

APPENDIX 6.6-1
BIOLOGICAL RESOURCES TECHNICAL REPORT

Avenal Energy Project Biological Resources Technical Report

Prepared for:
TRC

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EIP Associates

September 2001

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Biological Resources
Technical Report**

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Sacramento, California

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AVENAL ENERGY BIOLOGICAL RESOURCES TECHNICAL REPORT

INTRODUCTION

The purpose of this report is to describe the biological resources within the area of the Avenal Energy project (Project). The Project site (Site) comprises approximately 148 acres located in the western San Joaquin Valley, approximately two miles east of the Kettleman Hills. Construction and equipment laydown will occur within the Site boundaries and construction will also occur along linear corridors that connect the Site to existing gas lines, transmission lines, and water wells. Habitats and vegetation communities on and within one mile of the Site are of relatively low value and have been disturbed from human activities such as maintenance, agriculture, and infrastructure development for approximately 50 years. The Project has been designed and sited to avoid or reduce impacts to biological resources to a less than significant level.

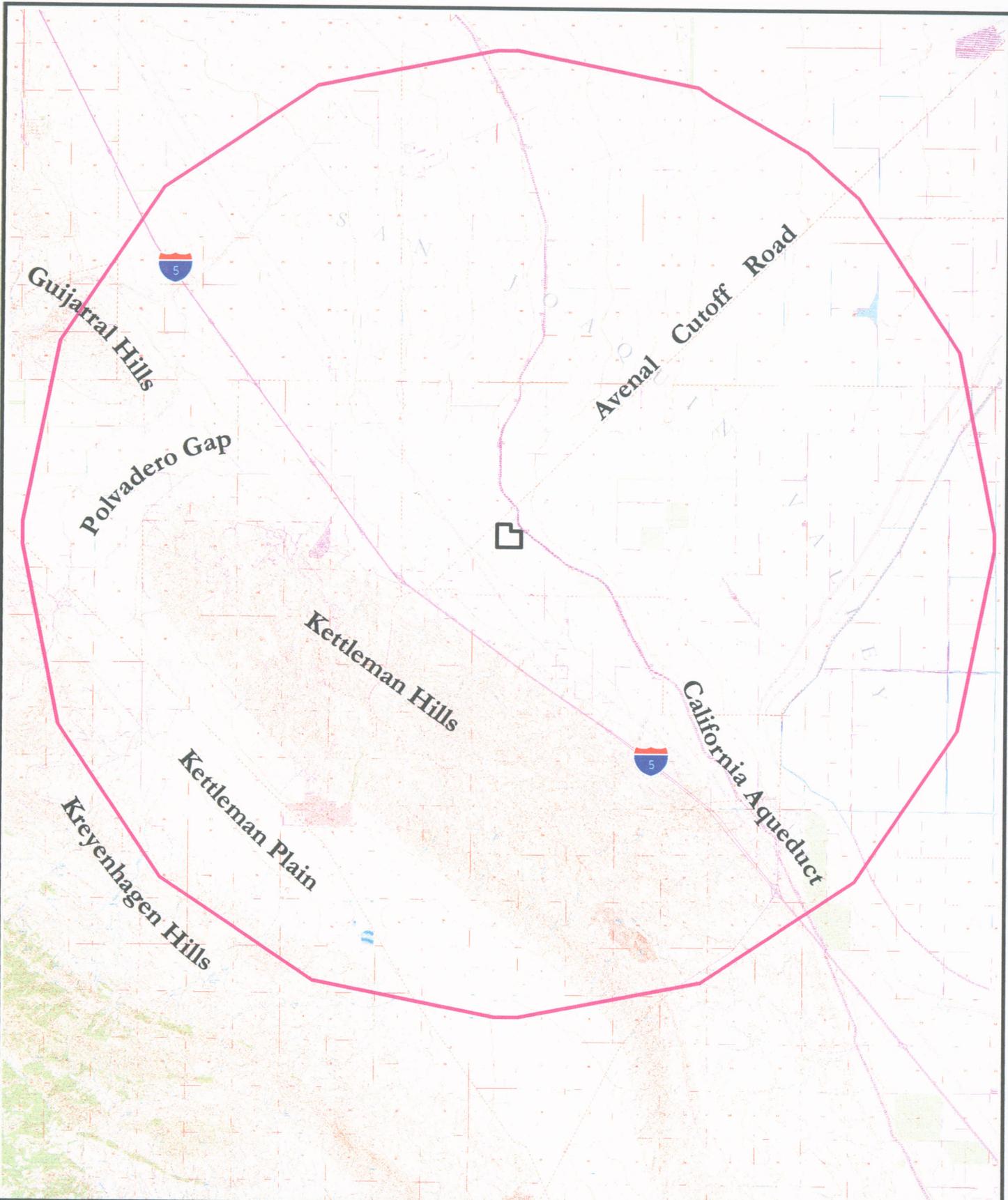
REGIONAL OVERVIEW

A regional overview of a 10-mile radius surrounding the Site was conducted to describe the range of environmental features in that area. Lands within the 10-mile radius (Figure 1) are referred to herein as the "region." The northeast approximately one-half of the region is encompassed by intensive agriculture on the San Joaquin Valley floor. The Site and Project linear corridors occur approximately two miles within this intensive agricultural setting. In contrast, the southwest half of the region includes the Gujarral Hills, Kettleman Hills, Kreyenhagen Hills, and Kettleman Plain. These areas are characterized by agriculture in the Kettleman Plain, open space and petroleum production in the Gujarral Hills and Kettleman Hills, and open space in the Kreyenhagen Hills.

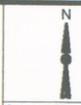
The land on and immediately surrounding the Site is planted with row crops, orchards, and vineyards and has been intensively disturbed by farming activities and infrastructure development (e.g., roads and canals) since the early 1950's. The Site and adjacent agricultural parcels to the south and west within the City of Avenal are zoned industrial. The agricultural lands to the north and east are unincorporated lands of Kings County that are designated for General Agriculture.

Biological Resource Areas in the Region

Vegetation in the region historically included native grassland and scrub communities. These communities have been replaced over the past 50 years by non-native vegetation communities (i.e., non-native annual grasslands) primarily through agriculture (i.e., farming on the valley floor and grazing in the uplands). A description of the predominant existing vegetation communities is provided in the following paragraphs.



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Source: USGS 7.5 minute topographic quads: La Cima, Avenal, Fluron, Gujarral Hills, Kettleman City, Westhaven, Kettleman Plain, Garza Peak, and Los Viejos; and EIP GIS Program, August 2001

- AE Project Site Boundary
- 10 Mile Regional Buffer

PROJECT NUMBER: 10535-00

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FIGURE 1
Regional Overview

Avenal Energy Project
Kings County, CA

Agricultural Land

The northeast portion of the region, generally east of Interstate 5, is primarily agricultural land with the predominant vegetation communities consisting of cropland and orchard/vineyard. The Site and Project linear corridors lie entirely within this setting. The cropland vegetation community consists primarily of row crops, orchards and grain crops. Most croplands support annuals that are planted in spring and harvested during summer or fall. In many areas, second crops are commonly planted after harvesting the first.

Orchards in the region are typically open, single-species, tree dominated habitats. Trees range in height from 15 to 30 feet. The understory is usually composed of low-growing grasses and other herbaceous plants, but may be managed to totally or partially prevent understory growth. Vineyards are composed of single species planted in rows, usually supported on wood and wire trellises. Between rows of vines, grasses and other herbaceous plants may be planted or allowed to grow as a ground crop to control erosion.

A United States Bureau of Reclamation (USBR) right-of-way dissects the agricultural lands and contains the concrete-lined San Luis Canal and adjacent maintained grassland swaths that occur between the canal and the edge of the USBR right-of-way. These maintained grasslands occur on the artificial fill of the canal embankment and on adjacent disturbed soil out to the limit of the right-of-way. The California Department of Water Resources (DWR) that manages the San Luis Canal as part of the California Aqueduct system conducts routine maintenance in these grasslands such as mowing and occasional pesticide applications (J. Vance, DWR, pers. comm.).

Natural Habitat Communities

The closest natural habitat communities are located on the west side of Interstate 5, approximately 2 miles west and southwest of the Site within the Kettleman Hills. The Kettleman Hills and other areas farther to the north and west support large expanses of annual grassland. Annual grassland habitats are open grasslands composed primarily of annual plant species. Non-native annual grasses are the dominant plant species in this habitat. These species include wild oats (*Avena* spp.), soft chess (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), red brome (*Bromus rubens*), wild barley (*Hordeum* spp.), and foxtail fescue (*Festuca megalura*). Common forbs include broadleaf filaree (*Erodium botrys*), redstem filaree (*Erodium cicutarium*), turkey mullein (*Eremocarpus setigerus*), true clovers (*Trifolium* sp.), bur clover (*Medicago polymorpha*), and popcorn flower (*Plagiobothrys notbofukus*). Most of these species were introduced with cattle and horses during the early settlement of California. These non-native species form a vegetation community that is successful at rapidly colonizing soils that have been disturbed. This is the dominant natural habitat community within the Kettleman Hills, Gujarral Hills, and Kreyenhagen Hills west of Interstate 5.

Within the annual grassland areas are limited inclusions of riverine, freshwater emergent wetland, and valley foothill riparian vegetation communities. These vegetation communities occur in association with surface water that occurs following infrequent rainstorms. Due to the dry local climate, with approximately six inches of annual rainfall, and the lack of large watershed areas, these habitats occur as small inclusions within the grasslands. Riverine habitats are distinguished by intermittent or continually running water. Freshwater emergent wetlands are characterized by erect, rooted herbaceous hydrophytes and occur in areas that are frequently wetted. Valley foothill riparian habitat is characterized by deciduous trees and understory shrubs and herbs that thrive on

abundant soil moisture. Limited inclusions of these natural habitats occur in the foothills west of Interstate 5, but are absent in the vicinity of the Site.

Wildlife of the Region

Many species of native and non-native fish and wildlife are known to inhabit the San Joaquin Valley and adjacent foothills. Bird species in the region include wading birds, shorebirds, gulls, terns, songbirds, and raptors. The most common bird species found within the region include western meadowlark, mourning dove, northern mockingbird, and Brewer's blackbird. Other common wildlife species in the region include small and large mammals (e.g., California ground squirrel, coyote), reptiles (e.g., gopher snake, side-blotched lizard), and amphibians (e.g., bullfrog, Pacific tree frog).

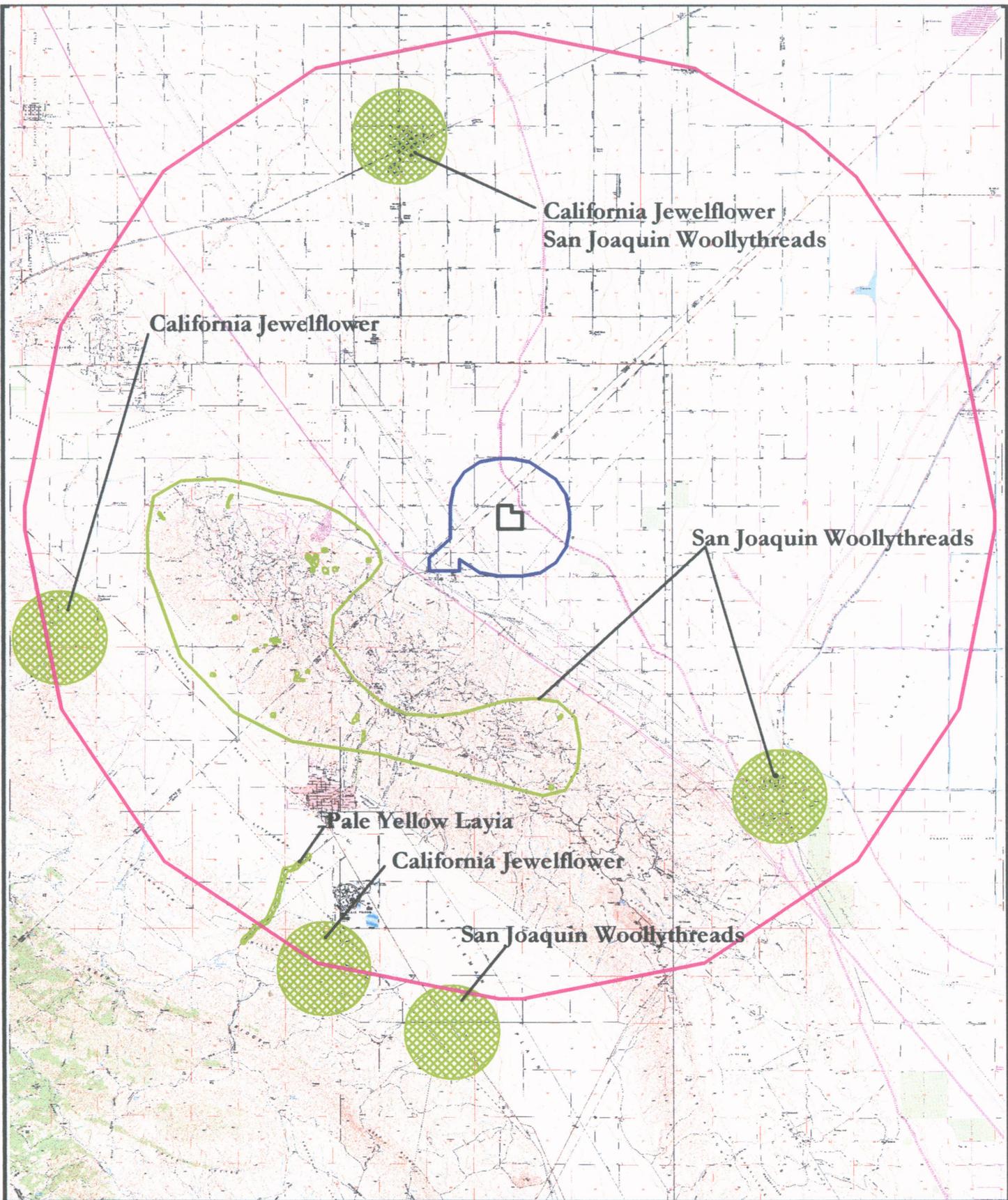
Special Status Species Potentially Occurring in the Region

The agricultural lands in the region that are east of Interstate 5 have low habitat value due to extensive disturbance caused by farming over the course of several decades. In contrast, the natural communities west of Interstate 5, which will not be impacted by the Project, provide important habitat for vegetation and wildlife including several special-status species such as San Joaquin kit fox, blunt-nosed leopard lizard, and short-nosed kangaroo rat. The Kettleman and Kreyenhagen Hills provide habitat for special-status plants such as San Joaquin woollythreads and California jewelflower. The U.S. Fish and Wildlife Service (USFWS) has designated the natural habitats west of I-5 and the lands that interconnect them as important areas to protect for their contributions to meeting the overall objectives of the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (SJVVP) (USFWS 1998). The Project will not impact these lands. Interstate 5 substantially precludes movement of terrestrial animals between the Kettleman Hills and the agricultural lands to the east. Few sightings of special-status terrestrial animals are recorded in the agricultural lands in the region.

This section presents a list of special-status species that could occur within the region (based on records within current USFWS, California Department of Fish and Game (DFG), and DWR databases) and an assessment of whether each could occur on or within one mile of the Site or within 1,000 feet of Project linear corridors. Any species that is known to occur in the region with habitat needs similar to habitats present on or within one mile of the Site, or within 1,000 feet of Project linear corridors was evaluated for its potential to occur in the Project vicinity.

Special-status species include all species listed under the state and federal Endangered Species Acts (ESA); species that are proposed for those listings; Federal Special Concern Species; California Special Concern Species; Fully Protected Species under the California Fish and Game Code; and plant species listed in the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Plants of California*.

Special-status species database queries were conducted within the La Cima, Avenal, Huron, Guijarral Hills, Kettleman City, Westhaven, Kettleman Plain, Garza Peak, and Los Viejos USGS 7.5-minute topographic quadrangles. The California Natural Diversity Database (CNDDDB) provides overlays that show known occurrences of special-status species. These occurrences are displayed on Figures 2 and 3. Table 1 lists the special-status species that could potentially occur on or within one mile of the Site or within 1,000 feet of Project linear corridors.



Source: CNDDDB, 2001; USGS 7.5 minute topographic quads: La Cima, Avenal, Huron, Guajarral Hills, Kettleman City, Westhaven, Kettleman Plain, Garza Peak, and Los Viejos; and EIP GIS Program, August 2001

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FIGURE 2
CNDDDB Special-Status Plants
Within the Project Region
 Avenal Energy Project
 Kings County, CA

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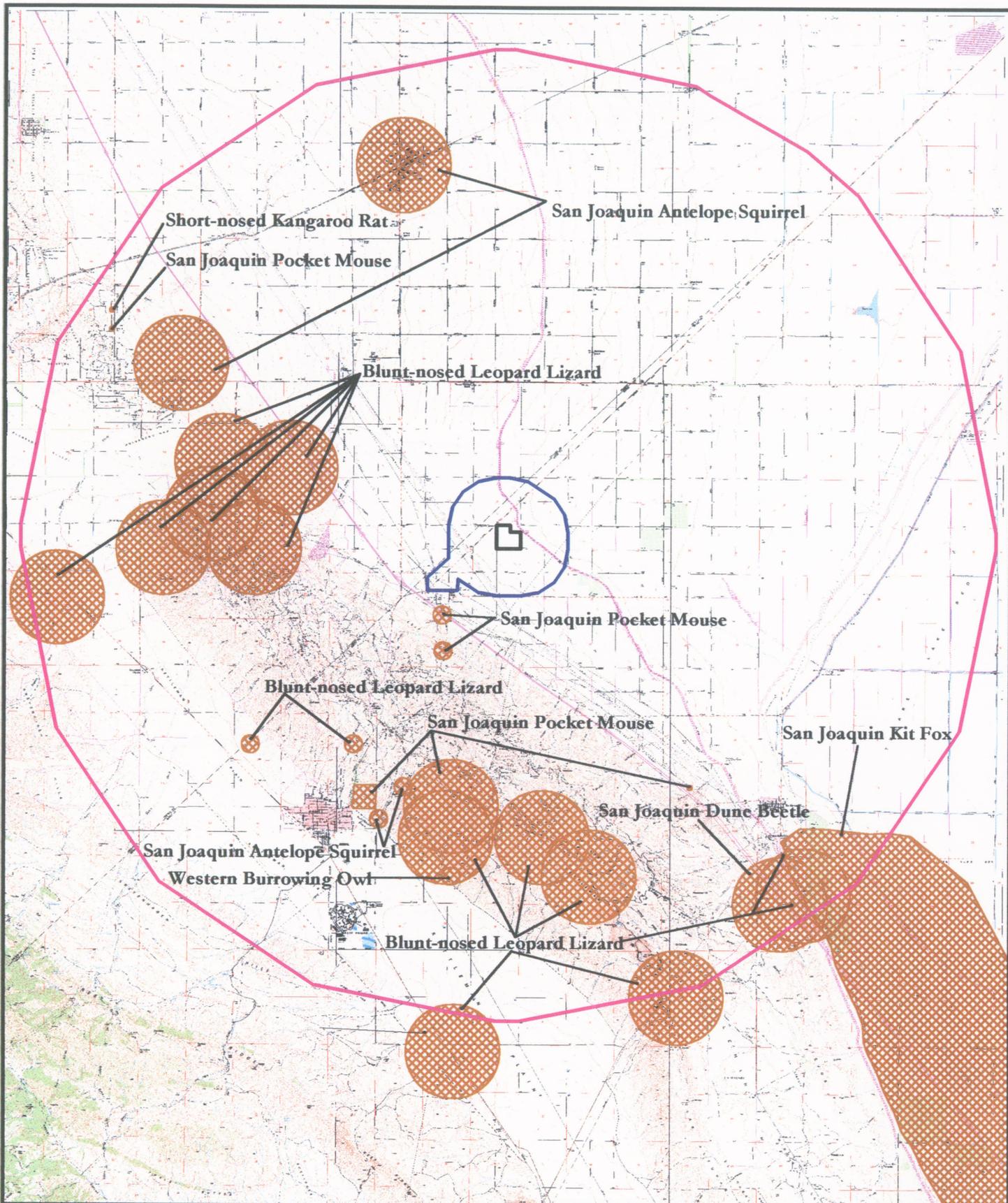
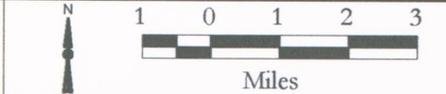


FIGURE 3
CNDDDB Special-Status Wildlife
Within the Project Region

Avenal Energy Project
Kings County, CA

CA GIS Projects 10



Source: CNDDDB, 2001; USGS 7.5 minute topographic quads: La Cima, Avenal, Huron, Gujarral Hills, Kettleman City, Westhaven, Kettleman Plain, Garza Peak, and Los Viejos; and EIP GIS Program, August 2001

AE Project Site Boundary
 10 Mile Regional Buffer
 Project Vicinity
 CNDDDB Special Status Animal Occurrences
 PROJECT NUMBER: 10535-00
 Requested by: JS Created by: MG Date: 8/31/01

TABLE 1
 SPECIAL STATUS SPECIES' POTENTIALLY OCCURRING WITHIN ONE MILE OF THE AVENAL ENERGY PROJECT SITE OR WITHIN 1,000 FEET OF LINEAR CORRIDORS

Common Name	Scientific Name	Status ² Fetl/CA/other	Habitat and Seasonal Distribution in California	Likelihood of Occurrence Within the Site Vicinity
Pale-Yellow Layia	<i>Layia heterotricha</i>	FSC/none/1B	Found in pinyon juniper woodlands as well as San Joaquin Valley and Foothill Grasslands.	Low. Could occur within the maintained grasslands adjacent to the San Luis Canal. However, its occurrence is unlikely, given the level of disturbance within these grasslands over the past 50 years and the lack of nearby populations. Closest occurrence (CNDDDB) to the project site is eight miles southwest in the Kettleman Plain and Kreyenhagen Hills, west of Interstate 5.
San Joaquin Woollythreads	<i>Monolopia congesta</i>	FE/none/1B	Endemic to San Joaquin Valley. Found in alkaline or loamy plains, sandy soils and is often associated with chenopod scrub as well as San Joaquin Valley and Foothill Grasslands.	Low. Could occur within the maintained grasslands adjacent to the San Luis Canal. However, its occurrence is unlikely, given the level of disturbance within these grasslands over the past 50 years and the lack of nearby populations. Closest occurrence (CNDDDB) to the project site is three miles southwest in the Kettleman Hills, west of Interstate 5.
California Jewel Flower	<i>Caulanthus californicus</i>	FE/SE/1B	Found in various habitats of the Central Valley and Carrizo Plain. Usually grows within chenopod scrub, San Joaquin Valley and foothill grasslands, and pinyon juniper woodlands.	Low. Could occur within the maintained grasslands adjacent to the San Luis Canal. However, its occurrence is unlikely, given the level of human disturbance within these grasslands over the past 50 years and the lack of nearby populations. Closest historic (probably extirpated) occurrence (CNDDDB) to the project site is 8.5 miles southwest on the east slope of the Diablo Range, west of Interstate 5.

TABLE 1

SPECIAL STATUS SPECIES POTENTIALLY OCCURRING WITHIN ONE MILE OF THE AVENAL ENERGY PROJECT SITE OR WITHIN 1,000 FEET OF LINEAR CORRIDORS

Common Name	Scientific Name	Status? Fed./CA/other	Habitat and Seasonal Distribution in California	Likelihood of Occurrence Within the Site Vicinity?
San Joaquin Dune Beetle	<i>Cæsus gracilis</i>	FSC/none/none	Inhabits fossil dunes along the western edge of the San Joaquin Valley.	Very low. Since there are no dunes or dune-like habitats within the project area, it is unlikely that this species would occur within one mile of the AE project site. Closest occurrence (CNDDDB) to the project site is nine miles southeast near Los Medanos.
Blunt-Nosed Leopard Lizard	<i>Gambelia sika</i>	FE/SE/CFP	Found throughout scattered locations within the San Joaquin Valley in sparsely vegetated alkali and desert scrub habitats. They do not excavate their own burrows, but rather seek cover in mammal burrows or under shrubs or other structures such as fence posts.	Low. Could potentially inhabit the maintained grasslands that are adjacent to the San Luis Canal using available small mammal burrows as cover. However, its occurrence is unlikely given that these maintained grasslands lack the components of its typical habitat associations of sparsely vegetated alkali and desert scrub communities. Closest occurrence (CNDDDB) to the project site is 3.5 miles northwest near the Polvadero Gap, west of Interstate 5.
Double-Crested Cormorant	<i>Phalacrocorax auritus</i>	none/CSC/none	Found throughout most of the state nesting on coastal cliffs, offshore islands, and along lake margins. Found foraging along the entire coast of California as well as in lacustrine and riverine habitats throughout the Central Valley.	Observed. No nesting habitat within one mile of the AE project site, but several individuals were observed foraging within the San Luis Canal near the proposed project site. No occurrences (CNDDDB) within 10 miles of the AE project site.

TABLE 1

SPECIAL STATUS SPECIES POTENTIALLY OCCURRING WITHIN ONE MILE OF THE AVENAL ENERGY PROJECT SITE OR WITHIN 1,000 FEET OF LINEAR CORRIDORS

Common Name	Scientific Name	Status Fed/CA/other	Habitat and Seasonal Distribution in California	Likelihood of Occurrence Within the Site Vicinity ³
Cooper's Hawk	<i>Accipiter cooperi</i>	none/CSC/none	Breeding resident throughout most of the wooded portion of the state. Usually inhabits open, interrupted, or marginal woodlands. Seldom found in areas without dense tree stands of patchy woodland habitat. Nest sites occur in riparian growths of deciduous trees, as in canyon bottoms on river flood plains.	Observed. No nesting habitat within one mile of the AE project site, but one migrating individual was observed flying over the project site. The maintained grasslands and croplands in the project area could provide limited seasonal and opportunistic foraging opportunities for this species. No occurrences (CNDDB) within 10 miles of the AE project site.
Western Burrowing Owl	<i>Athene cunicularia hypugae</i>	FSC/CSC/none	Nests and forages throughout the state in open, dry, annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation.	Observed (burrows). Nesting habitat exists within the maintained grasslands that are adjacent to the San Luis Canal within one mile of the AE project site. Foraging habitat exists within the maintained grasslands. Croplands and orchards also provide limited foraging opportunities. Two burrows were located within the maintained grasslands on the east side of the canal within 0.5 mile from the AE project site. Closest occurrence (CNDDB) to the project site is seven miles south near Kettleman Plain.

TABLE 1

SPECIAL STATUS SPECIES' POTENTIALLY OCCURRING WITHIN ONE MILE OF THE AVENAL ENERGY PROJECT SITE OR WITHIN 1,000 FEET OF LINEAR CORRIDORS

Common Name	Scientific Name	Status? Fed./CA/other	Habitat and Seasonal Distribution in California	Likelihood of Occurrence Within the Site Vicinity
Loggerhead Shrike	<i>Lanius ludovicianus</i>	FSC/CSC/none	Resident in the lowlands and foothills throughout the state. Usually occupies open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Rarely found in heavily urbanized areas, but are often found in open cropland.	Observed. Nesting habitat exists within established orchards and within willow trees growing in artificial water storage ponds. Foraging habitat exists within the maintained grasslands within the USBR canal right-of-way. The croplands, orchards, and vineyards also provide limited foraging opportunities. Two individuals were observed within one mile of the project site perching on a fence. No occurrences (CNDDB) within 10 miles of the AE project site.
San Joaquin Antelope Squirrel	<i>Ammospermophilus nelsoni</i>	FSC/ST/none	Found in the western San Joaquin Valley on dry, sparsely vegetated loam soils with widely scattered shrubs, forbs, and grasses in broken terrain with gullies and washes. Usually dig their own burrows or use the burrows of kangaroo rats.	Low to Moderate. Appropriately sized small mammal burrows and suitable loose-textured soils occur in maintained grasslands within the USBR canal right-of-way, and in agricultural drainage ditch and water storage pond berms. Though disturbed and less than optimal, the maintained grasslands could provide the elements that are necessary for occurrence of this species. Closest occurrence (CNDDB) to the project site is 5.5 miles southwest in the Kettleman Hills, west of Interstate 5.

TABLE 1
SPECIAL STATUS SPECIES' POTENTIALLY OCCURRING WITHIN ONE MILE OF THE AVENAL ENERGY PROJECT SITE OR WITHIN 1,000 FEET OF LINEAR CORRIDORS

Common Name	Scientific Name	Status? Fed/CA/other	Habitat and Seasonal Distribution in California	Likelihood of Occurrence Within the Site Vicinity?
San Joaquin Pocket Mouse	<i>Perognathus inornatus inornatus</i>	FSC/none/none	Typically found in grasslands and blue oak savannas associated with friable soils in the Central and Salinas Valleys.	Low to Moderate. Appropriate-sized small mammal burrows and suitable loose-textured soils occur within one mile of the AE project site in the maintained grasslands and in the USBR right-of-way and in the agricultural drainage ditch and water storage pond berms. Although these habitats are disturbed, they contain suitable habitat elements (cover, forage) necessary for occurrence of this species. Closest occurrence (CNDDB) to the project site is approximately one mile south of the Kettleman Compressor Station, in the Kettleman Hills, west of Interstate 5.
Short-Nosed Kangaroo Rat	<i>Dipodomys microps</i>	FSC/CSC/none	Typically found on the western side of the San Joaquin Valley on flat to gently sloping terrain within grassland and desert scrub communities that are associated with highly alkaline friable soils and dominated by species such as saltbush (<i>Atriplex</i> sp.)	Low. Appropriate-sized small mammal burrows and suitable loose-textured soils occur within one mile of the AE project site in the maintained grasslands within the USBR canal right-of-way in the agricultural drainage ditch and water storage pond berms. However, its occurrence is unlikely given that these features lack the components of its typical habitat associations of highly alkaline soils, desert scrub, and saltbush dominated communities. Closest occurrence (SJVRP) to the project site is five miles south in the Kettleman Hills, west of Interstate 5.

TABLE 1

SPECIAL STATUS SPECIES' POTENTIALLY OCCURRING WITHIN ONE MILE OF THE AVENAL ENERGY PROJECT SITE OR WITHIN 1,000 FEET OF LINEAR CORRIDORS

Common Name	Scientific Name	Status? Fed/CA/other	Habitat and Seasonal Distribution in California	Likelihood of Occurrence Within the Site Vicinity?
San Joaquin Kit Fox (SJKF)	<i>Vulpes macrotis macrotis</i>	FE/ST/none	Typically occupies annual grasslands or grassy open stages within scattered shrubby vegetation throughout the semi-arid habitats of the San Joaquin Valley. Require loose-textured soils for burrowing and a suitable prey base. Have also been found within the croplands of the valley floor.	Low. There are no known sightings of the SJKF in the vicinity of the project site and no sign of SJKF was observed in conjunction with site surveys conducted for the project. The farmer who has worked the site and surrounding area for more than 50 years reports to have not seen the SJKF in the vicinity. SJKF individuals have been observed in croplands and orchards in other regions so there is some chance of low and limited use of the project vicinity by this species. Closest occurrence (SIVRP) to the project site is three miles southwest in the Kettleman Hills, west of Interstate 5. The longstanding existence of the Interstate, with physical barriers (fencing, etc.), extensive traffic and human presence, discourage this species from moving between the Kettleman Hills and the agricultural lands of the valley floor. Given these considerations, the likelihood of occurrence for this species within one mile of the AE site is estimated to be low.

TABLE 1

SPECIAL STATUS SPECIES' POTENTIALLY OCCURRING WITHIN ONE MILE OF THE AVENAL ENERGY PROJECT SITE OR WITHIN 1,000 FEET OF LINEAR CORRIDORS

Common Name	Scientific Name	Status? Fed/CA/other	Habitat and Seasonal Distribution in California	Likelihood of Occurrence Within the Site Vicinity?
NOTES:				
1 - Special Status Species: Animals that were included in this table have a ranking of CSC or higher. Special-status plants that were included in this table have a ranking of 1B or higher.				
2 - Status:				
Federal				
FE	Federally listed as Endangered			
FT	Federally listed as Threatened			
FC	Federal Candidate Species			
FSC	U.S. Fish and Wildlife Service designated "Species of Concern"			
State				
SE	State listed as Endangered			
ST	State listed as Threatened			
CFP	California Department of Fish and Game designated "Fully Protected" or "Protected" - Permit required for "take."			
CSC	California Department of Fish and Game designated "Species of Special Concern"			
Other				
1B	California Native Plant Society (CNPS) Ranking. Defined as plants that are rare, threatened, or endangered in California and elsewhere.			
3 - Occurrence Sources/Site Vicinity: CDFG Natural Diversity Database (CNDDB), Recovery Plan for Upland Species of the San Joaquin Valley (SJVRP), Department of Water Resources (DWR). Site vicinity includes the project site, lands within one mile of the project site, project linear corridors and lands within 1,000 feet of project linear corridors.				

Each of the special-status species with potential to occur in the region is described below. Most of the CNDDDB records for these species involve sightings in the natural vegetation communities west of Interstate 5. Similar natural vegetation communities do not occur in the Project vicinity.

Pale-Yellow Layia (*Layia heterotricha*) is characterized as a Federal Special Concern Species. This native annual herb is found in pinyon-juniper woodlands as well as San Joaquin Valley and foothill grasslands. No individuals of this species were observed during the March 27-28 field survey of the Site. There is one extant occurrence of this species within the region, approximately eight miles southwest of the Site in the Kettleman Plain and Kreyenhagen Hills southwest of Avenal, west of Interstate 5 (CNDDDB 2001). Given that this species can occur within annual grasslands, it is possible for it to occur within the maintained grasslands adjacent to the San Luis Canal within one mile of the Site. However, its occurrence is unlikely, given the level of disturbance within these maintained grasslands over the past 50 years (i.e., mowing, pesticide applications, adjacent agriculture, and construction of the San Luis Canal), and the lack of nearby known populations.

San Joaquin Woollythreads (*Monolopia congdonii*) is listed as a Federal Endangered Species. This native annual is endemic to the San Joaquin Valley and grows on alkaline or loamy plains and sandy soils. It is often associated with chenopod scrub as well as San Joaquin Valley and foothill grasslands. No individuals of this species were observed during the March 27-28 field survey of the Site. There are occurrences of this species within the region (CNDDDB 2001, SJVRP 1998). The closest extant occurrence is approximately three miles southwest of the Site in the Kettleman Hills, west of Interstate 5 (CNDDDB 2001). Given that this species can occur within annual grasslands, it is possible for it to occur within the maintained grasslands adjacent to the San Luis Canal within one mile of the Site. However, its occurrence is unlikely, given the level of disturbance within these grasslands over the past 50 years (i.e., mowing, pesticide applications, adjacent agriculture, and construction of the San Luis Canal).

California Jewel Flower (*Caulanthus californicus*) is listed as a Federal and California Endangered Species. This native annual herb is found growing within chenopod scrub, San Joaquin Valley and foothill grasslands, and pinyon juniper woodlands. It has occurred historically in various valley habitats in both the Central Valley and Carrizo Plain. No individuals of this species were observed during the March 27-28 field survey of the Site. There are three documented occurrences of this species within the region (CNDDDB 2001, SJVRP 1998). All three of these occurrences are either extirpated or possibly extirpated from their historic locations. The closest historic occurrence is approximately 8.5 miles southwest of the Site on the east slope of the Diablo Range, west of Interstate 5 (CNDDDB 2001). This occurrence may also be extirpated, as it has not been seen since 1935. Given that this species can occur within annual grasslands, it is possible for it to occur within the maintained grasslands adjacent to the San Luis Canal within one mile of the Site. However, its occurrence is unlikely, given the level of disturbance within these grasslands over the past 50 years (i.e., mowing, pesticide applications, adjacent agriculture, and construction of the San Luis Canal) and the lack of nearby known populations.

San Joaquin Dune Beetle (*Coelus gracilis*) is characterized as a Federal Special Concern Species. San Joaquin dune beetles (SJDB) inhabit fossil dunes along the western edge of the San Joaquin Valley that contain sandy substrates. No SJDB or their sign were observed during the March 27-28 field survey of the Site. There is one extant occurrence of this species within the region, approximately nine miles southeast of the Site near Los Medanos (CNDDDB 2001, SJVRP 1998). Since there are no

dunes or dune-like habitats on or within one mile of the Site, it is unlikely that this species would occur near the Site.

Blunt-Nosed Leopard Lizard (*Gambelia sila*) is listed as a Federal and California Endangered Species. Blunt-nosed leopard lizards (BNLL) are generally found in sparsely vegetated alkali and desert scrub habitats throughout scattered locations in the San Joaquin Valley and adjacent foothills. BNLL do not excavate their burrows. They typically seek cover in mammal burrows, under shrubs, or under structures such as fence posts. No BNLL or their sign were observed during the March 27-28 field survey of the Site. There are 14 documented occurrences of this species within the region (CNDDDB 2001, SJVRP 1998). The closest extant occurrence is approximately 3.5 miles northwest of the Site near Polvadero Gap, west of Interstate 5 (CNDDDB 2001). The likelihood of this species occurring within one mile of the Site or within 1,000 feet of Project linear corridors is low. The maintained grasslands within the USBR canal right-of-way lack the structural components (e.g., scattered low shrubs) of more suitable habitat associations such as vegetated alkali and desert scrub communities.

Double-Crested Cormorant (*Phalacrocorax auritus*) is categorized as a California Special Concern Species. Double-crested cormorants are found throughout most of the state, nesting on coastal cliffs, offshore islands, and along lake margins (in stands of dead trees or snags). This species feeds mainly on fish, crustaceans, and amphibians, and can be found foraging along the entire coast of California as well as in lacustrine and riverine habitats in the Central Valley. There are no nesting records of this species documented in the CNDDDB within the region and there is no suitable nesting habitat for this bird on or within one mile of the Site (CNDDDB 2001). However, the San Luis Canal near the Site provides suitable foraging habitat for this species. Double-crested cormorants were observed foraging in the San Luis Canal within one mile of the Site during the March 27-28 field survey of the Site.

Cooper's Hawk (*Accipiter cooperi*) is categorized as a California Special Concern Species. This species is a resident throughout most of the wooded portion of the state, inhabiting open, interrupted, or marginal woodlands. Nest sites occur in riparian stands of deciduous trees, typically in canyon bottoms or on river floodplains. Although Cooper's hawk is seldom found in areas without dense tree stands or patchy woodland habitat, an individual was observed soaring over the maintained grasslands that are adjacent to the San Luis Canal. However, due to the lack of nesting habitat on or within one-mile of the Site for this species, this individual was most likely a seasonal migrant that was moving through the area. There are no records of this species documented in the CNDDDB within the region (CNDDDB 2001). However, the presence of birds, reptiles, and small mammals within the maintained grasslands, croplands, and orchards could provide limited seasonal and opportunistic foraging opportunities for individuals of this species that are moving through the San Joaquin Valley.

Western Burrowing Owl (*Athene cucularia hypuga*) is categorized as a Federal and California Special Concern Species. They are found in open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Burrowing owls are subterranean nesters that are dependent on burrowing mammals (e.g., California ground squirrel) to create their burrows. There is one extant occurrence for this species within the region, approximately seven miles south of the Site in the foothills on the east side of Kettleman Plain, west of Interstate 5 (CNDDDB 2001). Two burrowing owl burrows were observed approximately 0.3 and 0.4 mile from the Site, respectively, during the March 27-28 field survey. The burrows will not be affected by the Project.

They were located on the opposite side of the canal from the Site within the maintained grassland within the USBR canal right-of-way. The maintained grasslands within the USBR canal right-of-way provide suitable nesting and foraging habitat for this species. Croplands and orchards within one mile of the Site may provide limited foraging opportunities for this species.

Loggerhead Shrike (*Lanius ludovicianus*) is categorized as a Federal and California Special Concern Species. This species is a resident in the lowlands and foothills throughout California. It prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Loggerhead shrikes occur rarely in heavily urbanized areas, but are often found in open cropland. There are no records of this species documented in the CNDDDB within the region (CNDDDB 2001). However, potential nesting habitat exists within one mile of the Site in mature orchards and in the willow trees that are growing in the artificial water storage ponds. Two loggerhead shrikes were observed perching on a fence at a pump station on the west side of the San Luis Canal, approximately one mile north of the Site during the March 27-28 field survey of the Site. Suitable foraging habitat for this species exists within the maintained grasslands within the USBR canal right-of-way. The croplands and orchards/vineyards may also provide limited foraging opportunities.

San Joaquin Antelope Squirrel (*Ammospermophilus nelsoni*) is listed as a California Threatened and Federal Special Concern Species. This species is found in the western San Joaquin Valley on dry, sparsely vegetated loam soils from elevations of 200 to 1200 feet above mean sea level. San Joaquin antelope squirrels dig their burrows or use the burrows of kangaroo rats. They typically occur in association with widely scattered shrubs, forbs, and grasses in broken terrain with gullies and washes. No San Joaquin antelope squirrels or their sign were observed during the March 27-28 field survey of the Site. There are four documented occurrences of this species within the region (CNDDDB 2001, SJVRP 1998). The closest extant occurrence is approximately 5.5 miles southwest of the Site in the Kettleman Hills west of Interstate 5 (CNDDDB 2001). Appropriate-size small mammal burrows associated with loose-textured soils were located within the maintained grasslands within the USBR canal right-of-way, as well as within the dry perimeter of artificial water storage ponds and agricultural drainage ditch berms that occur outside the Site within the Project vicinity. Though disturbed and less than optimal, the maintained grasslands within one mile of the Site could provide the elements (forage, cover) that are necessary for occurrence of this species.

San Joaquin Pocket Mouse (*Perognathus inornatus inornatus*) is characterized as a Federal Special Concern Species. This species is typically found in grasslands and blue oak savannahs associated with friable soils in the Central and Salinas valleys. No San Joaquin pocket mice or their sign were observed during the March 27-28 field survey of the Site. There are six documented occurrences of this species within the region (CNDDDB 2001). The closest extant occurrence is approximately 2 miles southwest of the Site, west of Interstate 5 (CNDDDB 2001). Appropriate-size small mammal burrows associated with loose-textured soils were observed within the maintained grasslands within the USBR canal right-of-way, as well as within the dry perimeter of water storage ponds and agricultural drainage ditch berms that occur outside the Site within the Project Vicinity. Though disturbed and less than optimal, it is possible that the maintained grasslands within one mile of the Site could provide the elements (forage, cover) necessary for occurrence of this species.

Short-Nosed Kangaroo Rat (*Dipodomys nitratoides brevinasus*) is categorized as a Federal and California Special Concern Species. Short-nosed kangaroo rats (SNKR) are typically found on the western side of the San Joaquin Valley in grassland and desert scrub associations on flat to gently sloping terrain, especially habitats that are dominated by saltbush (*Atriplex* sp.). It occurs mainly in

highly alkaline friable soils. No SNKR or their sign were observed during the March 27-28 field survey of the Site. There is one extant occurrence of this species within the region, approximately nine miles northwest of the Site in the Gujarral Hills Oil Field, west of Interstate 5 (CNDDDB 2001). There is also one occurrence documented in the SJVRP (1998) located approximately five miles south of the Project site in the Kettleman Hills. Appropriate-size small mammal burrows associated with loose-textured soils were observed within the maintained grassland habitat within the USBR canal right-of-way as well as within the dry perimeter of agricultural drainage ditch and water storage pond berms that occur outside the Site within the Project vicinity. Although some of the exposed soils within the maintained grasslands were observed to exhibit signs of slight alkalinity, the habitats within one mile of the Site lack the components of typical SNKR habitat associations such as highly alkaline soils, desert scrub, and saltbush dominated communities. Therefore, it is unlikely that this species would be found on or within one mile of the Site.

San Joaquin Kit Fox (*Vulpes macrotis nutica*) is listed as a Federal Endangered and California Threatened Species. San Joaquin kit fox (SJKF) typically occupy annual grasslands or grassy open stages within scattered shrubby vegetation throughout the semi-arid habitats of the San Joaquin Valley. This species requires loose-textured soils for burrowing and a suitable prey base. The SJKF often use the burrows of California ground squirrels (*Spermophilus beecheyi*) for dens (Orloff 1992). SJKF dens usually range between 11 to 21 cm at the narrowest measurable horizontal breadth, and are typically higher than they are wide. However, SJKF dens can vary greatly in size and shape. Active den openings can be as small as 9 cm wide, as long as the opening is several cm taller than it is wide (Orloff 1992). No SJKF individuals or sign were observed during the March 27-28 field survey of the Site. EIP biologists investigated all burrows that were observed during the March 27-28 survey. All suspected burrows were measured with a ruler for entrance diameter and investigated for shape and length. Since dens with deceptively large entrances can end abruptly or narrow quickly to unsuitably small sizes, dens were probed with a flexible stick to determine their length and internal width. A number of burrows that appeared to have been created by California ground squirrels were observed within the maintained grasslands within the USBR canal right-of-way. One apparent California ground squirrel burrow was observed in a drainage ditch berm outside the east boundary of the Site. Several of these ground squirrel burrows appeared to have been modified by another animal. While some burrows appeared to be of suitable dimensions to be used by the SJKF, no evidence of use by this species was observed. A scat that was observed near one of these burrows (125 mm length, 25 mm diameter) was characteristic of coyote (*Canis latrans*).

The closest CNDDDB occurrences of the SJKF are approximately 8.5 miles southeast of the Site. The closest occurrence documented within the SJVRP database is approximately three miles southwest of the Site in the Kettleman Hills, west of Interstate 5. There are no known sightings of the SJKF within one mile of the Site and no sign of SJKF was observed in conjunction with site surveys conducted for the Project. The farmer who has worked the Site and surrounding area for more than 50 years reports to have not seen the SJKF in the vicinity (Kochengen 2001). SJKF individuals have been observed in croplands and orchards in other regions, so there is some chance of low and limited use of the Project vicinity by this species. For example, the physical barrier of the canal may detour some individuals moving within the region and an individual passing through the area might use the maintained grassland swath that occurs in the USBR canal right-of-way on occasion. While the maintained grasslands within the USBR canal right-of-way could provide suitable foraging habitat, the foraging opportunities presented by the surrounding agricultural lands are limited due to the frequent and extensive ground disturbance. Considering these factors, the

likelihood of the SJKF occurring within one mile of the Site or within 1,000 feet of Project linear corridors is estimated to be low.

METHODS

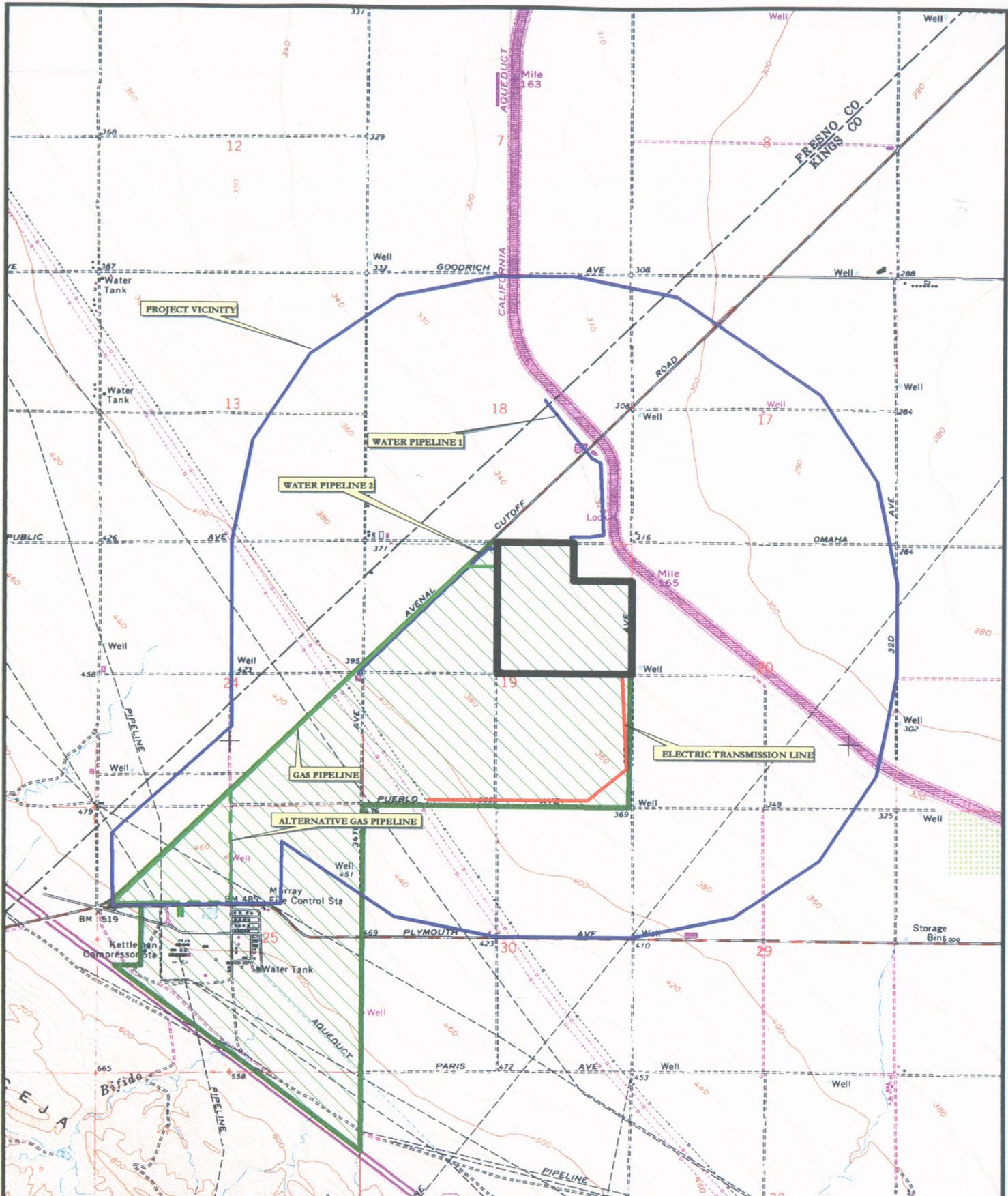
The biological resources evaluated for the AE project include vegetation communities, plants, wildlife, and wildlife habitats. Evaluations of regional biological resources (within the region) are based on published and unpublished literature reviews of the USFWS, CDFG and DWR databases, and other sources. A more intensive evaluation, including field surveys, was conducted for the area within one mile of the Site and within 1,000 feet of Project linear corridors. The Project linear facilities include the proposed natural gas pipeline, electric transmission line, and water line routes (Figure 4). The area within one mile of the Site and within 1,000 feet of Project linear facilities is referred to herein as the Project "vicinity."

Field Surveys

Field surveys to identify biological resources in the vicinity of the Site focused on locating special-status plant and animal species as well as their habitats and sign. A reconnaissance-level survey of the vicinity was conducted on March 27-28, 2001. These studies included:

- Meandering (walking) transects within the maintained grasslands that occur within the USBR canal right-of-way. Transects were conducted to achieve 100 percent visual coverage of the grasslands within the vicinity. This habitat was a focus of the fieldwork because it represents the majority of habitat within the Project vicinity that would support the life cycle requirements of plant and wildlife species. The remaining land in the Project vicinity consists of agriculture and infrastructure development (e.g., roads) that is subject to intensive and frequent disturbance.
- Driving and spot-checking the paved and dirt roads through the active cropland, orchards, and vineyards within the vicinity so that 100 percent visual coverage of these areas was achieved. The croplands, orchards, and vineyards were also scanned with binoculars to ensure complete documentation of plant and wildlife species. This method was chosen over walking linear transects due to the homogenous nature, open visibility, and lack of natural habitat within these areas. As shown in Figure 5, the Site and surrounding lands are actively plowed and planted. There is little variability in the field areas and the Site and adjacent lands are virtually 100 percent visible from the dirt roads. Spot-checking (on foot) occurred wherever there were visible changes in habitat such as at drainage ditches, water storage ponds, and the San Luis Canal.
- Documenting and recording biological resources in standard field notebooks immediately upon observation. Photographs of biological resources, habitat communities, as well as the Site, Project utility corridors, and Project vicinity were taken at several vantage points throughout the Site.

A follow-up site visit that was attended by representatives from the USFWS and CDFG occurred on May 16, 2001. This site visit consisted of driving and spot-checking the paved and dirt roads through the active agricultural areas and along the San Luis Canal. The entire 148-acre Site,



2000 0 2000
 Feet

Source: TRC, 2001; USGS 7.5 minute topographic quads: La Cima, and EIP GIS Program, August 2001

AE Project Site Boundary	Linear Features: Electric Waterline Gasline Alternative Gasline
Survey Area	
Industrial Zone (City of Avenal General Plan and Zoning Ordinance)	
PROJECT NUMBER: 10535-00	
Requested by: JS Created by: MG Date: 8/31/01	

FIGURE 4
Field Survey Area

Avenal Energy Project
 Kings County, CA



EIP
ASSOCIATES

PROJECT NUMBER: 10535-00

Requested by: JS Created by: MG Date: 8/31/2001

Source: TRC, Photograph of Project Site, 2001; and
EIP Associates GIS Program, August 2001.



NO SCALE

FIGURE 5

**Ground Photograph of
Avenal Energy Site**

**Avenal Energy Project
Biological Resources Technical Report**

Kings County, CA

adjacent areas, and Project linear routes were observed during this visit. Spot-checks were conducted at the maintained grasslands adjacent to the San Luis Canal, as well as isolated pond and ditch locations that contained grasses or other non-agricultural vegetation inclusions.

RESULTS

Biological Resources Within One Mile of the Site and 1,000 feet of Project Linear Corridors (Project Vicinity)

The Site comprises most of the northeast quarter of Section 19, Township 21 South, Range 18 East, on the USGS 7.5 minute La Cima quadrangle in the City of Avenal, California. The Site is bordered on the north, west, and south by newly planted (2001) orchards, and on the east by row crops and the City of Avenal Water Treatment Plant. Land use in the Project vicinity is predominantly agriculture. The San Luis Canal is approximately 200 feet northeast of the Site. Table 2 presents a list of the plant and animal species that were observed during the March 27-28 reconnaissance survey, and the habitats they were observed in.

Vegetation Communities

The Site is located entirely within an agricultural field that has been cleared of native vegetation for approximately 50 years. The field is currently used to grow cotton. The entire site is highly disturbed from plowing, disking, irrigating, planting, and harvesting during normal agricultural operations.

The water pipelines for the Site will be underground at the edge of agricultural fields in areas that contain bare ground or agricultural vegetation. The water pipeline corridor north of the Site is designed to avoid the maintained grasslands that occur adjacent to the San Luis Canal. The electrical transmission line tie-in corridor is located entirely on newly planted orchards. The gas line corridor crosses a newly planted orchard adjacent to the Site and then follows Avenal Cutoff Road and Plymouth Avenue to the Kettleman Compressor Station. The linear facilities are located entirely on disturbed lands with little or no vegetation except for agricultural vegetation.

Vegetation communities outside the Site within the Project vicinity consist of cropland, orchards, vineyards, maintained grasslands and several small isolated locales of aquatic vegetation that occur within artificial water storage ponds. Each of the vegetation communities is described below and shown in Figure 6.

Cropland comprises the entire Site and occurs on adjacent lands to the east and along the gas pipeline route. Cropland comprises the majority of the Project vicinity. Although most crops are planted in rows, alfalfa hay and small grains can form dense stands. Cotton is currently being grown on the proposed Site.

Orchards and Vineyards occur on land adjacent to and within one mile of the Site. Trees in established orchards within one mile of the Site range in height from 15 to 30 feet. Established orchards can have understory consisting of grasses and other herbaceous plants, but may be managed to totally or partially prevent understory growth. Orchards adjacent to the Site contain new trees ranging in height between 3 and 5 feet. The new orchards have no understory except for row crops that have been planted in some areas.

TABLE 2

**PLANT AND WILDLIFE SPECIES OBSERVED DURING MARCH 2001 SURVEYS OF
THE AVENAL ENERGY PROJECT SITE¹**

Common Name	Scientific Name	Habitat
PLANTS		
Wild Oats	<i>Avena fatua</i>	Annual Grassland
Soft Chess	<i>Bromus mollis</i>	Annual Grassland
Ripgut Brome	<i>Bromus diandrus</i>	Annual Grassland
Foxtail Barley	<i>Hordeum murinum</i>	Annual Grassland
Italian Ryegrass	<i>Lolium multiflorum</i>	Annual Grassland
Annual Blue Grass	<i>Poa annua</i>	Annual Grassland
Lupine	<i>Lupinus albus</i>	Annual Grassland
Menzie's Fiddleneck	<i>Amsinckia menziesii</i>	Annual Grassland
Red-stemmed Filaree	<i>Erodium cicutarium</i>	Annual Grassland
Bull Thistle	<i>Cirsium vulgare</i>	Annual Grassland
Purple Owl's Clover	<i>Castilleja exserta</i> ssp. <i>exserta</i>	Annual Grassland
Short-podded Lotus	<i>Lotus humistratus</i>	Annual Grassland
Shepard's Purse	<i>Capsella bursa-pastoris</i>	Annual Grassland
Hairy Toothwort	<i>Cardamine hirsuta</i>	Annual Grassland
Wormseed Mustard	<i>Erysimum cheiranthoides</i>	Annual Grassland
Sunflower	<i>Helianthus annuus</i>	Aquatic Feature
Broadleaf Cattail	<i>Typha latifolia</i>	Aquatic Feature
Western Common Tule	<i>Scirpus acutus</i> var. <i>occidentalis</i>	Aquatic Feature
Curly Dock	<i>Rumex crispus</i>	Aquatic Feature
Willow	<i>Salix</i> sp.	Aquatic Feature
INVERTEBRATES		
Monarch Butterfly	<i>Danaus plexippus</i>	Annual Grassland (migrating)
AMPHIBIANS		
Bullfrog	<i>Rana catesbeiana</i>	Aquatic Feature
Pacific tree frog	<i>Hyla regilla</i>	Aquatic Feature
REPTILES		
Gopher snake	<i>Pituophis melanoleucus</i>	Annual Grassland
Side-blotched lizard	<i>Uta stansburiana</i>	Annual Grassland
BIRDS		
Clark's Grebe	<i>Aechmophorus clarkii</i>	San Luis Canal
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	San Luis Canal
Mallard	<i>Anas platyrhynchos</i>	San Luis Canal
Ruddy Duck	<i>Oxyura jamaicensis</i>	San Luis Canal
American Coot	<i>Fulica americana</i>	San Luis Canal
Killdeer	<i>Charadrius vociferans</i>	Cropland
Greater Yellowlegs	<i>Tringa melanoleuca</i>	Aquatic Feature
Cooper's Hawk	<i>Accipiter cooperii</i>	Cropland (soaring overhead)
American Kestrel	<i>Falco sparverius</i>	Cropland
Rock Dove	<i>Columba livia</i>	Cropland/Annual Grassland
Mourning Dove	<i>Zenaidura macroura</i>	Cropland/Annual Grassland
Western Kingbird	<i>Tyrannus verticalis</i>	Annual Grassland
Barn Swallow	<i>Hirundo rustica</i>	Cropland
Cliff Swallow	<i>Hirundo pyrrhonota</i>	San Luis Canal (nesting under bridge)
Common Raven	<i>Corvus corax</i>	Cropland

TABLE 2

**PLANT AND WILDLIFE SPECIES OBSERVED DURING MARCH 2001 SURVEYS OF
THE AVENAL ENERGY PROJECT SITE¹**

Common Name	Scientific Name	Habitat
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Annual Grassland
Northern Mockingbird	<i>Mimus polyglottos</i>	Annual Grassland
American Pipit	<i>Anthus rubescens</i>	San Luis Canal (water's edge)
Song Sparrow	<i>Melospiza melodia</i>	Annual Grassland
Lark Sparrow	<i>Chondestes grammacus</i>	Annual Grassland
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	Annual Grassland
Western Meadowlark	<i>Sturnella neglecta</i>	Annual Grassland
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	Aquatic Feature
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	Annual Grassland
House Sparrow	<i>Passer domesticus</i>	Annual Grassland
Lesser Gold Finch	<i>Carduelis psaltria</i>	Annual Grassland
House Finch	<i>Carpodacus mexicanus</i>	Annual Grassland
MAMMALS		
Coyote	<i>Canis latrans</i>	Annual Grassland (skeleton)
California Ground Squirrel	<i>Spermophilus beecheyi</i>	Annual Grassland
Pocket Gopher	<i>Thomomys bottae</i>	Annual Grassland
Desert Cottontail	<i>Sylvilagus auduboni</i>	Annual Grassland

NOTES:

(1) - Project Site: Includes all areas within one mile of the Avenal Energy project site and 1,000 feet of the water lines, electric transmission lines, and natural gas pipelines.



LEGEND

-  1 MILE BUFFER
-  DRAINAGE BASIN
-  WATER STORAGE POND
-  DISTURBED GRASSLANDS
-  ORCHARD
-  NEW ORCHARD
-  ROW CROPS
-  VINEYARD
-  INDUSTRIAL ZONE
(CITY OF AVENAL GENERAL PLAN
AND ZONING ORDINANCE)



**HABITATS ON AND IN THE VICINITY
OF THE PROJECT SITE**

DUKE ENERGY AVENAL, LLC

AVENAL ENERGY

FIGURE 6

Vineyards are composed of single species planted in rows, usually supported on wood and wire trellises. Between rows of vines, grasses and other herbaceous plants may be planted or allowed to grow as a cover crop to control erosion. The closest vineyard to the Site is in the southwest quarter section of Section 17, approximately 500 feet northeast of the Site.

Maintained Grasslands occur within swaths adjacent to each side of the San Luis Canal. The swaths vary in width from 20 to 400 feet, averaging 80 feet in most places. The maintained grasslands consist of annual grasses that generally occur from the top of the outside levee slope to the edge of the USBR canal right-of-way. The DWR conducts routine maintenance within the grasslands such as mowing and occasional pesticide applications (J. Vance, DWR, pers. comm.). The eastern edge of the Site boundary is approximately 200 feet from the edge of the maintained grasslands. The water pipeline corridor that occurs near the San Luis Canal is designed to stay outside of the grasslands.

Aquatic vegetation occurs in five locations within one mile of the Site. This vegetation occurs where human activity has resulted in the creation of artificial barriers and surface grades that promote ponding of water (e.g., where the agricultural fields drain against the intersection of the fill embankments for the San Luis Canal and Avenal Cutoff Road, and where farmers and the City's water treatment plant have constructed ponds for water storage). Aquatic vegetation species that were observed in the pond areas in the Project vicinity include willow, curly dock, broadleaf cattail, and western common tule. All of these aquatic features are the result of human intervention and are subject to anthropogenic disturbances such as plowing, pesticide applications, garbage disposal, and variable water supply. There are no aquatic features on the Site or in areas that would be disturbed by the gas line or electrical transmission line tie-ins. The water pipeline routes are designed to avoid disturbance to several of the features that occur nearby.

The San Luis Canal is completely man-made and devoid of vegetation. The San Luis Canal supports habitat for a variety of fish and birds.

Wildlife

Because the Project vicinity is primarily agricultural, the vegetation communities contain limited and marginally suitable wildlife habitats. A major reason for this is that the agricultural lands in the vicinity are subject to virtually 100 percent intensive surface disturbance activities on a regular and frequent basis. Lands in the vicinity have been farmed for approximately 50 years. The habitats that occur in the Project vicinity are described below and shown in Figure 6.

Croplands, orchards, and vineyards that are located in the vicinity are devoid of natural vegetation. The agricultural fields, trees, and nearby high voltage transmission towers and poles provide low-quality foraging and nesting habitat for common bird species such as mourning dove, western meadowlark, killdeer, rock dove, and common raven. Small birds and mammals feed on the seeds, fruits, and insects within the fields. Smaller wildlife species provide subsistence for predators such as coyotes and raptors. Common ravens were observed nesting within the structural framework of transmission towers and power poles within the Project vicinity. Mammal burrows were observed within the uncultivated berm of a drainage ditch that runs outside and east of the quarter section road that delineates the easternmost boundary of the Site. The burrows are outside of the Site and away from planned Project linear facilities.

Wildlife inhabiting the maintained grasslands within the USBR canal right-of-way includes burrowing mammals such as California ground squirrel, Botta's pocket gopher and desert cottontail, which are prey for coyotes, raptors, and other predators. The grasslands also provide foraging habitat for seed-eating birds such as mourning dove, western meadowlark, house finch, song sparrow, and white-crowned sparrow; insect eaters such as northern mockingbird, loggerhead shrike, and western kingbird; and raptors such as red-tailed hawk and burrowing owl. Reptiles such as gopher snake and side-blotched lizard were also observed within the grasslands. Numerous ground burrows and animal trails were observed within the grasslands, with burrow entrances ranging from 2 to 15 inches in diameter. Scat and bones were also found within the maintained grasslands. One of the burrows located within the grassland swath had a pile of scat on the ramp leading to the burrow entrance. The scat was approximately 105 mm in length and 22 mm in diameter, which is characteristic of coyote scat.

The aquatic features that occur in the vicinity vary between areas that are typically dry, but trap rainwater runoff for short durations after infrequent large storms, to irrigation ditches and artificial water storage ponds that contain water or moisture over more extended periods. The vegetation, standing water, and habitat structure within some of these locales provide nesting and foraging habitat for birds such as red-winged blackbird, western kingbird, and greater yellowlegs. Amphibians such as bullfrog and Pacific tree frog were also observed. Small mammal burrows were observed within a berm that was created around a water storage pond that is adjacent to Avenal Cutoff Road in the northwest corner of the southwest quarter of section of Section 19, approximately 0.5 mile from the Site. The irrigation ditches and rainwater trap areas contain less moisture and vegetation than the artificial water storage pond areas and provide only marginal aquatic habitat. None of the aquatic features in the Project vicinity are located on the Site, or along the routes of the gas line or electrical transmission line tie-ins. The water pipeline routes are designed to avoid disturbance to several of the features that occur nearby.

The San Luis Canal near the Site provides foraging habitat for a variety of aquatic birds such as double-crested cormorants, grebes, and waterfowl. The San Luis Canal also provides habitat for fish. Birds such as American pipit and cliff swallow were observed feeding on insects over and adjacent to the San Luis Canal. The cliff swallows were also nesting under the bridge and pipeline structures that crossed over the canal.

Special-Status Species Potentially Occurring Within One Mile of the Site and 1,000 Feet of Project Linear Corridors (Project Vicinity)

Plants

No known occurrences of special-status plant species are recorded in the Project vicinity in the CNDDDB, or USFWS and DWR databases. Furthermore, no special-status plant species were observed in the vicinity during the Site reconnaissance or follow up visit. Pale-yellow layia, San-Joaquin woollythreads, and California jewel flower have historic occurrences within the region, but the remaining natural habitats that are on and within one-mile of the Site are so disturbed from maintenance, agriculture, and infrastructure development as to be highly unlikely to support these species. The closest CNDDDB occurrences of special-status plant species to the Site are San Joaquin woollythreads (3 miles west), and pale-yellow layia (8 miles southwest). Both of these occurrences are located out of intensive agriculture areas and on the west side of Interstate 5 in the Kettleman Hills and Kettleman Plain.

Wildlife

No known occurrences of special-status wildlife species are recorded in the Project vicinity in the CNDDDB, or USFWS and DWR databases. Four special-status wildlife species were observed in the Project vicinity during the March 27-28 survey: loggerhead shrike, Cooper's hawk, double-crested cormorant, and western burrowing owl (burrows only) (Figure 7). Documentation data for these species were recorded on the DFG's California Native Species Field Survey Forms (Appendix 1). Other than these species, the closest occurrences of special-status wildlife species to the Site include San Joaquin pocket mouse (2 miles southwest - CNDDDB) and San Joaquin kit fox (3 miles southwest - SJVRP). Both of these occurrences are located outside of intensive agriculture areas and on the west side of Interstate 5 in the Kettleman Hills.

The maintained grasslands within the canal right-of-way occur where the surface has been intensively disturbed by historic agriculture operations and San Luis Canal construction, as well as ongoing periodic disturbance from DWR maintenance activities such as mowing and pesticide applications. These disturbances limit the quality of habitat, but do not preclude wildlife use. DWR maintenance protocols are designed to avoid or minimize impacts to wildlife that use the grasslands. DWR adheres to maintenance guidelines such as mowing outside of the nesting season, keeping mower blades at least six inches off the ground, and avoiding potential San Joaquin kit fox dens. DWR also sets baited traps for ground squirrels along the San Luis Canal, but the traps are designed to avoid non-target deaths. Ground squirrel carcasses are removed on a regular basis to avoid bioaccumulation of poisons (J. Vance, DWR, pers. comm.).

Several mammal burrows that could be used by special-status mammals, as well as two burrowing owl burrows, were located within these grasslands during the March 27-28 survey of the Project vicinity. The existence of these burrows is due mainly to the fact that there have been no recent ground-disturbing activities to destroy them. The two burrowing owl burrows are located approximately 0.3 and 0.4 mile from the Site, on the opposite side of the canal, and would not be affected by the Project. The availability of seeds, birds, reptiles, and small mammals within the maintained grasslands provides foraging opportunities for special-status birds that were observed on and in the vicinity the grasslands such as loggerhead shrike. Two loggerhead shrikes were observed perching on a fence adjacent to the grasslands approximately one mile north of the Site, and a migrating Cooper's hawk was observed soaring over the grasslands during the March 27-28 field survey of the Site. Although burrowing owls were not observed directly, the burrowing owl burrows mentioned above provide evidence that the grasslands are used by this species.

Grasslands do not occur on the Site, or along the routes of the gas line or electrical transmission line tie-ins. The water pipeline routes are designed to avoid disturbance to grasslands that occur nearby.

The croplands, orchards, and vineyards that comprise the Site and adjacent lands are highly disturbed from plowing, disking, irrigating, planting, and harvesting over the past 50 years. These disturbances essentially preclude the lands that will be disturbed by the Project from being suitable for nesting or denning of special-status wildlife species. The established orchards and landscaping trees, maintained grasslands, and small isolated water pond areas, none of which would be disturbed by the Project, could provide habitat for denning or nesting of special-status mammals within the vicinity. The agricultural lands also provide low quality foraging habitat for special-status species that may occur in the area, such as burrowing owl and loggerhead shrike. No special-status species were observed within this habitat type during the March 27-28 survey of the Project vicinity.

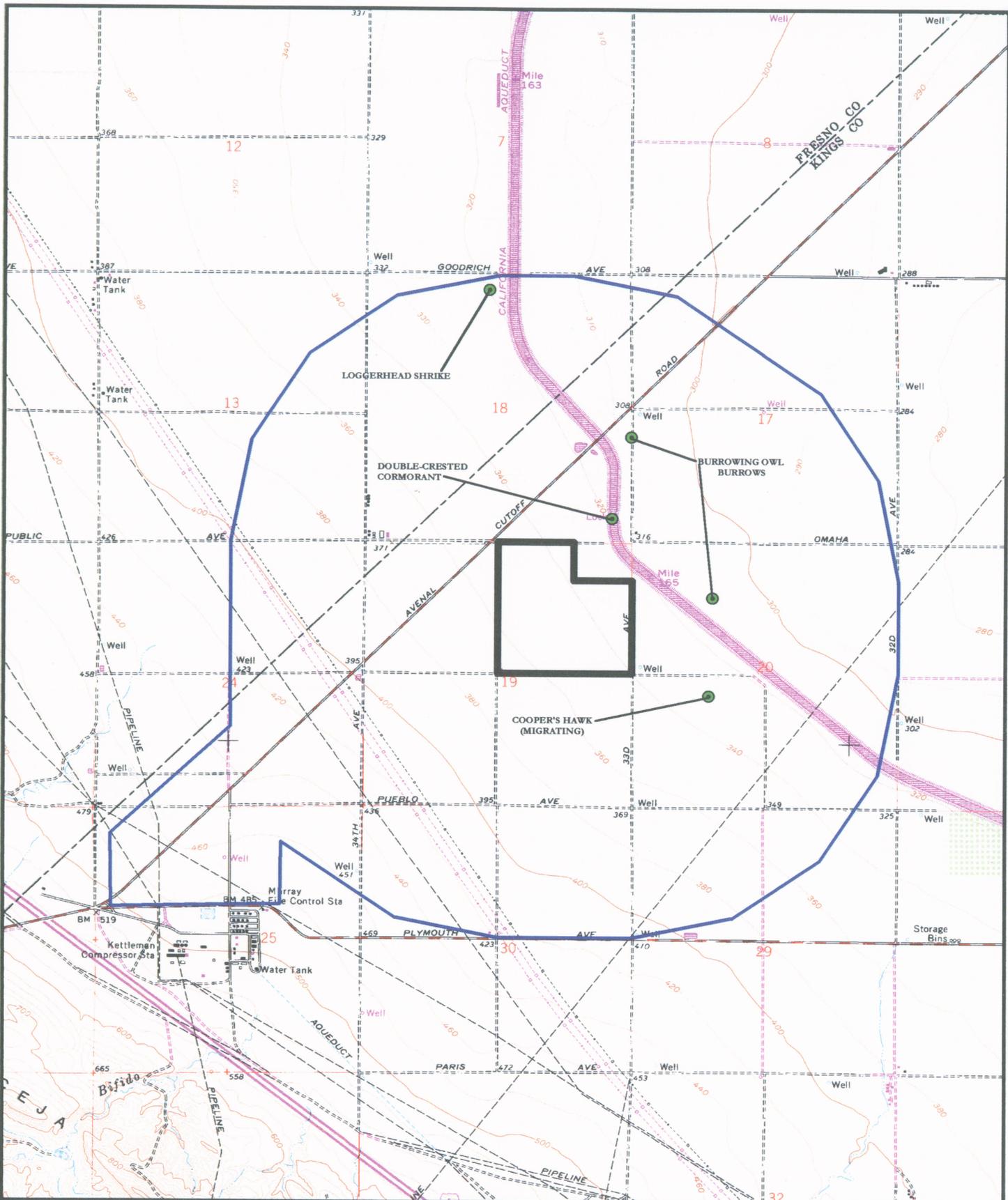


FIGURE 7
Special-Status Wildlife Observed
Within the Project Vicinity

Avenal Energy Project
Kings County, CA

EIP
 ASSOCIATES

2000 0 2000
 Feet

Source: EIP, 3-27-01; USGS 7.5 minute topographic quads: La Cima; and EIP GIS Program, August 2001

AE Project Site Boundary
 Project Vicinity
● Special-Status Wildlife Occurrence

PROJECT NUMBER: 10535-00
 Requested by: JS Created by: MG Date: 8/31/01

C:\GIS\Projects\10

Willow trees observed growing in some the aquatic features in the Project vicinity could provide nesting habitat for loggerhead shrikes and other special-status birds. Due to the presence of non-native bullfrogs in the perennial features, it is highly unlikely that they would support special-status amphibians. Furthermore, these features would not support listed vernal pool branchiopod species since they appear to be permanently inundated. No special-status species were observed within this habitat type within the Project vicinity.

The San Luis Canal in the Project vicinity supports a variety of fish and aquatic insect species, and thus provides foraging habitat for many birds and fish. Although only one special-status species, the double-crested cormorant, was observed during the March 27-28 survey, the San Luis Canal could also provide foraging opportunities for other special-status birds.

NAMES AND QUALIFICATIONS OF INDIVIDUALS

EIP Associates staff that participated in the preparation of this Biological Resources Technical Report included Michael Bumgardner (Director of Biological Services), Mark Genaris (Project Manager and Wildlife Biologist), and Demian Ebert (Wildlife Biologist). The resumes of each of these individuals are shown in Appendix 2.

AGENCY INTERACTION

Various staff from the USFWS, CDFG, and DWR were contacted during the development of this technical report. The names and phone numbers of these individuals are listed in Table 3.

AGENCY PERSONS CONTACTED FOR THE AVENAL ENERGY PROJECT			
Resource Agency	Person Contacted	Issue	Phone
U.S. Fish and Wildlife Service	Peter Cross	Federally-listed species	916-414-6655
U.S. Fish and Wildlife Service	Brian Peterson	Federally-listed species	916-414-6655
California Department of Fish and Game	Michael Mulligan	California-listed species	559-243-4014
California Department of Fish and Game	Annette Tenneboe	California-listed species	559-243-4014
California Department of Water Resources	John Shelton	Special-status species	559-230-3302
California Department of Water Resources	Julie Vance	Special-status species	559-230-3302

LITERATURE CITED

- California Department of Fish and Game. 2001. Natural Diversity Database.
- Kochergen, John and Kochergen, Mike. 2001. Personal communication with Joe Stenger (TRC). July 16, 2001.
- Orloff, S.G. 1992. Survey techniques for the San Joaquin kit fox (*Vulpes macrotis mutica*). Pages 185-198 in: Endangered and Sensitive Species of the San Joaquin Valley, California. (Eds: D.F. Williams, S. Byrne, and T.A. Rado) California Energy Commission, Sacramento, CA.
- U.S. Fish and Wildlife Service. 1998. Recovery plan for upland species of the San Joaquin Valley, California. Region 1, Portland, OR. 319 pp.
- Vance, J. 2001. California Department of Water Resources. Personal communication regarding biological resources that have been sited in the vicinity of the AE project

APPENDIX 1

California Native Species Field Survey Forms

California Native Species Field Survey Form

Mail to:
 Natural Diversity Database
 California Department of Fish and Game
 1807 13th Street, Suite 202
 Sacramento, CA 95814

For Office Use Only

Source Code _____ Quad Code _____
 Elm Code _____ Occ. No. _____
 EO Index No. _____ Map Index No. _____

Date of Field Work: 3 / 28 / 2001
month (mm) date (dd) year (yyyy)

Scientific Name: Phalacrocorax auritus
Common Name: Double-crested Cormorant

Species Found?
yes no If not, why?
 Total No. Individuals 3 Subsequent Visit? yes no
Is this an existing NDDB occurrence? yes no unk.
Yes, Occ. #
 Collection? If yes: _____
Number Museum / Herbarium

Reporter: Mark Genaris
Address: EIP Associates; 1200 Second Street, Suite 200
Sacramento, CA 95814
Email Address: mgenaris@eipassociates.com
Phone: (916) 325-4800

Plant Information

Phenology: _____
% vegetative % flowering % fruiting

Animal Information

Age Structure: 3
adults # juveniles # unknown
 breeding wintering burrow site rookery nesting other

Location (please also attach or draw map on back)

County: Kings Landowner / Mgr.: U.S. Bureau of Reclamation
 Quad Name: La Cima Elevation: 310
 T 21S R 18E SE 1/4 of SE 1/4 of Section 18 T _____ R _____ 1/4 of _____ 1/4 of Section _____
 UTM: Zone: _____ (10, 11) Datum: NAD27 (NAD83, NAD 27, WG584, other)
 Source: USGS 7.5 minute (GPS, map & type, etc.) Point Accuracy: 5 Meters
 UTM Coordinates _____

Habitat Description (plant communities, dominants, associates, substrates/soils, aspects/slope)
San Luis Canal.

Other rare species? Loggerhead Shrike, Burrowing Owl, Cooper's Hawk

Site Information Overall site quality: Excellent Good Fair Poor

Current / surrounding land use: Agriculture, Grasslands

Visible disturbances / possible threats:

Comments: Three individuals observed foraging within the San Luis Canal. No nesting habitat in the vicinity of the observation.

Determination: (check one or more, and fill in blanks)

- Keyed (cite reference): _____
- Compared with specimen housed at: _____
- Compared with photo / drawing in: _____
- By another person (name): _____
- Other: Personal Knowledge of Species

Photographs: (check one or more)

	Slide	Print
Plant / animal	<input type="checkbox"/>	<input type="checkbox"/>
Habitat	<input type="checkbox"/>	<input type="checkbox"/>
Diagnostic feature	<input type="checkbox"/>	<input type="checkbox"/>

May we obtain duplicates at our expense? yes no

California Native Species Field Survey Form

Mail to:
 Natural Diversity Database
 California Department of Fish and Game
 1807 13th Street, Suite 202
 Sacramento, CA 95814

For Office Use Only

Source Code _____ Quad Code _____
 Elm Code _____ Occ. No. _____
 EO Index No. _____ Map Index No. _____

Date of Field Work: 3 / 28 / 2001
month (mm) - date (dd) - year (yyyy)

Scientific Name: *Accipiter cooperii*
Common Name: Cooper's Hawk

Species Found? _____
yes no If not, why?
 Total No. Individuals 1 Subsequent Visit? yes no
 Is this an existing NDDDB occurrence? _____ no unk.
Yes, Occ. #
 Collection? If yes: _____
Number Museum / Herbarium

Reporter: Mark Genaris
Address: EIP Associates; 1200 Second Street, Suite 200
 Sacramento, CA 95814
Email Address: mgenaris@eipassociates.com
Phone: (916) 325-4800

Plant Information

Phenology: _____
% vegetative % flowering % fruiting

Animal Information

Age Structure: # adults _____ # juveniles _____ # unknown 1
 breeding wintering burrow site rookery nesting other

Location (please also attach or draw map on back)

County: Kings Landowner / Mgr.: U.S. Bureau of Reclamation
 Quad Name: La Cima Elevation: 310
 T 21S R 18E NE 1/4 of SW 1/4 of Section 20 T _____ R _____ 1/4 of _____ 1/4 of Section _____
 UTM: Zone: _____ (10, 11) Datum: NAD27 (NAD83, NAD 27, WG5 84, other)
 Source: USGS 7.5 minute (GPS, map & type, etc.) Point Accuracy: 10 Meters
 UTM Coordinates _____

Habitat Description (plant communities, dominants, associates, substrates/soils, aspects/slope)
 Rowcrops, Orchards, Vineyards. Also disturbed annual grasslands with Avena, Hordeum, Bromus, Erodium. Total vegetative cover approximately 75%. Friable soils. Slopes vary from flat to 45 degrees on the canal levee embankment. The grasslands occur as linear swaths between the San Luis Canal and the edge of adjacent agricultural fields.
 Other rare species? Loggerhead Shrike, Double-Crested Cormorant, Burrowing Owl

Site Information Overall site quality: Excellent Good Fair Poor
 Current / surrounding land use: Agriculture, Grasslands
 Visible disturbances / possible threats:
 Comments: One migrating individual observed soaring overhead. No nesting habitat in the vicinity of the observation.

Determination: (check one or more, and fill in blanks)
 Keyed (cite reference): _____
 Compared with specimen housed at: _____
 Compared with photo / drawing in: _____
 By another person (name): _____
 Other: Personal Knowledge of Species

Photographs: (check one or more) Slide Print
 Plant / animal
 Habitat
 Diagnostic feature
 May we obtain duplicates at our expense? yes no

California Native Species Field Survey Form

Mail to:
 Natural Diversity Database
 California Department of Fish and Game
 1807 13th Street, Suite 202
 Sacramento, CA 95814

For Office Use Only

Source Code _____ Quad Code _____
 Elm Code _____ Occ. No. _____
 EO Index No. _____ Map Index No. _____

Date of Field Work: 3 / 28 / 2001
month (mm) date (dd) year (yyyy)

Scientific Name: *Athene cunicularia hypugea*
Common Name: Western Burrowing Owl

Species Found? Burrows Only
yes no If not, why?
 Total No. Individuals 0 Subsequent Visit? yes no
 Is this an existing NDDB occurrence? yes no unk.
Yes, Occ. #
 Collection? If yes: _____
Number Museum / Herbarium

Reporter: Mark Genaris
Address: EIP Associates; 1200 Second Street, Suite 200
Sacramento, CA 95814
Email Address: mgenaris@eipassociates.com
Phone: (916) 325-4800

Plant Information

Phenology: _____
% vegetative % flowering % fruiting

Animal Information

Age Structure: # adults _____ # juveniles _____ # unknown _____
 breeding wintering burrow site rookery nesting other

Location (please also attach or draw map on back)

County: Kings Landowner / Mgr.: U.S. Bureau of Reclamation
 Quad Name: La Cima Elevation: 310
 T 21S R 18E NE 1/4 of NW 1/4 of Section 20 T 21S R 18E NE 1/4 of SE 1/4 of Section 18
 UTM: Zone: _____ (10, 11) Datum: NAD27 (NAD83, NAD27, WG584, other)
 Source: USGS 7.5 minute (GPS, map & type, etc.) Point Accuracy: 5 Meters
 UTM Coordinates _____

Habitat Description (plant communities, dominants, associates, substrates/soils, aspects/slope)
 Disturbed annual grasslands with Avena, Hordeum, Bromus, Erodium. Total vegetative cover approximately 75%. Friable soils. Slopes vary from flat to 45 degrees on the canal levee embankment. The grasslands occur as linear swaths between the San Luis Canal and the edge of adjacent agricultural fields.

Other rare species? Loggerhead Shrike, Double-Crested Cormorant, Cooper's Hawk

Site Information Overall site quality: Excellent Good Fair Poor
 Current / surrounding land use: Agriculture
 Visible disturbances / possible threats: Agriculture, DWR maintenance
 Comments: Two burrows located within the levee bank of the San Luis Canal

Determination: (check one or more, and fill in blanks)
 Keyed (cite reference) _____
 Compared with specimen housed at: _____
 Compared with photo / drawing in: _____
 By another person (name): _____
 Other: Personal Knowledge of Species

Photographs: (check one or more) Slide Print
 Plant / animal
 Habitat
 Diagnostic feature
 May we obtain duplicates at our expense? yes no

California Native Species Field Survey Form

Mail to:
 Natural Diversity Database
 California Department of Fish and Game
 1807 13th Street, Suite 202
 Sacramento, CA 95814

For Office Use Only

Source Code _____ Quad Code _____
 Elm Code _____ Occ. No. _____
 EO Index No. _____ Map Index No. _____

Date of Field Work: 3 / 28 / 2001
month (mm) date (dd) year (yyyy)

Scientific Name: Lanius ludovicianus
Common Name: Loggerhead Shrike

Species Found?
yes no If not, why?
 Total No. Individuals 2 Subsequent Visit? yes no
 Is this an existing NDDDB occurrence? no unk.
Yes, Occ. #
 Collection? If yes: _____
Number Museum / Herbarium

Reporter: Mark Genaris
Address: EIP Associates; 1200 Second Street, Suite 200
Sacramento, CA 95814
Email Address: mgenaris@eipassociates.com
Phone: (916) 325-4800

Plant Information

Phenology: _____
% vegetative % flowering % fruiting

Animal Information

Age Structure: 2
adults # juveniles # unknown
 breeding wintering burrow site rookery nesting other

Location (please also attach or draw map on back)

County: Fresno Landowner / Mgr.: U.S. Bureau of Reclamation, DWR, Private
 Quad Name: La Cima Elevation: 320
 T 21S R 18E NE 1/4 of NW 1/4 of Section 18 T _____ R _____ 1/4 of _____ 1/4 of Section _____
 UTM: Zone: _____ (10, 11) Datum: NAD27 (NAD83, NAD 27, WG584, other)
 Source: USGS 7.5 minute (GPS, map & type, etc.) Point Accuracy: 5 Meters
 UTM Coordinates _____

Habitat Description (plant communities, dominants, associates, substrates/soils, aspects/slope)
Rowcrops, Orchards, Vineyards. Water Storage Ponds containing wetland vegetation, including willows and tule. Also disturbed annual grasslands with Avena, Hordeum, Bromus, Erodium. Total vegetative cover approximately 75%. Friable soils. Slopes vary from flat to 45 degrees on the canal levee embankment. The grasslands occur as linear swaths between the San Luis Canal and the edge of adjacent agricultural fields.

Other rare species? Double-crested Cormorant, Burrowing Owl, Cooper's Hawk

Site Information Overall site quality: Excellent Good Fair Poor
 Current / surrounding land use: Agriculture, Grasslands
Agriculture
 Visible disturbances / possible threats: _____
 Comments: Two individuals observed perching on a fence on the west side of the San Luis Canal. Nesting and foraging habitat exists within the vicinity of the observation.

Determination: (check one or more, and fill in blanks)
 Keyed (cite reference): _____
 Compared with specimen housed at: _____
 Compared with photo / drawing in: _____
 By another person (name): _____
 Other: Personal Knowledge of Species.

Photographs: (check one or more) Slide Print
 Plant / animal
 Habitat
 Diagnostic feature
 May we obtain duplicates at our expense? yes no

APPENDIX 2

Resumes of Participating EIP Associates Staff

MICHAEL BUMGARDNER
Director Biological Services

Mr. Bumgardner has over 18 years of experience with terrestrial vertebrates, invertebrates and flora in ecosystems of North, Central and South America, Asia, and western Europe. He also has over 12 years of experience in the management and preparation of environmental documents that comply with the National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), Tahoe Regional Planning Agency (TRPA), Federal Endangered Species Act (FESA), and California Endangered Species Act (CESA). He has particular experience in the coordination and preparation of biological resource assessments, management plans, mitigation programs, habitat conservation planning and permitting associated with threatened and endangered species.

TECHNICAL CAPABILITIES

- Extensive experience with consultation and coordination with local, state, and federal regulatory agencies.
- Knowledgeable in the statutory requirements and guidelines for Federal Endangered Species Act Sections 7 Consultations and 10(a) incidental take permits and California Endangered Species Act Section 2081 Management Agreements.
- Experienced in the preparation of biological assessments for state and federal threatened and endangered species and other special-status species.
- Knowledgeable about the habitat requirements and ecology of terrestrial and aquatic vertebrates and invertebrates of the western United States.
- Managed and conducted surveys for a wide variety of species, including: *California red-legged frog*, *California tiger salamander*, *foothill yellow-legged frog*, *southwestern arroyo toad*, *San Joaquin kit fox*, *Fresno kangaroo rat*, *Swinson's hawk*, *burrowing owl*, *northern goshawk*, *California gnatcatcher*, *southwestern willow flycatcher*, *California clapper rail*, *least bell's vireo*, *vernal pool crustaceans*, and *valley elderberry longhorn beetle*.
- Experienced in the management and preparation of environmental documents that comply with CEQA, NEPA, and the TRPA Rules of Procedure.
- Particularly experienced with impact analyses involving sensitive habitats and special-status species, designing feasible mitigation measures to reduce significant impacts on biological resources, and resolving project conflicts with biological resources.

EDUCATION AND AFFILIATIONS

B.S., Zoology, June 1980, University of California at Davis, California

Registrations

Federal Fish and Wildlife Threatened Species Permit No. PRT-785564 for California Gnatcatcher (*Poliopitila californica californica*), Southwestern Willow Flycatcher (*Empidonax traillii eximius*) and California Clapper Rail (*Rallus longirostris obsoletus*)

Federal Scientific Take Permit No. PRT-702631 for Santa Barbara County District Population of California Tiger Salamander

State of California, Department of Fish and Game Scientific Collector's Permit #801033-05

Affiliations

American Birding Association
Society for Conservation Biology

PROJECT EXPERIENCE

State and Federal Endangered Species Act Compliance

Yolo County Multi-Species Habitat Conservation Plan, Yolo County

State Office and Warehouse Facility at Butterfield Way Valley Elderberry Longhorn Beetle Biological Assessment and Section 7 Consultation, State of California

UC Merced/University Community Federally Listed Vernal Pool Crustacean, California Tiger Salamander, Special-Status Plant, and San Joaquin Kit Fox/Fresno Kangaroo Rat Survey Programs, University of California and Merced County

Turk Anticline 3-D Seismic Exploration Project Endangered Species Impact Avoidance Program, Enron Oil and Gas Company

Stewart Tract Preliminary Survey, and Mitigation Program for Special-Status Wildlife Habitat, Califia Development

California Fish and Game Code Section 2081 Habitat Management Plan for *Swinson's Hawk*, Califia Development
Swinson's Hawk Nest Site Mitigation Plan, Sweetwater Enterprises

Southeast Specific Plan Area Final EIR *Swinson's Hawk* Mitigation Program, City of Woodland

San Joaquin Kit Fox and *Tipton's Kangaroo Rat* Habitat Conservation Plan (HCP) and Section 2081 Management Agreement, Oceanic Properties, Inc.

San Joaquin Kit Fox and *Burrowing Owl* Pre-construction Surveys, Kern County

Natural Resource Management Projects

Hansen Creek Biological Monitoring Program, Getchell Gold Mine

Lawrence Berkeley National Laboratory Biological Baseline Database, U.S. Department of Energy

Environmental Baseline Study for a 10-year comprehensive plan that addresses 280+ petroleum-related projects in eastern Venezuela, Petroleos de Venezuela, S.A.

Utility and Infrastructure Projects

Milpitas Recycled Water Pipeline Project Passive *Burrowing Owl* Relocation Program, Santa Clara Valley Water District

Paiute Natural Gas Pipeline Biological Evaluation, Tahoe Regional Planning Agency

Santa Rosa Subregional Long-Term Wastewater Project Biological Assessment, Sonoma and Marin County

Southern Nevada Water Authority Treatment and Transmission Facility EIS and Biological Assessment, Southern Nevada Water Authority

Biological Evaluations for a variety of projects on National Forest lands in the Lake Tahoe Basin, South Tahoe Public Utility District

San Gabriel River Sediment Management Plan Final EIR/EIS *Arroyo Southwestern Toad*, *Least Bell's Vireo*, and *Southwestern Willow Flycatcher* Surveys, U.S. Fish and Wildlife Service and California Department of Fish and Game.

Echo Lake Dam Stabilization Environmental Assessment, PG&E
Rock Creek-Cresta Sediment Management Project In-house CEQA consulting services, PG&E

TRPA Projects

Heavenly Ski Resort Master Plan EIR/EIS, Biological Resources Surveys, Biological Evaluation, and Annual Monitoring Program, Heavenly Ski Resort
Golden Bear Park Master Plan EIR/EIS, Tahoe Regional Planning Agency and El Dorado County
Harootunian Trust Land Transfer Biological Evaluation, U.S. Forest Service

Other CEQA/NEPA Projects

Reclamation District 2062 Cross Levee EIR, Reclamation District 2062
Civic Center Specific Plan and EIR, City of Rocklin
Shotgun Creek Estates EIR, Tuolumne County
Spreckles Sugar Company Annexation EIR, City of Woodland
Siskiyou Lake Highlands Final EIR, Siskiyou County
Croftwood Subdivision EIR, City of Rocklin
Tiechert/Granite Aggregate Mining Site Vernal Pool, Invertebrate, and Avian Surveys, Sacramento County
A-Line & B-Line Replacement Project EIRs/EISs, STPUD

Transportation Projects

Kowloon-Canton Railway Corporation (Hong Kong) Environmental Impact Assessment Responses, California Environmental Consulting Associates
US Highway 101 Auxiliary Lanes Project Jurisdictional Wetlands Delineation and Impact Assessment, Natural Environment Study, and Biological Assessment, San Mateo County Transportation Department
Sacramento South Corridor Project Final EIS, Sacramento Regional Transit
I-205 Widening Project Natural Environment Study and Biological Assessment, San Joaquin County
California Forest Highway 137 Proposed Rehabilitation and Reconstruction Sensitive Wildlife Survey Methodologies and Results Report, Federal Highway Administration (FHWA)
Southside Corridor EIR, Kern County Council of Governments
State Route 58 Extension EIR, Kern County Council of Governments

Department of Defense Projects

Brooks Air Force Base Inventory of Avian Species, U.S. Air Force Center for Environmental Excellence (AFCEE)
Hohenfels (Germany) Combat Maneuver Training Center Integrated Natural Resources Management Plan Pest, Fish and Wildlife Management, and Threatened and Endangered Species Management Program, U.S. Army Europe
Andrews Air Force, Davidsonville, and Brandywine Communication Sites Biological Inventory of Sensitive Species, AFCEE
BRAC US Army Chemical School and Military Police School Relocation Mitigation Monitoring Framework and Adaptive Management Strategy, U.S. Army
U.S. Fish and Wildlife Service World-listed, and Portuguese Government Listed Species Surveys and Integrated Natural Resources Management Plan, AFCEE and U.S. Air Force Air Combat Command (ACC)

Dyess Air Force Base Threatened and Endangered Species, Fish and Wildlife, and Outdoor Recreation Component Plans and Integrated Natural Resources Management Plan, ACC
Vandenberg Air Force Base Fiber Optic Cable Route Biological Assessment, U.S. Air Force Space Missile Command
Camp Pendleton Relocation of Baseline Road and Case Springs Access Road Habitat Suitability Preliminary Assessment for the federally-listed *Stephen's Kangaroo Rat*, *California Gnatcatcher*, and *Least Bell's Vireo*, U.S. Marine Corps

MARK C. GENARIS, M.S.
Wildlife Biologist

Mark Genaris has ten years of experience in wildlife biology and management and a broad background that includes work with wetland soils, vegetation, and ground water chemistry. As an EIP biologist, Mr. Genaris conducts wildlife and wetland studies for a wide variety of projects.

TECHNICAL CAPABILITIES

- Responsibilities and expertise include wildlife species assessments, evaluating and mapping wildlife habitats, assessing potential project impacts to biological resources, and identifying feasible mitigation measures.
- Conducts rare, threatened, and endangered plant and wildlife surveys and assessments.
- Is permitted by the USFWS to conduct vernal pool crustacean and California tiger salamander surveys.
- Conducts assessments for California special-status species including: San Joaquin kit fox, Fresno kangaroo rat, San Bernardino kangaroo rat, vernal pool crustaceans, California tiger salamander, California red-legged frog, California Clapper Rail, Least Bell's Vireo, and salt marsh harvest mouse.
- Is skilled in trapping, banding, remote sensing, and radio-telemetry with birds and mammals, including migratory waterfowl, small mammals, forest carnivores, cervids, and various canids.
- Is trained and skilled in GPS data collection and GIS mapping and analysis.
- Conducts informal special-status species consultation with both the USFWS and CDFG.
- Prepares biological resource documentation for NEPA and CEQA documents, HCPs, wildlife management plans, and biological survey reports involving sensitive habitats and special-status wildlife species.
- Experienced in identification and delineation of USCOE jurisdictional wetlands and has completed a 40-hour USCOE certification training program.
- Is skilled in assessing wetland soil and water dynamics.

EDUCATION AND AFFILIATIONS

B.S. in Wildlife Biology, Unity College, Maine
M.S. in Environmental Science and Engineering, Oregon Graduate Institute of Science and Technology, Portland
Research Associate, Delta Waterfowl and Wetlands Research Station, Manitoba CANADA
Wildlife Society, Western Section
Denton Belk California Fairy Shrimp Identification Course (December, 1998)
Trimble GPS Mapping for GIS Training Class
Trimble Pathfinder Office and Asset Survey Training Class
40-hour USCOE Certification Training Program

PROJECT EXPERIENCE

Biological Resources

San Clemente Island Fairy Shrimp Survey, Bitterroot Restoration [CLIENT]
Vernal Pool Crustacean Surveys, San Clemente Island
North Delta Shores Biological Survey, City of Sacramento
Poorman Reservoir Biological Resources Technical Report, City of Moreno Valley
Poorman Reservoir Stephen's Kangaroo Rat Survey, City of Moreno Valley
TRC Biological Resources and AFC, Avenal Power Plant, City of Avenal
NC Brown Development Biological Assessment, El Dorado County
University Community Concept Planning Process for the Tenth UC Campus in Merced, University of California
Vernal Pool Crustacean Surveys, UC Merced
Special-Status Mammal Surveys, UC Merced
California Tiger Salamander Surveys, UC Merced
University Community Site Alternatives Analysis, UC Merced
Bellevue Ranch San Joaquin Kit Fox Survey, City of Merced
Biological Assessment and California red-legged frog Habitat Suitability Survey, El Dorado Water Agency
Levee Mitten Crab Surveys, Sacramento Area Flood Control Agency
Ingram Slough Addendum, City of Lincoln
Lower Silver Creek SEIR Biological Survey, City of San Jose
Soquel Creek Biological Survey, City of Capitola
Mission Bay Subsequent EIR, City of San Francisco
Ventura Rail ROW Biological Survey, City of Santa Clarita
Landfill Park EIR Biological Surveys, City of Burlingame
Lower Crystal Springs Reservoir Biological Survey and California red-legged frog/San Francisco garter snake Mitigation Plan, San Mateo County
San Francisco International Airport Wildlife Hazard Management Plan Biological Surveys, City of San Francisco
Marine World Africa USA Biological Surveys, City of San Vallejo
Bay Division Pipelines Salt Marsh Vegetation Surveys, City of Newark
Westborough Property Biological Survey, City of Sacramento
New Standard Biological Survey, City of Standard
South Shore Club San Joaquin Kit Fox Survey, Tuolumne and Mariposa Counties
Coleman Ranch San Joaquin Kit Fox Survey, Tuolumne County
San Bernardino Kangaroo Rat Surveys, San Bernardino County
State Office and Warehouse Facility at Butterfield Way Valley Elderberry Longhorn Beetle Biological Assessment and Section 7 Consultation, State of California
Yolo County HCP, Yolo County

Wetland Delineation and Ecology

Wetland Delineation, UC Merced

Level 3 Communications Wetland Delineations, City of Sacramento

Lower Silver Creek Watershed Wetland Delineation, Santa Clara County

Hayward South of 92 EIR Wetland Delineation, City of Hayward
Rainier Avenue Crosstown Connector Wetland Mitigation Plan, City of Petaluma

Lower Crystal Springs Wetland Delineation, San Mateo County

Marine World Africa USA Wetland Delineation, City of Vallejo

Magpie/Robla Creek Wetland Delineation, City of Sacramento
Wetland Plant and Soil Surveys, Delta Waterfowl and Wetlands Research Station Wetland Soil Chemistry Study, Oregon Graduate Institute of Science and Technology, Portland

Construction and Mitigation Monitoring

Early Intake Diversion Dam Construction Monitoring, Tuolumne County

Tuolumne Meadows Storm Water Pollution Prevention Compliance Inspection, Tuolumne County

Level 3 Communications Construction Monitoring

CEQA/NEPA Documents

Lower Silver Creek SEIR, City of San Jose

Capitola Crossing Subsequent EIR, City of Capitola

Mission Bay Subsequent EIR, City of San Francisco

Hayward South of 92 EIR, City of Hayward

Whittier Narrows EA/ND, City of Whittier

Burlingame Landfill Park Initial Study and EIR, City of Burlingame

Pacific Hacienda Initial Study and EIR, City of San Carlos

White Oak Way Initial Study, City of San Carlos

San Francisco International Airport Consolidation Wetland Permit Negative Declaration, City of San Francisco

General Plan EIR, City of Redding

Garden Highway Initial Study, City of Sacramento

Kowloon-Canton Railway Corporation Environmental Impact

DEMIAN EBERT
Fisheries and Wildlife Biologist

Demian Ebert has over 9 years of experience conducting fisheries and wildlife investigations. His responsibilities include preparation of fisheries-related environmental analyses for development plans and projects, endangered species evaluations, field investigations, and mitigation monitoring. Mr. Ebert is skilled in conducting instream fisheries resource evaluations, performing literature reviews, research, and monitoring to assess impacts to fish and wildlife resources from multiple sources and to formulate or evaluate mitigation measures. He also has extensive experience in the preparation of technical documents, mitigation and management plans that evaluate and/or mitigate impacts from development, diversion, or other instream activities on fish and wildlife resources.

TECHNICAL CAPABILITIES

- Extensive experience conducting instream fisheries resource evaluations using a wide variety of methods.
- Conducts literature reviews, research, and monitoring to assess impacts to fish and wildlife resources from a variety of sources. Formulates and evaluates feasible and successful mitigation measures.
- Assists with preparation of CEQA documents and mitigation or management plans to evaluate and mitigate impacts from development, diversion, or other instream and uplope activities on fish and wildlife resources.
- Assists with the design of fisheries, wildlife, and habitat restoration plans, including the development of technical construction drawings, specifications, bid packages, and implementation schedules.
- Manages projects in which fisheries and wildlife issues are of primary concern.

EDUCATION AND AFFILIATIONS

B.A., Biology, University of California, Santa Cruz

Member, American Fisheries Society
Member, Cooper Ornithological Society
Member, Wilson Ornithological Society
Member, American Birding Association

PROJECT EXPERIENCE

Fisheries Monitoring/Investigations

Pacific Gas & Electric Company Hydroelectric Facility
Divestiture EIR, California Public Utilities Commission
Big Bear Creek Electrofishing Survey, Big Bear Municipal Water District
Potter Valley Project Monitoring Program, Effects of Operations on Upper Eel River Anadromous Salmonids, Pacific Gas and Electric Company
Passive Integrated Tagging Investigations of Juvenile Steelhead in the Upper Eel River, Pacific Gas and Electric Company
Sacramento Squawfish Predation on Juvenile Salmonids, California Department of Fish and Game
Decline of Salmonids in the Russian River, Sonoma County Water Agency and Circuit Rider Productions
Stream Habitat Surveys of Murphy and Horse Creeks, Round Valley Indian Tribes

Fisheries Mitigation

Compliance Testing of the Potter Valley Project Fish Screen Facility, Pacific Gas and Electric Company
Design, Construction Monitoring, and Compliance Testing of Bypass Modifications to the Potter Valley Project Fish Screen Facility, Pacific Gas and Electric Company

Biological Assessment

Significant Natural Resource Areas Management Plan, City and County of San Francisco, Recreation and Park Department
Lower Silver Creek Watershed Project IS/EA, Santa Clara Valley Water District
Lower Guadalupe River QA/QC Services, Santa Clara Valley Water District
Biological Assessments and Pre-construction Surveys in the San Francisco Bay Area and Southern California, Ralph Osterling Consultants, Inc.
General Plan and EIR, Biological Constraints Analysis, City of Brentwood
Waterfront Hotel Initial Study/Negative Declaration, City of Burlingame
Murphy Ridge/Asa Bean Biological Assessment, Round Valley Indian Tribes
North Fork Biological Assessment, Round Valley Indian Tribes

Wildlife Investigations

Neely California Red-legged Frog Surveys, CJW Architecture
California Red-legged Frog Site Assessment, Avi Meyers
California Red-legged Frog Surveys and Status Report, Lake Merced, City and County of San Francisco, Recreation and Parks Department
Sand Hill Road Bridge Retrofit Project, California Red-legged Frog Surveys, City of Palo Alto
Surveys for Fresno Kangaroo Rat and San Joaquin Kit Fox, University of California, Merced
Site Assessment for California Red-legged Frogs, Carneros Partners
Bird Nest Surveys Along Old Alameda Creek, Oliver Estate and Trust
Special Status Species Surveys at Sisuoc Gravel Plant, Hanson Aggregates
Northern Elephant Seal Pup Mortality, University of California, Santa Cruz
Dietary Analysis of White-tailed Kites, University of California, Santa Cruz
Covelo Breeding Bird Survey, National Biological Service
Multiple Northern Spotted Owl Surveys, Sonoma, Lake, Mendocino, and Trinity Counties
Breeding Raptor Survey, Yardbirds, Inc.
Breeding Raptor Survey, Zam Properties Inc.

Mitigation Plans

Crystal Springs Reservoir Dam Abutment Improvement Project, Habitat Mitigation and Monitoring Plan, City and County of San Francisco, Public Utilities Commission
Carranza Basin Habitat Reclamation Plan, Hanson Aggregates
Little Lucy Basin Conceptual Habitat Reclamation Plan, Hanson Aggregates
Alameda Creek Diversion Dam: Mitigation Site Planting Plan, City and County of San Francisco, Public Utilities Commission
Colma Creek Flood Control Project: Mitigation Site Design, San Mateo County Flood Control District

Permitting/Monitoring

San Quentin Shoreline Repairs Final Measures Initial
Study/Environmental Assessment, California Department
of Corrections and Department of General Services
Level 3 Long Haul Project Biological and Environmental
Services, BHE, Inc.