an average of about 22,000 acres per year (Biological Opinion for the Interim Water Contract Renewal, Ref. No. 1-1-00-F-0056, February 29, 2000). Virtually all of the documented loss of essential habitat was the result of conversion to irrigated agriculture.

During 1990 to 1996, a gross total of approximately 71,500 acres of habitat were converted to farmland in 30 counties (total area 23.1 million acres) within the Conservation Program Focus area of the Central Valley Project. This figure includes 42,520 acres of grazing land and 28,854 acres of "other" land, which is predominantly comprised of native habitat. During this same time period, approximately 101,700 acres were converted to urban land use within the Conservation Program Focus area (California Department of Conservation 1994, 1996, 1998). This figure includes 49,705 acres of farmland, 20,476 acres of grazing land, and 31,366 acres of "other" land, which is predominantly comprised of native habitat. Because these assessments included a substantial portion of the Central Valley and adjacent foothills, they provide the best scientific and commercial information currently available regarding the patterns and trends of land conversion within the kit fox's geographic range.

In summary, more than one million acres of suitable habitat for kit foxes have been converted to agricultural, municipal, or industrial uses since the listing of the kit fox. In contrast, less than 500,000 acres have been preserved or are subject to community-level conservation efforts designed, at least in part, to further the conservation of the kit fox (Service 1998).

Land conversions contribute to declines in kit fox abundance through direct and indirect mortalities, displacement, reduction of prey populations and denning sites, changes in the distribution and abundance of larger canids that compete with kit foxes for resources, and reductions in carrying capacity. Kit foxes may be buried in their dens during land conversion activities (C. Van Horn, Endangered Species Recovery Program, Bakersfield, personal communication to S. Jones, Fish and Wildlife Service, Sacramento, 2000), or permanently displaced from areas where structures are erected or the land is intensively irrigated (Jensen 1972, Morrell 1975). Furthermore, even moderate fragmentation or loss of habitat may significantly impact the abundance and distribution of kit foxes. Capture rates of kit foxes at the Naval Petroleum Reserve in Elk Hills were negatively associated with the extent of oil-field development after 1987 (Warrick and Cypher 1998). Likewise, the California Energy Commission found that the relative abundance of kit foxes was lower in oil-developed habitat than in nearby undeveloped habitat on the Lokern (Spiegel 1996a). Researchers from both studies inferred that the most significant effect of oil development was the lowered carrying capacity for populations of both foxes and their prey species owing to the changes in habitat characteristics or the loss and fragmentation of habitat (Spiegel 1996b, Warrick and Cypher 1998).

Dens are essential for the survival and reproduction of kit foxes that use them year-round for shelter and escape, and in the spring for rearing young. Hence, kit foxes generally have dozens of dens scattered throughout their territories. However, land conversion reduces the number of typical earthen dens available to kit foxes. For example, the average density of typical, earthen kit fox dens at the Naval Hills Petroleum Reserve was negatively correlated with the intensity of petroleum development (Zoellick *et al.* 1987), and almost 20 percent of the dens in developed areas were found to be in well casings, culverts, abandoned pipelines, oil well cellars, or in the banks of sumps or roads (Service 1983). These results are important because the California Energy Commission found that, even though kit foxes frequently used pipes and culverts as dens in oil-developed areas of western Kern County, only earthen dens were used to birth and wean

pups (Spiegel 1996b). Similarly, kit foxes in Bakersfield use atypical dens, but have only been found to rear pups in earthen dens (P. Kelly, Endangered Species Recovery Program, Fresno, personal communication to P. White, Fish and Wildlife Service, Sacramento, April 6, 2000). Hence, the fragmentation of habitat and destruction of earthen dens could adversely affect the reproductive success of kit foxes. Furthermore, the destruction of earthen dens may also affect kit fox survival by reducing the number and distribution of escape refuges from predators.

Land conversions and associated human activities can lead to widespread changes in the availability and composition of mammalian prey for kit foxes. For example, oil field disturbances in western Kern County have resulted in shifts in the small mammal community from the primarily granivorous species that are the staple prey of kit foxes (Spiegel 1996b), to species adapted to early successional stages and disturbed areas (e.g., California ground squirrels)(Spiegel 1996a). Because more than 70 percent of the diets of kit foxes usually consist of abundant leporids (*Lepus*, *Sylvilagus*) and rodents (e. g., *Dipodomys* spp.), and kit foxes often continue to feed on their staple prey during ephemeral periods of prey scarcity, such changes in the availability and selection of foraging sites by kit foxes could influence their reproductive rates, which are strongly influenced by food supply and decrease during periods of prey scarcity (White and Garrott 1997, 1999).

Extensive habitat destruction and fragmentation have contributed to smaller, more-isolated populations of kit foxes. Small populations have a higher probability of extinction than larger populations because their low abundance renders them susceptible to stochastic (i.e., random) events such as high variability in age and sex ratios, and catastrophes such as floods, droughts, or disease epidemics (Lande 1988, Frankham and Ralls 1998, Saccheri *et al.* 1998). Similarly, isolated populations are more susceptible to extirpation by accidental or natural catastrophes because their recolonization has been hampered. These chance events can adversely affect small, isolated populations with devastating results. Extirpation can even occur when the members of a small population are healthy, because whether the population increases or decreases in size is less dependent on the age-specific probabilities of survival and reproduction than on raw chance (sampling probabilities). Owing to the probabilistic nature of extinction, many small populations will eventually lose out and go extinct when faced with these stochastic risks (Caughley and Gunn 1995).

Oil fields in the southern half of the San Joaquin Valley also continue to be an area of expansion and development activity. This expansion is reasonably certain to increase in the near future owing to market-driven increases in the price of oil. The cumulative and long-term effects of oil extraction activities on kit fox populations are not fully known, but recent studies indicate that moderate- to high-density oil fields may contribute to a decrease in carrying capacity for kit foxes owing to habitat loss or changes in habitat characteristics (Spiegel 1996b, Warrick and Cypher 1998). There are no limiting factors or regulations that are likely to retard the development of additional oil fields. Hence, it is reasonably certain that development will continue to destroy and fragment kit fox habitat into the foreseeable future.

Competitive Interactions with Other Canids

Several species prey upon kit foxes. Predators (such as coyotes, bobcats, non-native red foxes, badgers, and golden eagles [*Aquila chrysaetos*]) will kill kit foxes. Badgers, coyotes, and red foxes also may compete for den sites (Service 1998). The diets and habitats selected by coyotes and kit foxes living in the same areas are often quite similar (Cypher and Spencer 1998). Hence, the potential for resource competition between these species may be quite high when prey resources are scarce such as during droughts (which are quite common in semi-arid, central California). Land conversions and associated human activities have led to changes in the distribution and abundance of coyotes, which compete with kit foxes for resources.

Coyotes occur in most areas with abundant populations of kit foxes and, during the past few decades, coyote abundance has increased in many areas owing to a decrease in ranching operations, favorable landscape changes, and reduced control efforts (Orloff *et al.* 1986, Cypher and Scrivner 1992, White and Ralls 1993, White *et al.* 1995). Coyotes may attempt to lessen resource competition with kit foxes by killing them. Coyote-related injuries accounted for 50-87 percent of the mortalities of radio collared kit foxes at Camp Roberts, the Carrizo Plain Natural Area, the Lokern Natural Area, and the Naval Petroleum Reserves (Cypher and Scrivner 1992, Standley *et al.* 1992, Ralls and White 1995, Spiegel 1996b). Coyote-related deaths of adult foxes appear to be largely additive (i.e., in addition to deaths caused by other mortality factors such as disease and starvation) rather than compensatory (i.e., tending to replace deaths due to other mortality factors; White and Garrott 1997). Hence, the survival rates of adult foxes decrease significantly as the proportion of mortalities caused by coyotes increase (Cypher and Spencer 1998, White and Garrott 1997), and increases in coyote abundance may contribute to significant declines in kit fox abundance (Cypher and Scrivner 1992, Ralls and White 1995, White *et al.* 1996). There is some evidence that the proportion of juvenile foxes killed by coyotes increases as fox density increases (White and Garrott 1999). This density-dependent relationship would provide a feedback mechanism that reduces the amplitude of kit fox population dynamics and keeps foxes at lower densities than they might otherwise attain. In other words, coyote-related mortalities may dampen or prevent fox population growth, and accentuate, hasten, or prolong population declines.

Land-use changes also contributed to the expansion of nonnative red foxes into areas inhabited by kit foxes. Historically, the geographic range of the red fox did not overlap with that of the kit fox. By the 1970's, however, introduced and escaped red foxes had established breeding populations in many areas inhabited by kit foxes (Lewis *et al.* 1993). The larger and more aggressive red foxes are known to kill kit foxes (Ralls and White 1995), and could displace them, as has been observed in the arctic when red foxes expanded into the ranges of smaller arctic foxes (Hersteinsson and Macdonald 1982). The increased abundance and distribution of nonnative red foxes will also likely adversely affect the status of kit foxes because they are closer morphologically and taxonomically, and would likely have higher dietary overlap than coyotes; potentially resulting in more intense competition for resources. Two documented deaths of kit foxes due to red foxes have been reported (Ralls and White 1995), and red foxes appear to be displacing kit foxes in the northwestern part of their range (Lewis *et al.* 1993). At Camp Roberts, red foxes have usurped several dens that were used by kit foxes during previous years

(California Army National Guard, Camp Roberts Environmental Office, unpubl. data). In fact, opportunistic observations of red foxes in the cantonment area of Camp Roberts have increased 5-fold since 1993, and no kit foxes have been sighted or captured in this area since October 1997. Also, a telemetry study of sympatric red foxes and kit foxes in the Lost Hills area has detected spatial segregation between these species, suggesting that kit foxes may avoid or be excluded from red fox-inhabited areas (P. Kelly, Endangered Species Recovery Program, Fresno, pers. comm. to P. White, Fish and Wildlife Service, Sacramento, April 6, 2000). Such avoidance would limit the resources available to local populations of kit foxes and possibly result in decreased fox abundance and distribution.

Disease

Wildlife diseases do not appear to be a primary mortality factor that consistently limits kit fox populations throughout their range (McCue and O'Farrell 1988, Standley and McCue 1992). However, central California has a high incidence of wildlife rabies cases (Schultz and Barrett 1991), and high seroprevalences of canine distemper virus and canine parvovirus indicate that kit fox populations have been exposed to these diseases (McCue and O'Farrell 1988; Standley and McCue 1992). Hence, disease outbreaks could potentially cause substantial mortality or contribute to reduced fertility in seropositive females, as was noted in closely-related swift foxes (*Vulpes velox*).

For example, there are some indications that rabies virus may have contributed to a catastrophic decrease in kit fox abundance at Camp Roberts, San Luis Obispo County, California, during the early 1990's. San Luis Obispo County had the highest incidence of wildlife rabies cases in California during 1989 to 1991, and striped skunks (*Mephitis mephitis*) were the primary vector (Barrett 1990, Schultz and Barrett 1991, Reilly and Mangiamele 1992). A rabid skunk was trapped at Camp Roberts during 1989 and two foxes were found dead due to rabies in 1990 (Standley *et al.* 1992). Captures of kit foxes during annual live trapping sessions at Camp Roberts decreased from 103 to 20 individuals during 1988 to 1991. Captures of kit foxes were positively correlated with captures of skunks during 1988 to 1997; suggesting that some factor(s) such as rabies virus was contributing to concurrent decreases in the abundances of these species. Also, captures of kit foxes at Camp Roberts were negatively correlated with the proportion of skunks that were rabid when trapped by County Public Health Department personnel two years previously. These data suggest that a rabies outbreak may have occurred in the skunk population and spread into the fox population. A similar time lag in disease transmission and subsequent population reductions was observed in Ontario, Canada, although in this instance the transmission was from red foxes to striped skunks (MacDonald and Voigt 1985).

Pesticides and Rodenticides

Pesticides and rodenticides pose a threat to kit foxes through direct or secondary poisoning. Kit foxes may be killed if they ingest rodenticide in a bait application, or if they eat a rodent that has consumed the bait. Even sublethal doses of rodenticides may lead to the death of these animals by impairing their ability to escape predators or find food. Pesticides and rodenticides may also indirectly affect the survival of kit foxes by reducing the abundances of their staple prey species.

For example, the California ground squirrel, which is the staple prey of kit foxes in the northern portion of their range, was thought to have been eliminated from Contra Costa County in 1975, after extensive rodent eradication programs. Field observations indicated that the long-term use of ground squirrel poisons in this county severely reduced kit fox abundance through secondary poisoning and the suppression of populations of its staple prey (Orloff *et al.* 1986).

Kit foxes occupying habitats adjacent to agricultural lands are also likely to come into contact with insecticides applied to crops owing to runoff or aerial drift. Kit foxes could be affected through direct contact with sprays and treated soils, or through consumption of contaminated prey. Data from the California Department of Pesticide Regulation indicate that acephate, aldicarb, azinphos methyl, bendiocarb, carbofuran, chlorpyrifos, endosulfan, s-fenvalerate, naled, parathion, permethrin, phorate, and trifluralin are used within one mile of kit fox habitat. A wide variety of crops (alfalfa, almonds, apples, apricots, asparagus, avocados, barley, beans, beets, bok choy, broccoli, cantaloupe, carrots, cauliflower, celery, cherries, chestnuts, chicory, Chinese cabbage, Chinese greens, Chinese radish, collards, corn, cotton, cucumbers, eggplants, endive, figs, garlic, grapefruit, grapes, hay, kale, kiwi fruit, kohlrabi, leeks, lemons, lettuce, melons, mustard, nectarines, oats, okra, olives, onions, oranges, parsley, parsnips, peaches, peanuts, pears, peas, pecans, peppers, persimmons, pimentos, pistachios, plums, pomegranates, potatoes, prunes, pumpkins, quinces, radishes, raspberries, rice, safflower, sorghum, spinach, squash, strawberries, sugar beets, sweet potatoes, Swiss chard, tomatoes, walnuts, watermelons, and wheat), as well as buildings, Christmas tree plantations, commercial/industrial areas, greenhouses, nurseries, landscape maintenance, ornamental turf, rangeland, rights of way, and uncultivated agricultural and non-agricultural land, occur in close proximity to kit fox habitat.

Efforts have been underway to reduce the risk of rodenticides to kit foxes (Service 1993). The Federal government began controlling the use of rodenticides in 1972 with a ban of Compound 1080 on Federal lands pursuant to Executive Order. Above-ground application of strychnine within the geographic ranges of listed species was prohibited in 1988. A July 28, 1992, biological opinion regarding the Animal Damage Control (now known as Wildlife Services) Program by the U.S. Department of Agriculture found that this program was likely to jeopardize the continued existence of the kit fox owing to the potential for rodent control activities to take the fox. As a result, several reasonable and prudent measures were implemented, including a ban on the use of M-44 devices, toxicants, and fumigants within the recognized occupied range of the kit fox. Also, the only chemical authorized for use by Wildlife Services within the occupied range of the kit fox was zinc phosphide, a compound known to be minimally toxic to kit foxes (Service 1993).

Despite these efforts, the use of other pesticides and rodenticides still pose a significant threat to the kit fox, as evidenced by the death of 2 kit foxes at Camp Roberts in 1992 owing to secondary poisoning from chlorophacinone applied as a rodenticide, (Berry *et al.* 1992, Standley *et al.* 1992). Also, the livers of 3 foxes that were recovered in the City of Bakersfield during 1999 were found to contain detectable residues of the anticoagulant rodenticides chlorophacinone, brodifacoum, and bromadiolone (California Department of Fish and Game 1999).
To date, no specific research has been conducted on the effects of different pesticide or rodent control programs on the kit fox (Service 1998). This lack of information is problematic because

Williams (in lit., 1989) documented widespread pesticide use in known kit fox and Fresno kangaroo rat habitat adjoining agricultural lands in Madera County. In a separate report, Williams (in lit., 1989) documented another case of pesticide use near Raisin City, Fresno County, where treated grain was placed within an active Fresno kangaroo rat precinct. Also, farmers have been allowed to place bait on Bureau of Reclamation property to maximize the potential for killing rodents before they entered adjoining fields (Biological Opinion for the Interim Water Contract Renewal, Ref. No. 1-1-00-F-0056, February 29, 2000).

A September 22, 1993, biological opinion issued by the Service to the Environmental Protection Agency (EPA) regarding the regulation of pesticide use (31 registered chemicals) through administration of the Federal Insecticide, Fungicide, and Rodenticide Act found that use of the following chemicals would likely jeopardize the continued existence of the kit fox: (1) aluminum and magnesium phosphide fumigants; (2) chlorophacinone anticoagulants; (3) diphacinone anticoagulants; (4) pival anticoagulants; (5) potassium nitrate and sodium nitrate gas cartridges; and (6) sodium cyanide capsules (Service 1993). Reasonable and prudent alternatives to avoid jeopardy included restricting the use of aluminum/magnesium phosphide, potassium/sodium nitrate within the geographic range of the kit fox to qualified individuals, and prohibiting the use of chlorophacinone, diphacinone, pival, and sodium cyanide within the geographic range of the kit fox, with certain exceptions (e.g., agricultural areas that are greater than 1 mile from any kit fox habitat)(Service 1999).

Endangered Species Act Section 9 Violations and Noncompliance with the Terms and Conditions of Existing Biological Opinions

The intentional or unintentional destruction of areas occupied by kit foxes is an issue of serious concern. Section 9 of the Act prohibits the "take" (e.g., harm, harass, pursue, injure, kill) of federally-listed wildlife species. "Harm" (i.e., "take") is further defined to include habitat modification or degradation that kills or injures wildlife by impairing essential behavioral patterns including breeding, feeding, or sheltering. Congress established two provisions (under sections 7 and 10 of the Act) that allow for the "incidental take" of listed species of wildlife by Federal agencies, non-Federal government agencies, and private interests. Incidental take is defined as "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." Such take requires a permit from the Secretary of the Interior that anticipates a specific level of take for each listed species. If no permit is obtained for the incidental take of listed species, the individuals or entities responsible for these actions could be liable under the enforcement provisions of potential section 9 of the Act if any unauthorized take occurs. Nevertheless, the Service is aware of numerous instances of conversion of fox habitat to agricultural, residential, and commercial purposes throughout the San Joaquin Valley.

Risk of Chance Extinction Owing to Small Population Size, Isolation, and High Natural Fluctuations in Abundance

Historically, kit foxes may have existed in a metapopulation structure of core and satellite populations, some of which periodically experienced local extinctions and recolonization (Service 1998). Today's populations exist in an environment drastically different from the

historic one, however, and extensive habitat fragmentation will result in geographic isolation, smaller population sizes, and reduced genetic exchange among populations; all of which increase the vulnerability of kit fox populations to extirpation. Populations of kit foxes are extremely susceptible to the risks associated with small population size and isolation because they are characterized by marked instability in population density. For example, the relative abundance of kit foxes at the Naval Petroleum Reserves, California, decreased 10-fold during 1981 to 1983, increased 7-fold during 1991 to 1994, and then decreased 2-fold during 1995 (Cypher and Scrivner 1992, Cypher and Spencer 1998).

Many populations of kit fox are at risk of chance extinction owing to small population size and isolation. This risk has been prominently illustrated during recent, drastic declines in the populations of kit foxes at Camp Roberts and Fort Hunter Liggett. Captures of kit foxes during annual live trapping sessions at Camp Roberts decreased from 103 to 20 individuals during 1988 to 1991. This decrease continued through 1997 when only three kit foxes were captured (White *et al.* 2000). A similar decrease in kit fox abundance occurred at nearby Fort Hunter Liggett, and only 2 kit foxes have been observed on this installation since 1995 (L. Clark, Wildlife Biologist, Fort Hunter Liggett, pers. comm. to P. White, Service, Sacramento, February 15, 2000). It is unlikely that the current low abundances of kit foxes at Camp Roberts and Fort Hunter Liggett will increase substantially in the near future owing to the limited potential for recruitment. The chance of substantial immigration is low because the nearest core population on the Carrizo Plain is distant (greater than 16 miles) and separated from these installations by barriers to kit fox movement such as roads, developments, and irrigated agricultural areas. Also, there is a relatively high abundance of sympatric predators and competitors on these installations that contribute to low survival rates for kit foxes and, as a result, may limit population growth (White *et al.* 2000). Hence, these populations may be on the verge of extinction.

The destruction and fragmentation of habitat could also eventually lead to reduced genetic variation in populations of kit foxes that are small and geographically isolated. Historically, kit foxes likely existed in a metapopulation structure of core and satellite populations, some of which periodically experienced local extinctions and recolonization (Service 1998). Preliminary genetic assessments indicate that historic gene flow among populations was quite high, with effective dispersal rates of at least one to 4 dispersers per generation (M. Schwartz, University of Montana, Missoula, pers. comm. on March 23, 2000, to P. White, Service, Sacramento, California). This level of genetic dispersal should allow for local adaptation while preventing the loss of any rare alleles. Based on these results, it is likely that northern populations of kit foxes were once panmictic (i.e., randomly mating in a genetic sense), or nearly so, with southern populations. In other words, there were no major barriers to dispersal among populations.

Current levels of gene flow also appear to be adequate, however, extensive habitat loss and fragmentation continues to form more or less geographically distinct populations of foxes, which could potentially reduce genetic exchange among them. An increase in inbreeding and the loss of genetic variation could increase the extinction risk for small, isolated populations of kit foxes by interacting with demography to reduce fecundity, juvenile survival, and lifespan (Lande 1988, Frankham and Ralls 1998, Saccheri *et al.* 1998).

An area of particular concern is Santa Nella in western Merced County where pending development plans threaten to eliminate the little suitable habitat that remains and provides a dispersal corridor for kit foxes between the northern and southern portions of their range. Preliminary estimates of expected heterozygosity from foxes in this area indicate that this population may already have reduced genetic variation.
Other populations that may be showing the initial signs of genetic isolation are the Lost Hills area and populations in the Salinas-Pajaro River watershed (i.e., Camp Roberts and Fort Hunter Liggett). Preliminary estimates of the mean number of alleles per locus from foxes in these populations indicate that allelic diversity is lower than expected. Although these results may, in part, be due to the small number of foxes sampled in these areas, they may also be indicative of an increase in the amount of inbreeding due to population subdivision (M. Schwartz, University of Montana, Missoula, pers. comm. on March 23, 2000, to P. J. White, Fish and Wildlife Service, Sacramento, California). Further sampling and analyses are necessary to adequately assess the effects of these potential genetic bottlenecks.

Arid systems are characterized by unpredictable fluctuations in precipitation, which lead to high frequency, high amplitude fluctuations in the abundance of mammalian prey for kit foxes (Goldingay *et al.* 1997, White and Garrott 1999). Because the reproductive and neonatal survival rates of kit foxes are strongly depressed at low prey densities (White and Ralls 1993; White and Garrott 1997, 1999), periods of prey scarcity owing to drought or excessive rain events can contribute to population crashes and marked instability in the abundance and distribution of kit foxes (White and Garrott 1999). In other words, unpredictable, short-term fluctuations in precipitation and, in turn, prey abundance can generate frequent, rapid decreases in kit fox density that increase the extinction risk for small, isolated populations.

The primary goal of the recovery strategy for kit foxes identified in the Recovery Plan is to establish a complex of interconnected core and satellite populations throughout the species' range. The long-term viability of each of these core and satellite populations depends partly upon periodic dispersal and genetic flow between them. Therefore, kit fox movement corridors between these populations must be preserved and maintained. In the northern range, from the Ciervo Panoche in Fresno County northward, kit fox populations are small and isolated, and have exhibited significant decline. The core populations are the Ciervo Panoche area, the Carrizo Plain area, and the western Kern County population. Satellite populations are found in the urban Bakersfield area, Porterville/Lake Success area, Creighton Ranch/Pixley Wildlife Refuge, Allensworth Ecological Reserve, Semitropic/Kern National Wildlife Refuge (NWR), Antelope Plain, eastern Kern grasslands, Pleasant Valley, western Madera County, Santa Nella, Kesterson NWR, and Contra Costa County. Major corridors connecting these population areas are on the east and west side of the San Joaquin Valley, around the bottom of the Valley, and cross-valley corridors in Kern, Fresno, and Merced counties.

In response to the drastic loss of habitat and steadily increasing fragmentation, California Department of Transportation and the Service convened a San Joaquin Kit Fox Conservation and Planning Team to address the rapid decline of kit fox habitat in the northern range, and increasing barriers to kit fox dispersal. Consisting of Federal, State, and local agencies, local land trusts, environmental groups, researchers, and other concerned individuals, the goal of this

team was to coordinate agency actions that will recover the species, and troubleshoot threats to San Joaquin kit foxes as they emerge. Between the years 2001-2003, the team addressed connectivity issues at specific points along the west-side corridor north of the Ciervo Panoche core population.

Baseline

The historic range of the kit fox extended from southern Kern County north to Contra Costa County. In 1979, less than 7% of the estimated historic wild lands of the San Joaquin Valley remained undeveloped (USFWS 2006). The Service recognizes loss and degradation of habitat by agricultural, industrial, and urban developments and associated practices as factors that continue to decrease the carrying capacity of remaining habitat and threaten kit fox survival. Such losses contribute to kit fox declines through displacement, direct and indirect mortalities, barriers to movement, and reduction of prey populations (USFWS 2006). Since the 1970s, researchers have identified predation, starvation, flooding, and drought as natural mortality factors. Human-induced mortality factors include shooting, trapping, poisoning, electrocution, road kills, and suffocation (Brown et al 2006).

The primary goal of the recovery strategy for kit foxes identified in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (U.S. Fish and Wildlife 1998) is to establish a complex of interconnected core and satellite populations throughout the species' range. The long-term viability of each of these core and satellite populations depends partly upon periodic dispersal and genetic flow between them. Therefore, kit fox movement corridors between these populations must be preserved and maintained. In the northern range, from the Ciervo Panoche in Fresno County northward, kit fox populations are small and isolated, and have exhibited significant decline. The core populations are the Ciervo Panoche area, the Carrizo Plain area, and the western Kern County population. Satellite populations are found in the urban Bakersfield area, Porterville/Lake Success area, Creighton Ranch/Pixley Wildlife Refuge, Allensworth Ecological Reserve, Semitropic/Kern National Wildlife Refuge (NWR), Antelope Plain, eastern Kern grasslands, Pleasant Valley, western Madera County, Santa Nella, Kesterson NWR, and Contra Costa County. Major corridors connecting these population areas are on the east and west side of the San Joaquin Valley including the Millerton Lake area of Fresno County, around the bottom of the Valley, and cross-valley corridors in Kern, Fresno, and Merced counties. The proposed project is located along the eastern boundary of the northern core population area, and there is contiguous non-irrigated agricultural habitat linked between the northern core population area and the proposed project. Kit fox may use the project area as a corridor for migration and foraging. The Service has identified the project area to be preserved for kit fox connectivity. The nearest CNDDB occurrence is approximately 3 miles west of the project site recorded in 1999.

Effects of the Proposed Action

This section includes the analysis of the direct, indirect, and cumulative effects of the project to the kit fox. The analysis identifies the project features and/or activities that are anticipated to adversely impact the species and when feasible, quantifies such impacts.

Proposed ground disturbance and physical habitat alteration resulting from construction activities for the proposed project will result in 5.6 acres of impacts to kit fox habitat, none of which are within Federally designated critical habitat.

In the absence of any recent empirical data, kit foxes that are known to forage or may occur in the project vicinity are assumed to have acclimated and developed tolerance to substantial noise, light, and other affects resulting from the presence of an active pomegranate orchard, electrical facilities, vehicle traffic, noise, etc. An additional unquantifiable acreage of suitable foraging habitat will be affected by construction and operational noise, light, and other impacts discussed below. Adequate research has not been conducted specifically on the kit fox to quantify these affects. However, the SPM has committed to implement a number of avoidance and minimization measures and support the long-term preservation of the kit fox. This is being accomplished by contributing conservation funding to help secure the highest quality habitat that is in private ownership and on potentially developable parcels. The SPM's contributions will help ensure that needed habitat, wildlife linkages and connectivity are maintained; which benefit a robust suite of plant and wildlife species, including kit fox.

Potential effects from the proposed action to kit fox were based on the proposed project location, construction methods, and the resource protection measures adopted as part of the project. Additional considerations and sensitivities included:

- Construction-related impacts (e.g., construction, vegetation clearing and grading, increased traffic, lighting, noise, vibrations, etc.);
- Post-construction operational noise, light and vibration impacts from SPM use;
- Post-construction SPM maintenance activities (e.g., herbicides, road maintenance, etc.);
- Affects on habitat connectivity (e.g., upland and breeding connectivity, movement corridors, landscape linkages, etc.); and
- Direct loss/mortality (e.g., habitat loss and or modification).

In general, construction activities and post-construction maintenance and operations could directly kill the kit fox, crush potential burrows, and/or temporarily displace them from some foraging habitat areas. The incremental increases in noise, light, vibration, and human activities associated with the construction activities are also expected to have the potential to cause the kit fox to avoid an area until the disturbances are eliminated or the animals become accustomed to the disturbance. However, ascertainable studies have been conducted to assess or quantify impacts of noise, light or vibration on the kit fox.

Kit fox seem to be fairly tolerant of human presence, although Link (1995) noted that Colorado kit foxes seemed to spend longer periods in their dens during weekend peaks of noise and disturbance by off-road vehicles or other forms of recreating. Vehicles passing on roads did not cause kit foxes to alter their behavior unless people stopped to watch them. Link (1995) located one occupied whelping den within 4 meters of a busy road. As the increase in human population in the Grand Valley and surroundings brings increased highway and off-highway travel, the likelihood of vehicle-related kit fox mortalities will rise (Fitzgerald 1996).

Construction will result in a permanent loss of 5.6 acres of habitat. Some disturbance to normal reproductive patterns could occur during the spring of 2008 for kit fox that may breed in close relation to the study area and other areas proposed for disturbance. This loss of productivity would be for only one season and individuals would be expected to reoccupy adjacent habitats following completion of construction activities. Post-construction maintenance and operations could also temporarily displace kit fox from some habitat areas.

Cumulative Effects

Per section 7 of the Endangered Species Act, cumulative effects analyses are limited to future State and private actions that are reasonably certain to occur within the area that are not expected to get a Federal permit. For section 7 consultations, the cumulative impacts should not include future Federal actions (e.g., undertakings that require Federal authorization or Federal funding) since they are actions that themselves would be subject to the restraints of section 7 at some later date. Indicators of "reasonably certain" projects must show more than the possibility that the non-Federal project would occur. They must demonstrate with reasonable certainty that it would occur. Accordingly, only those State or private projects that satisfy all major land use requirements and that appear to be economically viable are considered. Cumulative effects involve only future non-Federal actions: past and present impacts of non-Federal actions are part of the environmental baseline. The following subsections identify and describe potential cumulative effects that could result from the project in combination with other reasonably foreseeable future non-Federal actions or natural events in or near the SPM project area.

Future Actions Considered but Eliminated

Although identified in scoping comments and/or previous project analysis, the following actions (below table) were determined not to be reasonably foreseeable future actions and consequently were not considered in the cumulative effects assessment.

Dismissed Potential Projects for Cumulative Effects

Project Description	Project Location	Project Applicant	Status/Timing
Plan Check Power Generation Facility	APN: 027-060-61 This is the parcel directly adjacent and to the northeast of the subject site	Unknown	Plan Check submitted in June of 2001. Project has not yet been finalized (i.e., is not complete)
New Shell building with a convenience store	APN: 027-190-25	Unknown	Permit finalized in October of 2003

CalPeak Power Panoche No. 2

This existing power plant, which has been in operation since 2001, is directly adjacent to the project. It is unclear what the specific project that was submitted in June of 2001 was and why County of Fresno records indicates this project's permits have not been finalized. Since this plant is currently in operation, it can be assumed that any permits submitted subsequently are for relatively minor work and probably do not meet the 30,000 square foot criteria for projects that could potentially cause cumulative impacts. Thus, this project can be dismissed from the cumulative impact analysis because no cumulative impacts would occur.

Convenience Store Building

From the project description provided by the County of Fresno, this seems to be an addition to an already existing convenience store. Detailed information on this specific project was unavailable. However, it is highly unlikely that this building permit was for a structure that was equal to or over 30,000 square feet. Thus, this project can be dismissed from the cumulative impact analysis because no cumulative impacts would occur.

Reasonably Foreseeable Future Actions

Potential reasonably foreseeable future non-Federal actions were identified using the scoping comments; personal communication with resource experts, land use plans; and current events reported in local and regional news. Reasonably foreseeable future non-Federal actions considered in this cumulative impact assessment include projects that 1) are greater than 30,000 square feet; 2) have submitted a defined project application for required approvals or permits; or 3) have been previously approved and may be implemented in the near future. Cumulative impacts analysis focuses on the potential overlap of construction and operation impacts among various projects meeting the criteria described above.
Projects that will potentially contribute to cumulative impacts are those located in the same general geographic area of influence of the SPM. For this cumulative assessment, the area of

influence is defined as the area within a 5-mile radius of the power plant. Projects or proposed projects of potential regional significance are also considered in the cumulative analysis. The following table presents a list of potential projects considered in this cumulative impacts assessment.

Projects Considered for Cumulative Effects

Project Description	Project Location	Project Applicant	Status/Timing
Proposed Panoche Power Center to be operational in 2009	South of West Panoche Road and adjacent to CalPeak Power Plant	Unknown	This proposed facility will be constructed simultaneously

Panoche Power Center Project

The proposed Panoche Power Center Project to be operational by 2009. Limited information indicates operational dates are similar to the SPM. The cumulative impacts associated with the concurrent construction schedules would be insignificant due to the short duration and lack of other pending development in the area. The operation of the proposed Panoche Power Center Project will occur during operation of the SPM. The simultaneous operation of both power plants will not result in significant cumulative impacts on environmental resources in the area except for noise impacts due to the relatively remote locations of the two power facilities.

Conclusion

After reviewing the current status of the kit fox, the environmental baseline for the area covered by this biological opinion, the effects of the proposed project, and the cumulative effects, it is the Service's biological opinion that the SPM Project, as proposed, is not likely to jeopardize the continued existence of the kit fox. The proposed project is not located within designated or proposed critical habitat for any federally-listed species, and therefore, none would be adversely modified or destroyed.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations issued pursuant to section 4(d) of the Act, prohibit take of endangered and threatened species without a special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife 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. 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) of the Act, such incidental taking is not considered to be a prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary and must be implemented by the SPM, as appropriate, in order for the exemption from section 7(o)(2) of the Act to apply. The SPM has a continuing duty to regulate the activity that is covered by this incidental take statement. If the SPM fails to retain oversight to ensure compliance with these measures, the protective coverage of section 7(o)(2) of the Act may lapse. To monitor the impacts of incidental take, the SPM must report the progress of the action and its impact on the species to our agency as specified [50 CFR §402.14(I)(3)].

Amount or Extent of Take

The Service expects that incidental take of the kit fox will be difficult to detect or quantify because when this mammal is not foraging, mating, or conducting other surface activity, it inhabits dens or burrows, the animal may range over a large territory, it is primarily active at night, it is a highly intelligent animal that is often is extremely shy around humans, and the finding of an injured or dead individual is unlikely because of their relatively small body size. Take of this species also may be difficult to quantify due to seasonal fluctuations in their behaviors and consequential exposure to threats. Therefore, the Service is estimating that all of the kit foxes permanently occupying 5.6 acres, for the period of (2) years, as described herein, will be subject to incidental take from the project. Upon implementation of the Reasonable and Prudent Measures, incidental take associated with the Starwood Power Midway, LLC in the form of harm and harassment of the kit fox caused by habitat loss and construction activities will become exempt from the prohibitions described under section 9 of the Act.

Disposition of Sick, Injured, or Dead Specimens

This office is to be notified within three working days if any kit fox are found dead or injured as a direct or indirect result of the implementation of this project. Notification must include the date, time, location, and any other pertinent information as described in the project description. Dead animals should be collected in an appropriate manner by a biologist approved by the Service. The office contact person is Susan Jones, who may be contacted at the letterhead address or at (916) 414-6600.

Effect of Take

In the accompanying biological opinion, we determined that this level of anticipated take is not likely to result in jeopardy to the kit fox.

Reasonable and Prudent Measures

The following reasonable and prudent measures are necessary and appropriate to minimize the effect of the Starwood Power – Midway, LLC Peaking Power Project on the kit fox.

1. The applicant will ensure that SPM shall implement the project as described within this biological opinion.

2. The applicant shall ensure their compliance with this biological opinion.

These reasonable and prudent measures, which include the following implementing terms and conditions, are designed to minimize the impact of incidental take on a species that might result from the development of SPM. If, during the course of the action, the level of incidental take identified in this opinion is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The SPM must 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.

Terms and Conditions

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

1. The following Terms and Conditions implement Reasonable and Prudent Measure one (1):
    a. The applicant shall comply with all the conservation measures outlined in this Biological Opinion.

2. The following Terms and Conditions implement Reasonable and Prudent Measure two (2):

    a. The applicant shall comply with the Reporting Requirements of this biological opinion.

Reporting Requirements

A post-construction compliance report prepared by a Service-approved monitoring biologist(s) shall be forwarded to the Chief, Endangered Species Division, at the Sacramento Fish and Wildlife Office within 30 calendar days of the completion of construction activity. This report shall detail (i) dates that construction occurred; (ii) pertinent information concerning the success of the Project in meeting compensation and other conservation measures; (iii) an explanation of failure to meet such measures, if any; (iv) known project effects on federally listed species, if any; (v) occurrences of incidental take of federally listed species, if any; and (vi) other pertinent information.

SPM shall notify the Service via electronic mail and telephone within three (3) working days of the death or injury to a listed species that occurs due to project-related activities, or is observed at the project site. Notification must include the date, time, location of the incident or of the finding of a dead or injured animal, and photographs of the specific animal. In the case of an injured animal, the animal shall be cared for by a licensed veterinarian or other qualified person. In the case of a dead animal, the individual animal should be preserved, as appropriate, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen or the Service takes custody of the specimen. The Service contacts are: Chief of the Endangered Species Division (Central Valley) at 916/414-6600, and Scott Heard, Resident Agent-in-Charge of the Service's Law Enforcement Division at 916/414-6660. The California Department of Fish and Game contact is Ron Schlorff at 916/654-4262.

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

Proof of environmental training requirements shall be delivered within 10 business days of the start of construction to the Chief of the Endangered Species Division, Sacramento Fish and Wildlife Office, 2800 Cottage Way, Room W-2605, Sacramento, California, 95825-1846.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities 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. We encourage the applicant to adopt and implement these conservation recommendations.

1. All new sightings of kit foxes should be reported to the Service and the California Natural Diversity Database.

2. The Service has developed the following conservation recommendations based, in part, on The Recovery Plan for Upland Species of the San Joaquin Valley, California (U.S. Fish and Wildlife Service 1998).

    a. Locate, map, and protect existing populations of the San Joaquin kit fox (Recovery Plan Tasks 2.2.17 and 2.2.24).

b. Protect and create additional habitat for the kit fox in key portions of its range (Recovery Plan Tasks 2.1.19 and 5.1.5).

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

REINITIATION—CLOSING STATEMENT

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

If you have any questions regarding this biological opinion on the proposed Starwood Power – Midway, LLC project in Fresno County, California, please contact Jason Hanni or Susan Jones, the San Joaquin Valley Branch Chief, at (916) 414-6600.

Enclosure:
Selected Review Criteria for Section 7 Off-site Compensation (from April 11, 2006 Service draft guidance)

cc:
Steve Zaminski, Managing Director, Starwood Power – Midway, LLC, Greenwich, Connecticut
Patrick Mock, PhD, URS Corporation, San Diego, California
Heather Blair, Aspen Environmental Group, Sacramento, California

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Selected Review Criteria for
Conservation Banks and Section 7 Off Site Compensation
Rev. April 11, 2006

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

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

Property Assurances and Conservation Easement

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

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

Legal Description and Parcel Map

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

Conservation Easement

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

ii. Qualified under CA Civil Code § 815
iii. Bylaws, Articles of Incorporation, and biographies of Board of Directors on file at, and approved by, USFWS
1. Must meet requirements of USFWS, including 51% disinterested parties on the Board of Directors

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

<u>Property Assessment and Warranty</u>

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

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

Environmental Site Assessment – Phase I

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

Service Area

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

Restoration or Development Plan

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

Management Plan

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

Economic Analysis

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

Performance Security, Contingency Security and Endowment Fund

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

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

maximum success in earning potential, and with assurances for no loss of principal

3. Disbursements or releases from each of the funds must be for documented expenditures, as they occur
4. A full economic analysis must be included to demonstrate how each of the required funding amounts was determined. This analysis must be approved by the agencies as being full, complete and adequate
5. A schedule and plan (including target date and full amount on that date) for funding each of the accounts must be submitted for approval

Agreement Contract

This would include a "Conservation Bank Agreement," "Bank Enabling Instrument," or other consolidating agreement that ties all of the associated documents together. Some general, basic (certainly not all-inclusive) concerns to include are:

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

NEPA COMPLIANCE CHECKLIST

State: California

Grant/Project Name: Starwood Power – Midway, LLC

This proposal_X_ is; __is not completely covered by categorical exclusion No(s). __C1____, 516 DM 6 Appendix 1.

(check (X) one) (Review proposed activities. An appropriate categorical exclusion must be identified before completing the remainder of the Checklist. If a categorical exclusion cannot be identified, or the proposal cannot meet the qualifying criteria in the categorical exclusion , an EA must be prepared.)

Exceptions:

Will This Proposal *(check (X) yes or no for each item below)*:

Yes No

__ _X_ 1. Have significant adverse effects on public health or safety.

__ _X_ 2. Have adverse effects on such unique geographic characteristics as historic or cultural resources, park, recreation or refuge lands, wilderness areas, wild or scenic rivers, sole or principal drinking water aquifers, prime farmlands, wetlands, floodplains, or ecologically significant or critical areas, including those listed on the Department's National Register of Natural Land marks.

__ _X_ 3. Have highly controversial environmental effects.

__ _X_ 4. Have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks.

__ _X_ 5. Establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects.

__ _X_ 6. Be directly related to other actions with individually insignificant, but cumulatively significant environmental effects.

__ _X_ 7. Have adverse effects on properties listed or eligible for listing on the National Register of Historic Places.

__ _X_ 8. Have adverse effects on species listed or proposed to be listed on the List of Endangered or Threatened Species, or have adverse effects on designated Critical Habitat for these species.

__ _X_ 9. Have material adverse effects on resources requiring compliance with Executive Order 119 88 (Floodplain Management), Executive Order 119 90 (Protection of Wetlands), or the Fish and Wildlife Coordination Act.

__ _X_ 10. Threaten to violate a Federal, State, local or tribal law or requirement imposed for the protection of the environment.

(If any of the above exceptions receive a "Yes" check (X) , an EA must be prepared.)

Concurrences/Approvals:
Project Leader: _____ Date: 9/7/07

State Authority Concurrence: _____ Date: _____
(with financial assistance signature authority, if applicable)

Within the spirit and intent of the Council of Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record and have determined that the grant/agreement/amendment:

_X_ **is a categorical exclusion as provided by 516 DM 6, Appendix 1. No further NEPA documentation will therefore be made.**

__ **is not completely covered by the categorical exclusion as provided by 516 DM 6, Appendix 1. An EA must be prepared.**

__ **includes other attached information supporting the Checklist.**

Service signature approval:

RO or WO Environmental Coordinator: _____ Date: _____

Staff Specialist, Division of Federal Aid: _____ Date: _____
(or authorized Service representative with financial assistance signature authority)

OMB Control No. 1018-0110
03/31/2004