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In reply refer to:
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Memorandum

To: Chief, Division of Conservation Planning, Region 1, Portland, Oregon (AES)

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

Subject: Intra-Service Biological and Conference Opinion on Issuance of a Section 10(a)(1)(B) Incidental Take Permit to the Lamont Public Utility District in Kern County, California.

This document transmits the biological/conference opinion of the U.S. Fish and Wildlife Service (Service), Sacramento Fish and Wildlife Office (SFWO), regarding the issuance of an incidental take permit (ITP) to the Lamont Public Utility District in Kern County (Lamont PUD) (Applicant or Proposed Permittee) for implementation of the Lamont Public Utility District Habitat Conservation Plan (Lamont PUD HCP) pursuant to section 10(a)(1)(B) and section 10(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(Act) and in accordance with section 7 of the Act and the implementing regulations (50 CFR §402). The Service proposes to issue the ITP to Lamont PUD for a period of 50 years.

The Applicant seeks an ITP from the Service to authorize the incidental take of three species (collectively called "Covered Species") in connection with the Lamont PUD's effluent disposal expansion project: two federally-endangered species – the Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*)(kangaroo rat) and the San Joaquin kit fox (*Vulpes macrotis mutica*)(kit fox) – and one unlisted Species of Concern, the western burrowing owl (*Athene cunicularia*)(owl). Should the owl become listed pursuant to the Act during the term of the permit, the permit would become effective to authorize incidental take of the owl. Assurances provided under the "No Surprises" rule at 50 CFR 17.3, 17.22(b)(5) and 17.32(b)(5) would extend to all Covered Species.

The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, or possessing of migratory birds. The MBTA identifies a variety of prohibited actions including the taking of individual birds, young, feathers, eggs, nests, etc. Actions conducted under the Lamont PUD HCP and Implementation Agreement (IA) will comply with the provisions of the MBTA with strict avoidance measures for actions affecting Covered Species that are included in the list of species protected by the MBTA, such as the owl.

There are currently no Covered Species in the Lamont HCP that are listed under the Act and subject to a special purpose permit at this time. Should the owl become listed under the Act during the life of the ITP, the ITP would also constitute an MBTA special purpose permit for that species for a three-year term as specified under 50 CFR 13 and 50 CFR 21 for MBTA special purpose permits subject to renewal by Lamont PUD.

This biological opinion is based on information provided in the following documents: (1) the November 2004 Lamont PUD HCP; (2) the October 2004 Environmental Assessment (EA); (3) the October 2004 IA; and (4) other information available to the Service.

Consultation History

- **1995 –** The Service began working with Lamont PUD to begin HCP process.

- **April 3, 1996 –** Service sent letter to Lamont PUD detailing Lamont PUD's responsibilities under the Act.

- **October 31, 1996 –** Service sent letter to Lamont PUD regarding Lamont PUD's intention to conduct activities that may result in the take of Tipton kangaroo rats without Section 10 permit.

- **January 3, 1997 –** Lamont PUD received Notice of Violation letter from the RWQCB related to flooding neighboring property with effluent.

- **November 1997 –** Service conducted a site visit to Lamont PUD and found disking and potential flooding of Tipton kangaroo rat habitat.

- **July 6, 1999 –** Lamont PUD received Notice of Violation letter from RWQCB related to failure to submit monitoring report.

- **April 2000 –** Congressman Bill Thomas' Office calls Service for status of Lamont PUD in relation to HCP process.

- **October 24, 2000 –** Lamont PUD is given a Cease and Desist Order requiring Lamont PUD to construct facilities to handle the treated effluent. Ponds are to be constructed by 05/15/01 under Order.

- **February 1, 2002 –** Lamont PUD received Notice of Violation letter from RWQCB related to exceeding average monthly discharge flow limit, failing to maintain freeboard greater than 2.0 feet in ponds, exceeding various effluent limits, and failing to comply with Monitoring and Reporting Program.

- **March and April 2002 –** The Service reviewed the draft HCP and draft EA.

- **May 1, 2002 –**Lamont PUD purchased mitigation credits at the Coles Levee Conservation Bank to mitigate for the loss of 19 acres of habitat.

- **November 18, 2002 –** The Service conducted a site visit to the project site to determine the status of the project area.

- **December 5, 2002 –** Lamont PUD accepted the proposed strategy and agreed to modify the HCP to incorporate this strategy.

- **December 5, 2002 –** The Service provided comments on the draft HCP to the HCP consultant.

- **December 6, 2002 –** The CEQA Notice of Determination and Negative Declaration for the Lamont PUD project was provided to the Service by the HCP consultant.

- **March 6, 2003 –** The Service met with Marcia Wolfe, HCP consultant, to discuss the proposed strategy and how to modify the draft HCP to incorporate this strategy.

- **November 3, 2003 –** The Service received revised draft of Lamont PUD HCP.

- **April to September 2004 –** Phone calls between the Service, HCP consultant, and Lamont PUD to discuss HCP and changes needed to EA and IA.

- **September 21, 2004 –** The Service and the California Department of Fish and Game (CDFG) met with Lamont PUD and California State Senator Dean Florez.

- **October 28, 2004 –** The Service sent suggested revision of IA to Stewart of Lamont PUD.

- **November 2004 –** The Service and Lamont PUD engaged in discussions (email and telephone) regarding the revisions to the HCP and IA.

- **January 7, 2005 –** The Service's California/Nevada Operations Office sent the Notice of Availability for the Lamont Public Utility District HCP and EA to the Department of Interior Office to publish in the *Federal Register* for public comment.

- **January 25, 2005 –** The Notice of Availability for the Lamont Public Utility District HCP and EA is published in the *Federal Register* for public comment. Comment period is 60 days.

- **March 28, 2005 –** Comment period for Notice of Availability for the Lamont Public Utility District HCP and EA closes.

- **April and May 2005 –** The biological opinion, findings for issuance of the ITP, and the NEPA decision are completed.

BIOLOGICAL OPINION

Description of the Proposed Action

The Service proposes to issue a 50-year ITP to the Lamont PUD based on the Lamont PUD Habitat Conservation Plan, pursuant to Section 10(a)(1)(B) of the Act. The Lamont PUD seeks an ITP from the Service to authorize the incidental take of the covered species (Tipton kangaroo rat, San Joaquin kit fox, and the western burrowing owl) during construction and operation of Lamont PUD's effluent disposal expansion facility on a 160-acre site south of Lamont in Kern County, California.

The Lamont PUD is responsible for sewage treatment and handling of wastewater disposal for the unincorporated town of Lamont. Because an increased human population has caused a need for increased effluent disposal capacity, the Lamont PUD is proposing to increase their effluent disposal capability by expanding to a 160-acre site south of Lamont, in cooperation with the Regional Water Quality Control Board (RWQCB) – Central Valley Region.

The proposed project site is located in Kern County on approximately 160 acres in the southeast quarter of map Section 25 (T31S, R28E) of the Weedpatch Quadrangle (Mt. Diablo Base and Meridian). This site is adjacent to sites currently being used for composting facilities. It is about 2.5 miles directly south of the town of Lamont, and half a mile south of Bear Mt. Boulevard (State Highway 223). The site is bordered on its eastern boundary by Wheeler Ridge Road (State Highway 184), and on its western side by land operated by the Community Recycling and Resource Recovery Inc. (CRRR), for composting. Dirt roads for farm access run adjacent to the northern and southern boundaries of the project site. The existing Lamont PUD sewage treatment ponds are located to the northwest of the proposed project spreading site in the same map section.

Sewage typically enters the treatment plant site through pipelines. It is screened to remove coarse materials and is then pumped into ponds where natural biological processes treat the material. The treated effluent may be recirculated in additional treatment ponds or discharged to be sprayed or flooded onto agricultural fields for leaching and evaporation. Laws and regulations strictly limit potential uses of sewage effluent. It cannot be used on any agricultural crop destined for human consumption, but is allowed to be used on livestock forage crops, like winter wheat, corn, and alfalfa. The Lamont PUD is presently providing treated effluent to a recycling and composting contractor which is irrigating fiber and fodder crops on land located south of the treatment plant. Existing operations have received several violations from the RWQCB because the Lamont PUD's waste treatment plant is currently exceeding its permitted flow of 2 million gallons per day and may not allow any future development until the expansion occurs. Regulations require a 30-year capacity for spreading grounds.

The Lamont PUD had initiated irrigation on the expansion site, but the site was subsequently found to support habitat for threatened and endangered species. Consequently, the need for an ITP was identified, and an HCP was developed by consultants for the Lamont PUD (M.H. Wolfe and Associates Environmental Consulting Inc.) at the request of the Lamont PUD, in coordination with the Service and CDFG.

The proposed project is the expansion of the effluent discharge area onto 160 acres in Section 25, T31S, R28E, under the terms of an ITP of the Act. On the northwest corner of the site two ponds would be constructed on approximately 21 acres. This pond construction is to be located in areas that have been previously disturbed and that are unoccupied by sensitive species as reported by trapping reports (BioEnvironmental Associates 1995) and preconstruction surveys. Many activities already occur in this area such as composting and agriculture. The remaining 139 acres of the property would be graded and leveled for access roads, project benches, terraces, and ponds. The east side of the property, including the power line right-of-way would be planted in corn, alfalfa, or another forage crop that can be irrigated and harvested periodically through standard cultivating and harvesting techniques.

A series of terraced benches may be constructed on the east side of the site, which is designated for agricultural use as is most of the surrounding properties. Effluent would be spread aerially onto the benches, which would be about 600 feet wide, with four-foot drops in elevation between each bench. The terraced leaching benches would be used sequentially. This would allow evaporation and infiltration of the effluent into the soil while water is being spread on other benches. The effluent would be spread on each pad, as needed. Following the completion of infiltration and drying, each bench would be disked several times per year to maintain the highest levels of permeability and percolation. Winter wheat, corn, alfalfa or another forage crop may be planted on the benches and harvested periodically.

The development of the project would entail the incidental take of approximately 76 acres of foraging habitat for the San Joaquin kit fox and 19 acres of denning habitat for Tipton kangaroo rat. The Lamont PUD proposes to mitigate for the take by the acquisition and long-term management of an off-site parcel of existing Tipton kangaroo rat denning habitat. The Lamont PUD has purchased compensation acreage credits in the amount of 57 acres at an estimated cost of $34,200.00. Purchase of the credits was made from ARCO Western Energy at the Coles Levee Ecosystem Preserve, a Service-approved mitigation bank, in advance of completion of the permits, on February 4, 1998. It also provided the sum of $27,075.00 for an endowment to ensure the long-term funding for the fencing and management of the compensation lands. The compensation acreage at the Coles Levee Ecosystem Preserve supports all of the covered species as well as other species that may be affected by this project.

The long-term economic backing for completion of this project and mitigation during site construction would come from CRRR profits and utility taxes on those residents served by the Lamont PUD. The RWQCB completed a Memorandum of Understanding with the CDFG for this project being implemented by the Lamont PUD, but CDFG did not sign it prior to expiration of Section 2090.

The principle biological goal of the Lamont PUD HCP is to obtain alternative and suitable long-term off-site habitat for the Tipton kangaroo rat on the project site, consistent with the Recovery Plan for Upland Species of the San Joaquin Valley (Recovery Plan)(Service 1998). Specific biological goals are to: (1) obtain suitable long-term habitat that will be enhanced by the management; (2) minimize the level of incidental take of covered and related species within the project site through take avoidance measures; and (3) educate the staff and contractors that work on the project site.

The overall biological objective by which the principle goal will be attained is to protect a substantial proportion of remaining high quality lands in the Coles Levee Ecological Preserve. The Preserve will also protect, and in some cases, improve habitat quality necessary for the long term continued existence of the species and will provide contiguous occupied habitat for the movement of the wildlife. The HCP's specific biological objectives are to: (1) provide the means by which habitat disturbance can be mitigated through direct payment for acquisition and management in perpetuity of an off-site parcel of prime Tipton kangaroo rat habitat through the Coles Levee Ecological Preserve; (2) minimize the level of incidental take of covered species within the project site area through specific take avoidance and mitigation measures (detailed later in this document); and (3) develop an employee training program that shall be conducted by a qualified biologist prior to construction to educate all workers on the identification of threatened and endangered species along with the mitigation measures and the reporting requirements of the ITP.

Monitoring of the project site covered by the Lamont PUD HCP will be performed by a qualified biologist. The objectives of monitoring program will be to document the amount of incidental take of the covered species, compliance and effectiveness of the take and mitigation measures, and the success of the environmental education program. The information collected will also be the basis for the monitoring for effectiveness of the mitigation program as a whole. A review of the effectiveness of mitigation measures will in turn indicate where and when changes or adaptations are needed to remain in compliance or may indicate how to improve the mitigation approaches.

The HCP describes an approach for ensuring that mitigation is provided for the activities for the covered species on the project site. Lamont PUD has developed mitigation measures to reduce the potential of take during the construction and operation of the project and these measures will be evaluated through a monitoring process under the oversight of the CDFG. There will be a process of continually improving management policies and practices for the compensation acreage purchased at the Service-approved Coles Levee Ecological Preserve, which was used as a compensatory site. The overall goal of adaptive management of the Coles Levee Ecological Preserve is to ensure the protection of natural lands for the covered designated species.

The implementation of the mitigation measures on the Lamont PUD project site will be monitored for effectiveness and compliance. The effectiveness of the educational and training programs and the level of compliance or cause of noncompliance of the mitigation measures will be submitted in a report to Service no later than February 28 of each year. If noncompliance is determined, the cause of the noncompliance will be reviewed and adjustments made accordingly to remedy the situation. If the implementation of the take avoidance and mitigation measures is not effective, or part fails, the measures will be revised and monitored to determine if the inadequacies have been corrected.

The length of the permit term being requested is for 50 years. This is the viable operational life of an effluent disposal site for the Town of Lamont.

The Lamont PUD proposes to minimize and mitigate potential take by implementing the following mitigation measures:

(1) No more then 60 days after completion of construction, applicant shall prepare and deliver to Service and CDFG a construction compliance report. This report would include documentation of the implementation of mitigation measures, and incidents of non-compliance, all available information about project-related take of species named in the Section 2081(b) Permit, and an evaluation of the effectiveness of the mitigation measures in minimizing and mitigating impacts on the species.

(2) Applicant shall submit, no later then February 28 of each year, a status report on implementation of mitigation measures and all available information about project-related take during the preceding year. Reports shall include a copy of the table from the Mitigation Monitoring and Reporting Program with notes indicating the status of each mitigation measure.

(3) Applicant shall fully cooperate with the CDFG in its efforts to verify compliance with, or effectiveness of mitigation measures.

(4) A specific individual shall be designated in writing as contact representative between the Lamont PUD, CDFG and the Service to oversee compliance with the Biological Opinion and the HCP.

(5) Applicant shall hire a qualified biologist to perform specific monitoring duties and other biological work as required below.

(6) A qualified biologist shall conduct an environmental pre-activity survey of the project site no more than 30 days prior to any construction to assess endangered species presence and distribution.

(7) If Tipton kangaroo rats are present, applicant shall provide an estimation of numbers to the Service and the CDFG and the two agencies would determine whether Tipton kangaroo rats are to be trapped, salvaged, or relocated and would provide their direction to the Lamont PUD in writing.

(8) All potential kangaroo rat burrows shall be hand-excavated to ensure their removal. This action would also verify the burrows are not occupied by blunt-nosed leopard lizards.

(9) Any potential San Joaquin kit fox dens would be tracked in accordance with standard agency guidelines to determine if they are active. If they are inactive, the dens would be closed. If they are active, the Service and CDFG would be contacted to determine the appropriate course of action.

(10) Project boundaries, dens/burrows or buffer zones to be avoided during construction shall be flagged and posted as necessary to prevent straying of vehicles and equipment into adjacent

areas where take could occur. The applicant shall consult with a qualified biologist to determine the necessity and extent of flagging and posting.

(11) All construction equipment, staging areas, materials and personnel shall be restricted to the project site or previously disturbed off-site areas that are not habitat for listed species.

(12) A 25 mile-per-hour speed limit shall be enforced on the project site.

(13) All garbage and foodstuffs shall be contained and removed from the site regularly to prevent attraction of predators such as dogs (*Canis familiaris*), coyotes (*Canis latrans*), or San Joaquin kit fox to the project area where they may injure or increase harassment of the Tipton kangaroo rat, or result in the potential for incidental take of the San Joaquin kit fox.

(14) To minimize take of the Tipton kangaroo rat on adjacent habitat after conversion, a pet management plan shall be submitted to the Service and CDFG for review and approval.

(15) Employees or contractors shall be prohibited from using firearms on, or bringing dogs or other pets to the project site, unless confined or leashed.

(16) The applicant shall consult with the Service and CDFG prior to application of any rodenticide on the project area during construction and operation of the proposed facility. Rodenticide use shall be in accordance with Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requirements being implemented under the FIFRA Biological Opinion through the Kern County Agricultural Commissioner's office.

(17) Any spills of petroleum products or other chemicals, which may represent a hazard to wildlife, shall be cleaned up promptly and in accordance with appropriate laws and regulations.

(18) All steep-walled pipeline and utility trenches shall be inspected in the mornings to prevent entrapment of kangaroo rats and/or San Joaquin kit fox, or shall be provided escape ramps as determined by a qualified biologist. All trenches shall be inspected prior to back filling and a qualified biologist shall remove any entrapped wildlife or allow animals to escape voluntarily prior to resuming construction.

(19) All pipe, culverts, or similar structures on-site with a diameter of 2 to 24 inches shall be inspected for endangered species prior to moving or welding, and shall be capped or otherwise covered if sections cannot be inspected to prevent the entry and potential loss of wildlife. If an endangered species is discovered inside a pipe, the animal shall be safely removed by a qualified biologist. The pipe segment shall not be moved until the animal has escaped, or the pipe segment shall be moved a single time out of the path of construction. Alternatively, stored pipe may be kept capped at all times until used during construction.

(20) To minimize disturbance of adjacent wildlife and the potential for increased night-time predation, the facility lighting shall be directed toward the facility and shielded in a manner as to minimize artificial lighting the listed species or adjacent agricultural lands. Landscaping would also be of a type to reduce or shield light from adjacent habitat.

(21) Any dead, sick or injured threatened or endangered species shall be reported within 48 hours to the Sacramento Fish and Wildlife Office of the Service and the Fresno office of the CDFG.

(22) If the incidental take of the Tipton kangaroo rat occurs during construction, the causative action shall cease immediately, and the Service and CDFG shall be contacted immediately for further guidance. Consultation may be reopened as necessary.

(23) If an incidental take of the San Joaquin kit fox occurs during construction the causative action shall cease immediately, and the Service and CDFG shall be contacted immediately for further guidance. Consultation may be reopened as necessary.

(24) An employee training program shall be conducted by a qualified biologist prior to construction to educate all workers on identifying threatened and endangered species along with the mitigation measures and the reporting requirements of the Section 10(a) permit.

(25) Applicant shall include in all construction contracts a requirement that the contractor comply with the mitigation requirements of the Service and CDFG. If compliance with this requirement is not possible, the Lamont PUD shall explain in writing to the Service and CDFG why this measure can not be fully implemented.

(26) A qualified biologist shall be present on site during the initial land clearing to ensure implementation of the mitigation measures.

(27) The applicant shall provide the CDFG and Service access to the project site during construction, mitigation and monitoring to ascertain project progress and compliance.

(28) The applicant has permanently protected 57 acres of suitable habitat for the listed species at a location approved by the Service and CDFG. These conservation lands are permanently protected by a conservation easement approved by the Service and CDFG. The applicant has also provided $27,075.00 to establish an endowment to fund long-term management of the conservation lands.

In addition to the mitigation measures being implemented for covered species, special take avoidance measures would be implemented to protect waterfowl and shorebirds that may be expected to use the area. Nesting of certain waterfowl may be encouraged with agricultural fields adjacent to ponds if there is undisturbed cover present during nesting times, such as in alfalfa. Shorebirds also may nest on barren ground along infrequently used roadways and berms. Further, if grain crops are planted, extensive foraging of waterfowl may be anticipated by certain waterfowl, especially following harvesting. Other species, such as the tricolored blackbird (*Agelaius tricolor*) may both nest and forage in wheat. Harvesting activities would be conducted in such a manner and at times to avoid harm to these species. Pre-activity surveys would be conducted to ensure avoidance during nesting times.

Action Area

The action area is within the boundaries of the Lamont PUD HCP. The site is located in Kern County on 160 acres in the southeast quarter of map Section 25 (T31S, R28E) of the Weedpatch Quadrangle (Mt. Diablo Base and Meridian). It is about 2.5 miles directly south of the town of Lamont, and half a mile south of Bear Mt. Boulevard (State Highway 223). The site is bordered on its eastern boundary by Wheeler Ridge Road (State Highway 184), and on its western side by land operated by CRRR. Dirt roads for farm access run adjacent to the northern and southern boundaries of the project site. The existing Lamont PUD sewage treatment ponds located to the northwest of the proposed expansion project is not a part of the action area for this opinion.

Status of the Species/Environmental Baseline

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 includes this canine (Service 1998).

In the San Joaquin Valley before 1930, the range of the San Joaquin 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. San Joaquin 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 San Joaquin 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 coyote predation within the orchards (Orloff 2002). Alfalfa fields provide an excellent prey base (Woodbridge 1987; Young 1989), and berms adjacent to alfalfa fields sometimes provide good denning habitat (Orloff 2002). 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 San Joaquin 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 San Joaquin 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 to 4 weeks, and are weaned at age 6 to 8 weeks. Reproductive rates, the proportion of females bearing young, of adult San Joaquin kit foxes vary annually with environmental conditions, particularly food availability. Annual rates range from 0 to 100 percent, and reported mean rates include 61 percent at the Naval Petroleum Reserve (Cypher *et al*. 2000), 64 percent in the Lokern area (Spiegel and Tom 1996), and 32 percent 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 the rearing of 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 8 kilometers (5 miles)(Scrivner *et al*. 1987), dispersal distances of up to 122 kilometers (76.3 miles) have been documented for the San Joaquin 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 to 32 months (Cypher 2000). Among juvenile kit foxes surviving to July 1 at the Naval Petroleum Reserve, 49 percent of the males dispersed from natal home ranges while 24 percent of the females dispersed (Koopman *et al*. 2000). Among dispersing kit foxes, 87 percent did so during their first year of age. Most, 65.2 percent, 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 1983). 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 (CDFG 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 and Tom 1996).

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 1.9 to 3.2 kilometers (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. 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 129 to 195 hectares (320 to 482 acres)(Morrell 1972). An average den density of one den per 28 to 37 hectares (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. San Joaquin 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 San Joaquin 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 San Joaquin 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 to 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).

San Joaquin 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 1996, 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 1.2 animals per square kilometer (3.11 per square miles) in optimal habitats in good years (Service 1998). At the Elk Hills in Kern County, density estimates varied from 0.7 animals per square kilometer (1.86 animals per square mile) in the early 1980s to 0.01 animals per square kilometer (0.03 animals per square mile) in 1991 (Service 1998). Kit fox home ranges vary in size from approximately 2.6 square kilometers to 31.2 square kilometers (1 to 12 square miles)(Spiegel and Tom 1996; Service 1998). Knapp (1979) estimated that a home range in agricultural areas is approximately 2.5 square kilometers (1 square mile). Individual home ranges overlap considerably, at least outside the core activity areas (Morrell 1972; Spiegel 1996).

Mean annual survival rates reported for adult San Joaquin 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 to 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, San Joaquin 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 1930s, 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 (CDF 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 (CDC 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 1967. 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 1996). 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 1996, 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 1996). 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 1996), to species adapted to early successional stages and disturbed areas (e.g., California ground

squirrels)(Spiegel 1996). 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 1996).

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 1996, 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 San Joaquin kit foxes. Predators (such as coyotes, bobcats, non-native red foxes, badgers (*Taxidea taxus*), 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 to 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 1996). 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 San Joaquin kit fox. By the 1970s, however, introduced and escaped red foxes had established breeding populations in many areas inhabited by San Joaquin 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 1990s. 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 San Joaquin 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 two 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 three 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 (CDFG 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 (1990) documented widespread pesticide use in known kit fox and Fresno kangaroo rat habitat adjoining agricultural lands in Madera County. 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 section 9 of the Act if any unauthorized take occurs. There are numerous examples of potential section 9 violations and noncompliance with the terms and conditions of existing biological opinions at the Sacramento Fish and Wildlife Office.

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 four 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 which 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, Caltrans 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 and 2003, the team addressed connectivity issues at specific points along the west-side corridor north of the Ciervo Panoche core population.

There has never been a comprehensive survey of San Joaquin kit foxes or their habitat except for one core population in western Kern County. What is known comes from incidental sightings, local surveys, research projects, and aerial photos. There are more than several hundred recorded sightings of San Joaquin kit foxes in the San Joaquin Valley (CNDDB 2005). Given the biology and ecology of the animal (San Joaquin kit foxes have been documented to move 9 miles or more in a single night), the kit fox is highly likely to inhabit the action area. Areas of suitable habitat that exist within and adjacent to the project include ruderal lands, row cropland, and orchards. Ruderal lands, row cropland, fallow fields, and orchards provide denning and foraging habitat, although farming activities have likely reduced denning opportunities and prey base. Kit foxes are able to travel through fallow and active agricultural fields, seasonal wetland areas, and old orchards for both local movement and long distance dispersal. Seasonal wetlands may also provide amphibian prey for kit foxes.

The Lamont PUD project site is within 10 miles of recorded kit fox sightings, and contains habitat components that can be used by the kit fox for feeding, resting, mating, other essential behaviors, or as movement corridors. Although no active San Joaquin kit fox dens were located on the project site, Pruett and Lawrence (1993) reported the presence of scat and “probable dens” during their biota report studies. Scat of the San Joaquin kit fox and two potential fox dens were identified on the adjacent Arvin Landfill site (Biosystems Analysis 1991). Given the biology and ecology of this species, the suitable habitat located within the action area, and the recent records, the Service believes it is reasonable to assume the San Joaquin kit fox inhabits the action area.

Tipton Kangaroo Rat

The Tipton kangaroo rat was federally listed as endangered on August 8, 1988 (Service 1988), and was listed by the State of California as endangered on June 11, 1989. The Recovery Plan includes the Tipton kangaroo rat (Service 1998). The Recovery Plan calls for (1) research to determine how to manage natural lands to reduce the frequency and severity of population crashes, and (2) consolidation and protection of blocks of suitable habitat to minimize the effects of random catastrophic events on their populations.

Tipton kangaroo rats inhabit saltbush scrub and alkali sink scrub communities in the southern San Joaquin Valley. The historical geographic range of Tipton kangaroo rats was over 1.7 million acres. Its distribution was limited to arid-land communities occupying the valley floor of the Tulare Basin in level or nearly level terrain. By 1985, the inhabited area had been reduced, primarily by cultivation and urbanization, to about 60,000 acres. In 1997, the Service estimated that Tipton kangaroo rats inhabited approximately 4 percent of their historic range (Service 1998). Current occurrences are limited to scattered, isolated areas. In the southern San Joaquin Valley, this includes the Kern National Wildlife Refuge, Delano, and other scattered areas within Kern County.

The preferred location for Tipton kangaroo rat burrows typically involves alluvial fans and flood plains and includes fine, highly alkaline sands and, to a lesser degree, alkaline sandy loams. Burrow systems are usually in open areas but may occur in areas of thick scrub. They are typically simple, but may include interconnecting tunnels. Most are less than 10 inches deep. They are commonly in slightly elevated mounds, the berms of roads, canal embankments, railroad beds, and bases of shrubs and fences where wind-blown soils accumulate above the level of surrounding terrain. Terrain not subject to flooding is essential for permanent occupancy by Tipton kangaroo rats.

The construction of dams and canals, which made a dependable supply of water available and allowed the cultivation of the alkaline soils of the saltbush, valley sink scrub, and relictual dune communities, was principally responsible for the decline and endangerment of the Tipton kangaroo rat. Widespread, unrestricted use of rodenticides to control California ground squirrels probably contributed to the decline or extirpation of small populations. Urban and industrial development and petroleum extraction all have contributed to habitat destruction. Except for small, isolated populations, predation is unlikely to threaten Tipton kangaroo rats. The increasing fragmentation of the range of Tipton kangaroo rats, however, increases the vulnerability of small populations to predation. Current threats of habitat destruction or modifications come primarily from industrial and agriculturally-related developments, cultivation, and urbanization, and secondarily from flooding.

The causes of decline of the Tipton kangaroo rat are similar to those discussed above for the kit fox. Conversion of native habitats to agricultural production is considered the primary reason for the Tipton kangaroo rat's population decline (Service 1988). Construction of canals, roads, highways, railroads, and buildings and the use of rodenticides have probably also accelerated this subspecies' population decline. Because of the small, isolated nature of many remaining populations, their lack of genetic diversity, and low powers of dispersal, Tipton kangaroo rats are especially vulnerable to local extirpation from random environmental events such as flooding or unpredictable land use changes.

In 1995, the most recent year in which sufficient information is available, the Tipton kangaroo rat was believed to be present on only about 63,000 acres, or 3.7 percent of the historical range. Tipton kangaroo rats are found in Tulare County both east and west of State Route 99, in Kings County in the Tulare Lake Bed and Allensworth, and in Kern County in scattered populations across the valley floor from the California Aqueduct to several locations east of Bakersfield.

The Tipton kangaroo rat was identified to occur in low densities on the project area during trapping surveys conducted in November 1995 by BioEnvironmental Associates (1995). Locations of potential burrows were also mapped during the trapping effort. The acreage of occupied habitat was determined to be 19 acres by mapping the survey results onto aerial photos. Given the biology and ecology of the species, the suitable habitat located within the action area, and the recent records, the Service believes it is reasonable to assume the Tipton kangaroo rat still inhabits the action area.

<u>Western burrowing owl</u>

The western burrowing owl is classified by the State of California as a Species of Special Concern. It is classified as endangered in Canada and is listed as threatened or endangered in many of the states that it is known to inhabit (Rosenberg *et al*. 1998). There are two subspecies of burrowing owl in North America. The Florida burrowing owl (*Speotyto cunicularia floridans*) is located primarily in Florida and the Bahamas. The western burrowing owl (*S. c. hypugaea*) is located throughout Mexico, the western United States , and southwestern Canada (Haug *et al.* 1993).

The burrowing owl is a small, long-legged owl of open habitats that possesses a short tail, long, narrow wings, and flat head. It is often observed perched on the ground or on fence posts (Sibley 2000). The burrowing owl generally inhabits vacated burrows created by small mammals, such as badgers, ground squirrels (*Spermophilus* spp. and *Ammospermophilus* spp.), and foxes (*Vulpes* spp.) or artificial structures (e.g., culverts, wood debris piles, etc.) for nesting and shelter. It also uses the burrow as refugia from the daytime heat (Haug and Oliphant 1990). Ground squirrel burrows are most often used by burrowing owls in central California (B. Johnson, California Department of Fish and Game, pers. comm. to C. Bailey, Service, Sacramento, California. 2002). Burrowing owls forage nocturnally on small mammals and may take invertebrates during the day (Haug and Oliphant 1990). The species is often found in areas with few visual obstructions such as roadsides and other disturbed areas inhabited by ground squirrels. It also favors elevated places such as berms, levees, road and rail beds where it can overlook open lands. Additional information about burrowing owls can be found in CDFG's *Staff Report on Burrowing Owl Mitigation* (CDFG 1995).

The burrowing owl is a neotropical migrant that occurs throughout the western United States, including portions of northern Mexico and southern Canada. Its breeding range extends from the Canadian prairie provinces through the western United States to southern California and Texas. The species is also locally distributed throughout suitable habitat in the Caribbean, Central America, and South America. The owl winters in the southern portion of its range (Haug *et al*. 1993).

California appears to have a nonmigratory population of burrowing owls (primarily in the Imperial Valley), as well as burrowing owls wintering from other regions. Burrowing owls in northern California are probably migratory, but little information is known about their migration habits (Haug *et al*. 1993). The owl is fairly uncommon along the coast north of Marin County, and rare east of the crest of the Sierra Nevada. Additional populations are reported from the Modoc Plateau and Great Basin region. Fragmentation or elimination of historic habitat and population declines have been noted throughout its range.

Burrowing owls occupy open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation (e.g., campuses, airports, golf courses, perimeter of agricultural fields, banks of irrigation canals) (Natureserve 2000). They use well-drained, level to gently sloping areas characterized by sparse vegetation and bare ground such as moderately to heavily grazed pasture. Although specific habitat characteristics associated with burrowing owls vary by location, the three basic attributes of nesting habitat are: (1) available nest burrows; (2) short or sparse vegetation; and (3) open terrain (Zarn 1974). Burrowing owls forage in a variety of habitats including cropland, pasture, prairie dog colonies, fallow fields, and sparsely vegetated areas. In Saskatchewan, burrowing owls preferred foraging in dense, permanent grass-forb vegetation greater than 30 cm in height located in uncultivated areas and right-of-ways. They also tended to avoid cultivated cropland and pasture (Haug and Oliphant 1990). Benedict *et al*. (1996), Warnock (1997), and Warnock and James (1996) stated that large, contiguous areas of native grassland are important for the species.

Numerous factors have contributed to the owl's decline throughout its range including: (1) habitat loss, fragmentation, and degradation (e.g., agricultural practices, land development); (2) vehicle collisions; (3) rodent control measures; and (4) predation from domestic animals. Of these, habitat alteration and destruction is most important (Sheffield 1997). Habitat alteration and destruction as a result of development appears to be the most important recent influence on burrowing owl populations in central California. Agricultural practices such as the removal of ground squirrels, use of chemical herbicides on levees along irrigation canals, and increased use of insecticides and rodenticides likely also contribute to the owl's decline in central California (DeSante *et al.* 1997). Urbanization is likely a key threat to the species in the proposed project's action area.

Populations of the western burrowing owl are declining throughout the subspecies' range (Haug *et al.* 1993), including California. DeSante *et al*. (1997) observed: (1) that only about 873 breeding pairs of owls existed in central California in 1991; (2) owls almost exclusively bred at lower elevations (where the majority of development is occurring); (3) the species was apparently extirpated in the last decade from Sonoma, Marin, Santa Cruz, and Napa Counties; (4) there was at least a 12 percent decrease in the number of breeding pairs in Central California between 1986 and 1991; and (5) there was at least a 23 percent decrease in the number of breeding groups in central California between 1986 and 1991. They also observed that burrowing owls in central California had been or would soon be reduced to three isolated breeding populations: (1) lower San Francisco Bay between Alameda and Redwood City; (2) Livermore; and (3) the Central Valley. Of the three remaining populations, the Central Valley was the largest with approximately 720 breeding pairs and appeared to have decreased the least between 1986 and 1991.

Little scientific information is available for the local burrowing owl population (e.g., home range information), but suitable habitat in the action area consists of areas with small mammal burrows and nearby foraging habitat. Numerous sightings of the western burrowing owl were noted during the surveys on the Lamont PUD effluent expansion site conducted in 1995 (BioEnvironmental Associates 1995). A number of active burrowing owl burrows were identified during transects they walked in preparation for their kangaroo rat trapping effort. These findings were similar to those found at the Paradise Lake site in Section 1, T32S, R28E, south of the project area (Wolfe 1991). Burrowing owls were also observed by MH Wolfe *& Associates* during the survey conducted for the kangaroo rat trapping on this site(Wolfe 1999).

Effects of the Proposed Action

Overview of Potential Effects

The proposed project likely will result in adverse effects to the San Joaquin kit fox, Tipton kangaroo rat, and western burrowing owl. There is a likelihood the animals may be affected by being crushed, entombed, in their burrows, killed or displaced by flooding, hit and injured or killed by vehicle strikes, being shot, chased and injured or killed by domestic pet dogs, poisoned by exposure to contaminants, harassed by noise and vibration, or displaced by invasive species. The San Joaquin kit fox and Tipton kangaroo rat may be adversely affected by the proposed project blocking travel corridors, or by evening construction disturbing night time foraging, mating, movement, or subjecting them to predation that otherwise would not occur. These species are likely to be subject to indirect effects including loss of habitat, and a reduction in natural food sources as a result of habitat disturbance and loss.

San Joaquin Kit Fox

The range-wide habitat loss, fragmentation, and degradation from multiple factors are the primary threat to the survival and recovery of the San Joaquin kit fox (Service 1998). Approximately 95 percent of native habitat for the kit fox in the San Joaquin Valley has been destroyed by agricultural, industrial, and urban development (Service 1998). Loss of natural lands continues to occur, further reducing its habitat.

Habitat Fragmentation

As a landscape becomes more fragmented, the fragments within this landscape "mesh" become progressively smaller (Forman *et al*. 2003). Patches within densely developed areas and road networks are constrained in terms of ecosystem functioning and are thus degraded. As patches become progressively smaller, they become unsuitable to support the San Joaquin kit fox and its prey. If a habitat fragment is too small to support a home range, animals may abandon it. Abandonment increases the probability that the animals will be extirpated from each patch. Estimates of home range size for the San Joaquin kit fox vary from 1.7 square miles to 4.5 square miles (White and Ralls 1993). Typically, a mated pair will share a home range. As mesh size becomes smaller, the patches themselves can function as barriers with habitat degraded to the point that it offers little in the way of foraging grounds or refuge from predators. These remnant patches interrupt dispersal corridors and reduce genetic exchange and mating opportunities.

Loss and degradation of habitat by agricultural and industrial developments and urbanization continue, decreasing carrying capacity of remaining habitat and threatening kit foxes. Agricultural practices may alter the numbers of different prey species, depending on the type and intensity of the practice. For instance, a practice such as livestock grazing that destroys shrub cover and reduces prey abundance may be detrimental (O'Farrell *et al*. 1980, O'Farrell and McCue 1981, O'Farrell 1983, Kato 1986).

Kit foxes are affected by habitat degradation due to grading and construction for roads, ponds, and pipelines. Habitat degradation derives from increased noise and release of waste waters. Some agricultural developments negatively impact kit fox habitat, but kit foxes may survive within or adjacent to them given adequate prey base and den sites. Many influences combine to compress and constrict the kit fox range to a patchwork of isolated or semi-isolated parcels of natural land, varying in size and habitat quality. The isolation of these parcels coupled with habitat degradation and barriers to movement of kit foxes, such as aqueducts and busy highways, can limit dispersal to and habitation of these lands. As the human population of California continues to grow, the amount and quality of habitat suitable for kit foxes will inevitably decrease. Continued habitat fragmentation is a serious threat to the survival of kit fox populations.

Direct Mortality

San Joaquin kit fox mortality and injury occurs when the animals attempt to cross roads and are hit by cars, trucks, or motorcycles. The majority of strikes likely occur at night when the animals are most active. Such strikes are usually fatal for an animal the size of a kit fox. If vehicle strikes are sufficiently frequent in a given locality, they could result in reduced kit fox abundance. The death of kit foxes during the December through March breeding season could result in reduced reproductive success. Death of females during gestation or prior to pup weaning could result in the loss of an entire litter of young, and therefore, reduced recruitment of new individuals into the population.

The local and range-wide effects of vehicle strikes on San Joaquin kit foxes have not been adequately assessed. Vehicle strikes appear to occur most frequently where roads transverse areas where kit foxes are abundant. However, the linear quantity of roads in a given area may not be directly related to the number of vehicle strikes in a given area. The type of road (e.g., number of lanes) traffic volume, and average speed of vehicles likely all influence the number of vehicle strikes for which San Joaquin kit foxes are as risk. The number of strikes likely increases with road size, traffic volume, and average speed (Clevenger and Waltho 1999). Another factor influencing the number of vehicles striking San Joaquin kit foxes, but for which little data is available, is the frequency with which the animals cross roads and are therefore at risk. The proportion of successful road crossings by these animals likely declines with increasing road size, traffic volume and density, and vehicle speeds. The proportion of San Joaquin kit foxes successfully crossing roads may increase in areas where they obtain more experience crossing roads, such as in and near urban areas.

Occurrences of vehicle strikes involving San Joaquin kit foxes have been well documented, and such strikes occur throughout the range of the species. Sources of kit fox mortality were examined during the period 1980-1995 at the Naval Petroleum Reserves in California in western Kern County (Cypher *et al*. 2000). During this period, 341 adult San Joaquin kit foxes were monitored using radio telemetry, and 225 of these animals were recovered dead. Of these, 20, or 9 percent were struck and killed by vehicles. During this same period, 184 juvenile (<1 year old) kit foxes were monitored. Of these, 142 were recovered dead and 11 or 8 percent were killed by vehicles. For both adults and juveniles, vehicle strikes accounted for less than 10 percent of all San Joaquin kit fox deaths in most years. However, in some years, vehicles accounted for about 20 percent of deaths (predators, primarily coyotes and bobcats, were the primary source of mortality at the Naval Petroleum Reserves). In addition, 70 kit foxes, both radio collared and non-collared, were found dead on roads in and around the Naval Petroleum Reserves during the period between 1980 and 1991 (Scrivner *et al*. 1993). Of these, 34 were hit by vehicles on the approximately 1,600 km (990 miles) of roads at the Reserve, and 36 were struck on the approximately 80 km (50 miles) of State and County roads (e.g., State Route 119, Elk Hills Road), where traffic volumes and average vehicle speeds were higher than those on the Reserve.

In other areas of western Kern County, 49 kit foxes were radio-collared in the highly developed Midway-Sunset oil field, and 54 kit foxes were radio-collared in the Lokern Natural Area, a nearby undeveloped area, during the period between 1989 and 1993 (Spiegel and Disney 1996). Of these animals, 60 were recovered dead; 1 (2 percent) was killed by a vehicle, and it was found in an undeveloped area along the access road adjacent to the California Aqueduct. Though six non-collared kit foxes were killed by vehicles on the access road, predators, primarily coyotes, bobcats, and feral dogs were responsible for most deaths in this study. Forty-one San Joaquin kit foxes were radio-collared and monitored from 1989 to 1991 on the Carrizo Plain National Monument in eastern San Luis Obispo County (Ralls and White 1995). Twenty-two were found dead; 1 (5 percent) was attributed to a vehicle strike. At the Camp Roberts National Guard Training Facility in Monterey and San Luis Obispo counties, 94 San Joaquin kit foxes were radio-collared during the period from 1988 to 1992 (Standley *et al.* 1992). Forty-nine were found dead of which two were attributed to vehicle strikes. In western Merced County, 28 San Joaquin kit foxes were radio-collared during the period from 1985 to 1987 (Briden *et al*. 1992). Seventeen were found dead and two (12 percent) of these deaths were attributed to vehicles.

According to Morrell (1970), "The automobile is by far the major cause of reported San Joaquin kit fox deaths – 128 of 152 deaths reported were caused by automobiles." Morrell acknowledged that the numbers were based on non-radio-collared kit foxes and therefore were biased because road-killed foxes are conspicuous and easily observed compared to animals dying from other causes. Though predators such as coyotes, bobcats, non-native red foxes, and domestic dogs likely constitute a higher source of mortality than vehicle strikes (Service 1998; Cypher 2000), predation as a source of mortality is likely dependent upon local conditions. Where abundance of predators has also been reduced due to road density and loss of habitat, vehicle strikes may present a significant threat to kit fox survival and recovery.

Barrier Effects

Roads and urban and some agricultural developments may constitute barriers to San Joaquin kit fox movements, dispersal, and gene flow. Movements and dispersal corridors are critical to kit fox population dynamics, particularly because the animals currently persist as metapopulations with multiple disjunct population centers. Movement and dispersal corridors are important for alleviating over-crowding and intraspecific competition during years when San Joaquin kit fox abundance is high, and also they are important for facilitating the recolonization of areas where the animal has been extirpated. Movement between population centers maintains gene flow and reduced genetic isolation. Genetically isolated populations are at greater risk of deleterious genetic effects such as inbreeding, genetic drift, and founder effects.

Noise Harassment

Disturbance from construction and operation of the project could induce stress in the San Joaquin kit fox which may affect physiological parameters or behavior. The resulting effects could include increased energetic requirements, decreased reproductive output, decreased immunological functions, altered space use patterns, displacement, or possibly death. Observations from a variety of sources and situations suggest that San Joaquin kit foxes may not be significantly affected by disturbance, even when the source is prolonged or continuous (Cypher 2000). However, individual animals may be more affected than others, and it is unknown whether different types of disturbance may result in reduced local abundance.

Contaminants

Contaminants that adversely affect kit foxes could be introduced in several ways. Substances used in road building materials or to recondition roads can leach out or wash off roads adjacent to habitat. Vehicles may leak hazardous substances such as motor oil and antifreeze. Although the quantity leaked by a given vehicle may be minute, these substances can accumulate on roads and may be washed into the adjacent environment by runoff during rain storms. An immense variety of substances, including fertilizers, pesticides, and herbicides are used in agricultural zones. San Joaquin kit foxes in the area could be exposed to any contaminants that are used at the site. Exposure pathways include inhalation, dermal contact, direct ingestion, ingestion of contaminated soil or plants, or consumption of contaminated prey. Exposure to contaminants may cause short- or long-term morbidity, possibly resulting in reduced productivity or mortality.

Carcinogenic substances may cause genetic damage resulting in sterility, reduced productivity, or reduced fitness among progeny. Contaminants also may have the same effect on kit fox prey species. This could result in reduced prey abundance and diminished local carrying capacity for the kit fox. Little information is available on the effects of contaminants on the San Joaquin kit fox. The effects may be difficult to detect. Morbidity or mortality likely would occur after the animals had left the contaminated site, and more subtle effects such as genetic damage could only be detected through intensive study and monitoring.

Invasive Species

Fragmentation of habitat can facilitate the invasion and establishment by species not native to the area. Disturbance and alteration of habitat, such as that adjacent to roads, may create favorable conditions for non-native plants and animals. Non-native plants can spread along disturbed areas and then into adjacent habitat (Gelbard and Harrison 2003), potentially displacing or altering kit fox prey species. Non-native animals may use modified habitats adjacent to roads to disperse into kit fox habitat. These exotic animals could compete with kit foxes for resources such as food or dens, or directly injure or kill kit foxes. Non-native plants and animals may reduce habitat quality for kit foxes or their prey, and reduce the productivity or the local carrying capacity for the kit fox. Introductions of non-native species could cause kit foxes to alter behavioral patterns by avoiding or abandoning areas near roads (Cypher 2000).

Roads and increased access to water from irrigation may facilitate movements of red foxes and increase access to kit fox habitat. Red foxes are infrequently observed in large blocks of undisturbed habitat within the range of the San Joaquin kit fox, possibly due to the absence of permanent water or the presence of coyotes which prey upon red foxes. Red foxes can kill San Joaquin kit foxes (Ralls and White 1995, Service 1998), and likely compete with kit foxes for food and dens.

The adverse effects to the kit fox on the Lamont PUD site consist largely of harassment and disturbance. Compensation for the adverse effects of the project has resulted in the acquisition of 57 acres of high-quality habitat on a large contiguous preserve, the Coles Levee Preserve in Kern County. The preservation of large contiguous areas of habitat is likely to help ensure the long-term continued existence of the species.

Tipton kangaroo rat

The Tipton kangaroo rat is likely to be affected in a manner similar to that described above for the San Joaquin kit fox. Tipton kangaroo rats may be adversely affected by temporary and permanent loss or degradation of their habitat. The Service estimates that 19 acres inhabited by Tipton kangaroo rats will be taken as a result of the project that we are proposing to permit. Tipton kangaroo rats may also be adversely affected by vehicle strikes, entombment in burrows during initial earth-moving activities, flooding of burrows, and harassment from noise and ground vibration. Disoriented and displaced individuals may die while dispersing or be subject to exposure or increased predation common around construction sites. Once the benches for the agricultural fields have been constructed, the potential exists during the life of the project that kangaroo rats could reoccupy the out-slopes of the property or fence lines and be affected by road and/or fence line maintenance, weed and rodent control activities or harvesting activities.

Construction and operation of the project is likely to include the fragmenting and barrier effects previously described. Roads have been documented to act as barriers to many rodents (Oxley *et al*. 1974). The introduction of contaminants or toxins into Tipton kangaroo rats' habitat via agricultural misapplication, accidental spills, or deposition on roads is a possibility. Nitrogen deposited from agricultural applications and from vehicle exhaust in habitats adjacent to roads enhance nitrogen levels which appear to promote growth of non-native species, particularly non-native grasses (Weiss 1999). These grasses, such as red brome (*Bromus madritensis rubens*) create dense ground cover in the San Joaquin Valley, and this dense cover appears to reduce habitat quality for various small mammal species, such as kangaroo rats, which are also an important prey for kit foxes (Goldingay *et al*. 1997, Cypher 2000).

Tipton kangaroo rats give birth in February and April. Project activities during this time period in or near to Tipton kangaroo rat habitat are likely to result in adverse effects to the species. As a species that feeds on seeds, the Tipton kangaroo rats cache seeds in areas within or adjacent to their burrow systems. Construction and operation of the effluent expansion site may therefore result not only in partial or complete loss of burrow systems, but loss of food reserves due to grading for roads and ponds, or contouring terraces. Loss of burrow systems compromise the ability of the Tipton kangaroo rats to maintain their optimal body temperature and exposes them to predators. Loss of food caches may result in reduced caloric intake, reduced energy reserves, leading to reduced reproductive capacity, and viability of individuals. Tipton kangaroo rats feed on seeds but also other plant materials. Activities that require the clearing of vegetation may remove food sources and cover upon which these species depend.

Ground vibration and noise is thought to have a significant effect on Tipton kangaroo rats. Giant kangaroo rats, a similar species, are known to communicate with each other by foot drumming (Randall 1997). Foot drumming may serve the function of allowing neighbors to recognize each other, or may serve as a warning call. Thus, interference from ambient noise produced by the project construction may interfere with communication among the kangaroo rats, causing them to be unusually susceptible to predators and predation. Kangaroo rat hearing is highly developed and a large portion of the brain is devoted to auditory input. Hearing loss from motorcycle traffic has been documented for the kangaroo rat (*Dipodomys* species)(Bondello and Brattstrom 1979), and desert kangaroo rats (*Dipodomys deserti*) showed a significant reduction in reaction distance to the sidewinder (*Crotalus cerastes*) after exposure to 95 dBA (Cornman 2001). Other desert mammals appear to sustain the same impacts from noise (Bondello and Brattstrom 1979). These potential effects would most likely be restricted to areas where noise levels are at or above 95 decibels (dBA), estimated to be within about 91 meters (300 feet) of some construction activities (La Paloma Generating Company 1998). Habitat compensation measures are anticipated to minimize habitat effects resulting from project implementation.

Mortality of individuals will be avoided by the Service-approved and supervised relocation of individuals if burrows are encountered on site. Compensation for other adverse effects of the project has resulted in the acquisition of 57 acres of known high-quality Tipton kangaroo habitat on a large contiguous preserve, the Coles Levee Preserve in Kern County. The preservation of large contiguous areas of habitat is likely to help ensure the long-term continued existence of the species and its ability to move to new habitats.

Western burrowing owl

The western burrowing owl is likely to be affected in a manner similar to that described above for the San Joaquin kit fox and Tipton kangaroo rat. Rodenticide use, grading, blading or disking may adversely affect owls occupying ground squirrel burrows adjacent to agricultural fields or along canals, road ditches, and berms.

The adverse effects to the western burrowing owl are compensated for by the acquisition of 57 acres of high-quality habitat on a large contiguous preserve, the Coles Levee Preserve in Kern County. The preserve is known habitat for the western burrowing owl. The preservation of large contiguous areas of habitat is likely to help ensure the long-term continued existence of the species.

Cumulative Effects

Cumulative effects are the effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal Action under review (50 CFR §402.02).

Numerous non-Federal activities continue to eliminate habitat for the San Joaquin kit fox, Tipton kangaroo rat, and western burrowing owl in Kern County. Loss and degradation of habitat affecting both animals and plants with or without Service authorization continues as a result of: urbanization; oil and gas development on private lands; road and utility right-of-way management; flood control and water banking projects that may not be funded, permitted, or constructed by a Federal agency; overgrazing by livestock; and continuing agricultural expansion including the building of new dairies and stockyards.

As the human population of central California increases, and land continues to be converted to municipal and industrial uses, the amount and quality of habitat suitable for the species considered in this biological opinion will decrease. Between 1970 and 2000, California's total population increased by approximately 71 percent while the Central Valley's population increased 200 percent. Of the Sacramento and San Joaquin Valleys within the Central Valley, the San Joaquin Valley had the greater population growth (California Department of Finance (CDF) 2002). During the period 1940 to 1995, the increase in population for Kern County was 356 percent (CDF 2002). During the period 1988 to 1998, 82,756 acres in the San Joaquin Valley were converted to urban and built-up land uses (California Department of Conservation 2000). This trend indicates that habitat loss continues to threaten the survival and recovery of listed species.

Listed and proposed animal species are also affected by poisoning, shooting, increased predation associated with human development, ground squirrel reduction efforts, mosquito control, and reduction of food sources. Unauthorized take is occurring, and the Service continues to request reinitiation of projects when project descriptions have changed markedly since our biological opinion was issued, and Service Law Enforcement continues to investigate potential violations of the Act.

The Service has received limited information for a list of projects in Kern County which include a new dairy, a dairy expansion, surface mining, a new administrative center, new subdivisions, a composting and bio-solids facility, and a wild animal keeping facility. The project descriptions when initially provided to the Service, lacked a Federal nexus and were therefore not considered Federal projects that would be subject to a section 7 consultation under the Act. Some of these projects may eventually become Federal projects whereas others may be abandoned for reasons unknown to the Service. The list therefore provides an example of the projects that are representative of development throughout the San Joaquin Valley. The size of such projects and the habitat loss consequential to each is often unknown; however, some of the projects listed are known to range in size from less than 25 acres to more than 655 acres. If HCPs were in place in Kern County, they would provide a locally-designed mechanism for complying with the Act and for project proponents to make targeted and effective contributions to the survival and recovery of listed species.

San Joaquin kit fox. Several unpermitted projects are likely to sever the north-south kit fox corridor at Patterson on the west side of Stanislaus County in the next year, effectively cutting off kit fox in the Contra Costa/Alameda satellite population north of Patterson from satellite and core populations south of Patterson. The expansion of the urban areas north of Highway 145 in Madera County, north of the City of Fresno, and to the east of the City of Porterville threatens the north-south kit fox corridor on the east side of the valley. Growth around the City of Merced that is induced by the selection of a new University of California campus in that city is threatening to cut off kit fox that inhabit the valley edge north of the City of Merced. Expanding development in the Santa Nella area also threatens the north-south corridor on the west side, although the Service has had initial discussions with some landowners concerning a regional HCP for the area.

Tipton kangaroo rat. Less is know to the Service about unpermitted projects and their effects on the more localized Tipton kangaroo rat. Tipton kangaroo rats in an important population in the Lemoore area are being harassed and individuals are possibly being harmed, injured, and killed by off-road vehicle use on private unfenced property. Another small population nearby precariously exists on the side of a county road and in a farmer’s pasture.

Western burrowing owl. Potential cumulative effects of the proposed action specific to the owl are: (1) the use of herbicides and pesticides in agricultural lands that provide owl foraging and nesting habitat; and (2) use of rodenticides in lands that provide owl burrowing habitat. However, neither of these activities is likely to reduce the viability of the owl in Kern County or as a whole, either alone or when added to the effects of the proposed action. The burrowing owl has persisted in the county despite decades of use of herbicides, pesticides, and rodenticides, and the use of these substances is not expected to increase in the future.

Overall, the cumulative effects of all the future State, Tribal, local, and private actions that are reasonably certain to occur in the action area will continue to have a deleterious effect on the reproduction, numbers, and distribution of the species considered herein. Existing habitat is so fragmented in the San Joaquin Valley that extirpation of certain remaining populations of San Joaquin kit fox, Tipton kangaroo rat, and western burrowing owl appears likely, due to chance fluctuation of small populations, unusual climatic events, the loss of genetic fitness commonly associated with very small populations, and other factors discussed previously. The cumulative effects of these threats serve to magnify the adverse effects of the proposed action and diminish any beneficial effects and pose a significant impediment to the survival and recovery of these species.

The Service continues to pursue the creation of large area HCPs through local and county governments and industry groups in order to address effects to listed species in a more comprehensive manner. Large area HCPs already in place near the action area include the *Metropolitan Bakersfield HCP* and the *Kern Water Bank Authority HCP/Natural Community Conservation Plan*, which addresses small projects in Kern, Tulare, and Kings Counties. The HCPs in Kern County have been in place for several years, and have started to contribute protected habitat lands to the recovery effort for kit fox and Tipton kangaroo rat.

Conclusion

Federally-Listed Species

After reviewing the current status of the endangered San Joaquin kit fox and Tipton kangaroo rat, the environmental baselines for the action area, the effects of the proposed action, including all measures proposed to avoid, minimize, and mitigate adverse effects and the cumulative effects, it is the Service's biological opinion that the issuance of an incidental take permit to the Lamont PUD pursuant to section 10(a)(1)(B) of the Act is not likely to jeopardize the continued existence of the San Joaquin kit fox or Tipton kangaroo rat, for the reasons stated in the "Effects of the Proposed Action" section of this opinion. Critical habitat has not been designated or proposed for the San Joaquin kit fox or Tipton kangaroo rat, therefore none will be affected.

Other Covered Species – Not Federally-Listed as Threatened or Endangered

After reviewing the current status of the western burrowing owl, an unlisted Species of Concern, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's opinion that, should the western burrowing owl be listed in the future, issuing an incidental take permit that includes this species as a covered species and that authorizes its incidental take should it become listed during the term of the permit, is not likely to jeopardize its continued existence, for the reasons stated in the "Effects of the Proposed Action" section of this opinion.

INCIDENTAL TAKE STATEMENT

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

One of the covered species addressed in this biological opinion, the western burrowing owl, is neither proposed for listing nor currently listed. As such, there is no take prohibitions under the Act for this species at the time of writing. The Incidental Take Statement for the unlisted Covered Species and the Permit shall become effective when it becomes listed under the Act during the term of the permit.

The proposed Lamont PUD HCP and its associated documents clearly identify anticipated impacts to affected species likely to result from the proposed taking and the measures that are necessary and appropriate to minimize those impacts. All conservation measures described in the proposed HCP, together with terms and conditions described in the associated IA and any section 10(a)(1)(B) permit or permits issued with respect to the proposed HCP, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this Incidental Take Statement pursuant to 50 CFR 402.14(i). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) to apply. If the Permittee fails to adhere to these terms and conditions, protective coverage of the section 10(a)(1)(B) permit and section 7(o)(2) may lapse. The amount or extent of incidental take anticipated under the proposed Lamont PUD HCP, associated reporting requirements, and provisions for disposition of dead or injured animals are described in the Lamont PUD HCP and its accompanying section 10(a)(1)(B) permits.

The proposed action’s action area is known to be occupied or visited by all three Covered Species. The amount of take (killing, harming, harassing, wounding) of these species, described below, is anticipated to be low, due to the nature of the project, the limited presence of the species, and the effectiveness of the take avoidance and minimization measures. Both the San Joaquin kit fox and the western burrowing owl are highly mobile and are expected to avoid direct effects. Indirect effects are best interpreted as the extent of habitat lost or degraded by the covered activity.

The section 10 (a) incidental take permit would also constitute a Special Purpose permit under 50 CFR 21.27 for the take of the owl which may be listed as threatened or endangered under the Endangered Species Act during the permit term and which are also protected by the MBTA, in the amount and/or number and subject to the terms and conditions specified in the 10(a) permit. The MBTA Special Purpose permit would become effective upon the listing of the species under the ESA. Any such take shall not be in violation of the MBTA of 1918, as amended (16 U.S.C. 703-712). The Special Purpose permit shall be valid for a period of three years from the effective date, provided the section 10(a) permit remains in effect for such period. The Special Purpose permit shall be renewed, provided the permittee remains in compliance with the terms of the 10(a) permit and the Implementation Agreement. Each such renewal shall be valid for the maximum period of time allowed by 50 CFR 21.27 or its successor at the time of renewal.

The measures described below are non-discretionary, and must be undertaken by the Service so that they become binding conditions of any grant or permit issued to the Lamont PUD, as appropriate, for the exemption in section 7(o)(2) to apply. The Service has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the Service (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Service must track the progress of the action and its impact on the species as specified in the Incidental Take Statement. [50 CFR §402.14(i)(3)]

Amount or Extent of Take

The Lamont PUD proposes to construct and operate an effluent disposal facility on 160 acres in accordance with the requirements, guidelines, measures, and processes described in the Lamont PUD HCP and IA. The disturbance of land associated with the project is expected to result in incidental take of the Covered Species. Incidental take that will result from Lamont PUD’s project activities will be authorized through the section 10(a)(1)(B) permit for the Lamont PUD HCP. Take will be in the form of harass, harm, and kill. It is expected that individuals of the Covered Species will or may be taken during the activities addressed in the Lamont PUD HCP.

The Service expects that incidental take of the Covered Species will be difficult to detect or quantify for the following reasons: (1) the burrowing nature of all of the Covered Species and the relatively small body size of the burrowing owl and kangaroo rat make the finding of a dead specimen unlikely; (2) the secretive nature of the species makes detection or quantification difficult; (3) species abundance may be masked by seasonal fluctuations in numbers or other causes; (4) the species occur in habitats that make them difficult to detect; (5) the species use of the habitat is intermittent. Due to the difficulty in quantifying the number of individuals of the Covered Species that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of habitat that will become unsuitable for the species as a result of the action.

Therefore, the Service estimates that, as a result of issuing the proposed ITP to the Lamont PUD, 76 acres of potentially suitable foraging habitat for all three species will become unsuitable, including 19 acres of occupied Tipton kangaroo rat habitat. Upon implementation of the requirements, guidelines, measures, and processes described in the Lamont PUD HCP and IA, incidental take associated with the Lamont PUD HCP on the project site – in the form of harm, harassment, or killing of Tipton kangaroo rats and western burrowing owl, and in the form of harm or harassment of San Joaquin kit fox – from the activities described in the Lamont PUD HCP will become exempt from the prohibitions described under section 9 of the Act for direct and indirect impacts as a result of the activities described.

The Service anticipates that an undetermined number of San Joaquin kit foxes, Tipton kangaroo rats, and western burrowing owls could be taken over a 50-year period as a result of this proposed action. San Joaquin kit foxes could be harmed or disturbed, and Tipton kangaroo rats and western burrowing owls could be killed, harmed, or disturbed during activities described above and in the Lamont PUD HCP. The number of individuals affected by implementation of the Lamont PUD HCP should be very small, as the amount of potential suitable habitat is very limited throughout the proposed project's action area. We estimate that the Lamont PUD will incidentally take up to all Tipton kangaroo rats via the disturbance and habitat conversion associated with project activities on 19 acres of occupied habitat. We estimate that Lamont PUD will incidentally take up to all San Joaquin kit foxes, Tipton kangaroo rats, and western burrowing owls via the harassment associated with covered project activities on about 76 acres of suitable foraging habitat within the 160-acre project site. The number of individuals of all three of the Covered Species affected by the implementation of the proposed action should be small because of the minimization measures included in the Lamont PUD HCP and IA. Additionally, the number of San Joaquin kit foxes affected by implementation of the proposed action should be very small because individuals have not actually been observed in the project area, and there is little activity in the surrounding areas.

Effect of the Take

Listed and Proposed Species

For the reasons stated in the analyses of the proposed project's effects, the Service determined that the level of incidental take specified in the effects of the action and this Incidental Take Statement is not likely to result in jeopardy to the endangered San Joaquin kit fox or the endangered Tipton kangaroo rat.

Unlisted Species

For the reasons stated in the analyses of the proposed project's effects, the Service determined that the level of incidental take specified in the effects of the action and this Incidental Take Statement is not likely to result in jeopardy to the western burrowing owl, an unlisted Covered Species, should it become listed.

Reasonable and Prudent Measures and Terms and Conditions

The Lamont PUD HCP and accompanying agreements identify anticipated adverse effects to all Covered Species likely to result from the proposed actions, and the specific measures and levels of species and habitat protection that are necessary and appropriate to minimize those adverse effects. All of the conservation and management measures in the Lamont PUD HCP and accompanying agreements, together with the terms and conditions identified in the associated Implementing Agreement, are hereby incorporated by reference as reasonable and prudent measures, and terms and conditions for this incidental take statement pursuant to 50 CFR 402.14(I). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the Act to apply. If the Applicants fail to adhere to these terms and conditions, the protection of the Permit, and section 7(o)(2), may lapse. The amount or extent of the incidental take anticipated under the Lamont PUD HCP, associated reporting requirements, and provisions for disposing of dead or injured animals, are as described in the Permit.

Further, the following terms and conditions apply to the Service after issuance of the Permit:

1. The Service shall provide technical assistance to the Applicant throughout the term of the Permit.

2. The Service shall, at all time of listing of any of the currently unlisted Covered Species, reinitiate consultation on the proposed actions in accordance with 50 C.F.R. §402.16.

3. The Service shall ensure that any section 7 consultation with other Federal agencies regarding activities covered by the permit is consistent with the conservation goals and objectives of the Lamont PUD HCP, and that any such activities reviewed under section 7 and the Act shall provide levels of listed species protection consistent with the protection afforded under the Lamont PUD HCP.

Reporting Requirements

Lamont PUD shall provide the Service and CDFG with a construction compliance report no more than 60 days after completion of construction; and no later then February 28 of each year, a status report on implementation of mitigation measures and all available information about project-related take during the proceeding year. Reports shall include all of the information identified in section 5.4 of the Lamont PUD HCP, including the results of the Compliance Monitoring implemented by Lamont PUD during the prior calendar year. In addition, at any other time during the Permit terms, Lamont PUD, at the request of the Service or CDFG, shall provide to them within thirty (30) days, additional information relevant to implementation of the Lamont PUD HCP reasonably available to the Lamont PUD.

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 designed 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. The Service has the following conservation recommendations:

1. Pursue available funding sources to enhance and enlarge the habitat preservation programs in Kern County such as the *Metropolitan Bakersfield HCP* and the *Kern Water Bank Authority HCP/Natural Community Conservation Plan*, and the Coles Levee and Lokern Preserves. Priority areas for acquisition should have known kit fox and kangaroo rat presence. In addition, known kit fox corridors should be acquired to enhance population exchange.

REINITIATION – CLOSING STATEMENT

This concludes formal consultation on the proposed issuance of a section 10(a)(1)(B) incidental take permit for the Lamont PUD. 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, the action agency must immediately request reinitiation of formal consultation.

The Incidental Take Statement provided in this conference opinion for unlisted Covered Species does not become effective until the unlisted Covered Species is listed and the conference opinion is adopted as the biological opinion issued through formal consultation.

If you have any questions regarding this consultation, please contact Wayne S. White, Field Supervisor, at (916) 414-6600.

Attachments

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