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5.2 BIOLOGICAL RESOURCES

Hydrogen Energy International LLC (HEI or Applicant) is jointly owned by BP Alternative Energy North America Inc., and Rio Tinto Hydrogen Energy LLC. HEI is proposing to build an Integrated Gasification Combined Cycle (IGCC) power generating facility called Hydrogen Energy California (HECA or the “Project”) in Kern County, California. The Project will produce electricity while substantially reducing greenhouse gas emissions by capturing carbon dioxide (CO₂) and transporting it for enhanced oil recovery (EOR) and sequestration.

The 315-acre Project Site is located approximately 6.5 miles west of the outermost edge of the city of Bakersfield and 2 miles northwest of the unincorporated community of Tupman in western Kern County, California, as shown in Figure 2-1, Project Vicinity Map. The Project Site is adjacent to an oil producing area known as the Elk Hills Oil Field Unit. The Project Site is currently undeveloped. Existing surface elevations vary from about 445 feet above mean sea level (msl) in the southwest corner to about 310 feet above msl in the northeast corner.

The Project will gasify petroleum coke (or blends of petroleum coke and coal, as needed) to produce hydrogen to fuel a combustion turbine operating in combined cycle mode. The gasification component feeds a 390 gross megawatt (MW) combined cycle plant. The net electrical generation output from the Project will provide California with approximately 250 MW of low-carbon baseload power to the grid. The gasification component will also capture approximately 90 percent of the carbon dioxide from the syngas at steady-state operation, which will be transported and used for EOR and sequestration (storage) in the Elk Hills Oil Field Unit. In addition, approximately 100 MW of natural gas generated peaking power will be available from the Project.

The Project Site and linear facilities comprise the affected study area and are entirely located in Kern County, California. These Project components are described below.

Major on-site Project components will include, as shown on Figure 2-4, Plot Plan:

- Solids Handling, Gasification, and Gas Treatment
 - Feedstock delivery, handling and storage
 - Gasification
 - Sour shift/gas cooling
 - Mercury removal
 - Acid gas removal
- Power Generation
 - Combined-cycle power generation
 - Auxiliary combustion turbine generator
 - Electrical switching facilities
- Supporting Process Systems
 - Natural gas fuel systems

- Air separation unit (ASU)
- Sulfur recovery unit
- Zero liquid discharge
- Carbon dioxide compression
- Wastewater injection wells
- Raw water treatment plant
- Other plant systems

The Project also includes the following off-site facilities, as shown on Figure 2-5, Project Location Map:

- **Electrical Transmission Line** – An electrical transmission line will interconnect the Project to Pacific Gas & Electric’s (PG&E) Midway Substation. The interconnection voltage is expected to be 230 kilovolts (kV). The Project is considering two alternative transmission routes, both of which extend from the western edge of the Project Site to the north, and west to the north side of the substation. Transmission Alternative 1 is approximately 9 miles long and Transmission Alternative 2 is approximately 9.5 miles long.
- **Natural Gas Supply** – A natural gas interconnection will be made with either PG&E or Southern California Gas Company natural gas pipelines, both of which are located southeast of the Project Site. The natural gas pipeline will be approximately 7 miles in length. The interconnect will consist of one tap off the existing natural gas line, one meter set, one service pipeline service connection, and a pressure limiting station located on the Project Site.
- **Water Supply Pipelines** – The Project will utilize brackish groundwater supplied from the Buena Vista Water Storage District (BVWSD) located to the northwest. The raw water supply pipeline will be approximately 18 miles in length. Potable water for drinking and sanitary use will be supplied by West Kern Water District located near the State Route 119 (SR 119)/Tupman Road intersection (southeast of the Project Site). The potable water supply pipeline will be approximately 5.5 miles in length.
- **Carbon Dioxide Pipeline** – The carbon dioxide pipeline will transfer the carbon dioxide captured during gasification from the Project Site southwest to the custody transfer point. The Project is considering two alternative pipeline routes. Alternative 1 is approximately 2 miles in length, while Alternative 2 is approximately 2.5 miles in length.

The Project components described above are shown on Figure 2-5, Project Location Map, which depicts the region, the vicinity, the Project Site and its immediate surroundings for Project components.

In accordance with the California Energy Commission (CEC) regulations, Section 5.2, Biological Resources, describes biological resources in the vicinity of the Project Site, including wetlands, vegetation, and wildlife, in Section 5.2.1, Affected Environment. Sections 5.2.2, Environmental Consequences, 5.2.3, Cumulative Impacts Analyses, and 5.2.4, Mitigation Measures, describe the anticipated potential Project-related impacts to biological resources and measures proposed to mitigate or compensate for those impacts. Laws, ordinances, regulations, and standards (LORS) for protection of biological resources are provided in Section 5.2.5, Laws,

Ordinances, Regulations, and Standards. The subsequent sections describe agencies contacted for this evaluation as well as permits associated with biological resources that will be obtained prior to Project construction. Through agency consultations, Project design modifications, and appropriate mitigation measures, the Project will conform to all applicable LORS for protection of biological resources.

The areas evaluated for biological resources include the 315-acre Project Site with a 1-mile radius buffer, where property access was available. Additional Project components that were surveyed include the proposed water line corridor, the combined gas transmission/potable water line and access road corridor, the two carbon dioxide pipeline routes, and the two alternative transmission line routes connecting the Project to the PG&E Midway Substation. The surveys for these Project components included a 1,000-foot buffer, where property access was available. These features are shown on Figure 5.2-1, Biological Resources Study Area Coverage, which also shows the biological resources study area.

The impact assessment for biological resources included informal consultation with resource management agencies, literature review, and preliminary field surveys. The literature search included examination of environmental documents from adjacent and nearby areas and a review of pertinent maps, scientific literature, and regional biological field guides. Key resources/references include the following:

- Recovery Plan for Upland Species of the San Joaquin Valley, California (USFWS 1998)
- 2001 Special-status plant species survey results at Elk Hills Oil Field, Kern County, California (Quad Knopf 2001)
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CNPS 2007)
- California Natural Diversity Database (CDFG 2007)

Table 5.2-1, Biological Resources Field Surveys, summarizes the surveys performed for this biological resources study. Resumes for the primary biologists are attached in Appendix G, Biological Resources.

**Table 5.2-1
Biological Resources Field Surveys**

Resource	Field Surveys Completed	Conducted by URS Biologists(s)
General biology	Habitat assessment, small mammal evaluation, general reconnaissance conducted of Project Site, construction laydown area on 5 and 6 March 2008.	David Kisner Alex Brown
General biology	Habitat assessment, small mammal evaluation, general reconnaissance conducted of northern transmission line, waterlines, and gas line route on April 13 and April 24, 2008.	Alex Brown Julian Valenzuela
General biology	Habitat assessment, small mammal evaluation, general reconnaissance conducted of southern transmission line, and carbon dioxide gas line route on 20 May 2008.	David Kisner
Potential jurisdictional wetlands	Site review of Project Site, pipeline routes/access road, construction laydown area, and transmission line conducted on 5 and 6 March, 20 and 28 May 2008.	David Kisner Alyssa Berry

Plant and animal species observed during these field surveys are listed in Tables 5.2-2, Plant Species Observed in the Biological Resources Study Area, and 5.2-3, Wildlife Species Observed in the Biological Resources Study Area.

Table 5.2-2
Plant Species Observed in the Biological Resources Study Area

Scientific Name ¹	Common Name	Native/Exotic
<i>Amsinckia menziesii</i>	rancher's fireweed	E
<i>Astragalus sp.</i>	milk vetch	N
<i>Atriplex spinifera</i>	spinescale	N
<i>Bromus madritensis ssp. rubens</i>	red brome	E
<i>Camissonia sp.</i>	suncup	N
<i>Centaurea melitensis</i>	toocalote	E
<i>Crassula connata</i>	pygmy-weed	N
<i>Erodium cicutarium</i>	redstem filaree	E
<i>Isocoma acradenia var. bracteosa</i>	goldenbush	N
<i>Lasthenia californica</i>	goldfields	N
<i>Lepidium nitidum</i>	peppergrass	N
<i>Lycium sp.</i>	wolfberry	N
<i>Pectocarya sp.</i>	combseed	N
<i>Plagiobothrys canescens</i>	valley popcorn flower	N
<i>Salsola tragus</i>	tumbleweed	E

Source: HECA Project

Note:

1) No sensitive plant species were observed during the site surveys conducted March 5 and 6, 2008.

**Table 5.2-3
Wildlife Species Observed in the Biological Resources Study Area**

Common Name	Scientific Name	State/Federal/Other Listing Status
Invertebrates		
California harvester ant	<i>Pogonomyrmex californicus</i>	
Stink Beetle	Family: Tenebrionidae	
Scorpion	Order: Scorpionidae	
Reptiles		
Side blotch lizard	<i>Uta stansburiana</i>	
Rattlesnake species ¹	<i>Crotalus</i> spp.	
Avian		
Killdeer	<i>Charadrius vociferous</i>	
Mourning dove	<i>Zenaida macroura</i>	
Great-horned owl ²	<i>Bubo virginianus</i>	
Burrowing owl	<i>Athene cunicularia</i>	CSC
Loggerhead Shrike	<i>Lanius ludovicianus</i>	CSC
Common raven	<i>Corvus corax</i>	
Thrasher species	<i>Toxostoma</i> spp.	
Cliff swallow	<i>Petrochelidon pyrrhonota</i>	
Horned lark	<i>Eremophila alpestris</i>	DGF:WL
White-crowned sparrow	<i>Zonotrichia leucophrys</i>	
Savannah Sparrow	<i>Passerculus sandwichensis</i>	
Brewer's sparrow	<i>Spizella breweri</i>	
Western meadowlark	<i>Sturnella neglecta</i>	
Mammals		
Coyote ³	<i>Canis latrans</i>	
San Joaquin kit fox ⁴	<i>Vulpes macrotis mutica</i>	FE, CT
San Joaquin antelope squirrel ⁵	<i>Ammospermophilus nelsonii</i>	CT
Kangaroo rat ⁶	<i>Dipodomys</i> sp.	
Black-tailed jackrabbit	<i>Lepus californicus</i>	
Audubon's cottontail	<i>Sylvilagus audubonii</i>	
American badger ⁷	<i>Taxidea taxa</i>	CSC

Source: HECA Project Team. DFG 2008b

Notes:

- 1- Shed skin found.
- 2- Pellets and feathers found on-site
- 3- Coyote tracks and scat were identified.
- 4- San Joaquin kit fox tracks, scat, and active dens were identified.
- 5- Burrows of the correct size and shape found on the project site.
- 6- Kangaroo rat tracks and scats were identified- species indeterminate.
- 7- Badger digs observed.

FE Federally Endangered
 CT California Threatened
 CSC California Species of Concern
 DGF:WL DFG Watch List

5.2.1 Affected Environment

5.2.1.1 Regional Setting

The Project is located in Kern County, California. Kern County is located at the southern end of California's Central Valley and is the third-largest county in land area totaling 8,073 square miles. Primary components of the Kern County economy are farm products, petroleum, and national defense and space activities. Four natural areas with important biological resources were identified within 35 miles of the Project Site and are shown in Table 5.2-4, National Forests, Wilderness Areas, and Conservation Preserves near the Proposed Project Biological Resources Study Area.

**Table 5.2-4
National Forests, Wilderness Areas, and Conservation Preserves near the
Proposed Project Biological Resources Study Area**

Natural Area	Distance (approx. miles)	Direction
Tule Elk State Reserve	1.5	East
Buena Vista Aquatic Recreation Area	7.8	Southeast
Carrizo Plain National Monument	22.7	West
Kern and Pixley National Wildlife Refuges	33.4	Northwest

5.2.1.2 Local Setting

The Project Site is located on the southwest side of unincorporated Kern County within the Westside sub-area just northwest of the unincorporated community of Tupman and south of Adohr Road. The Westside sub-area is resource-based oil exploration and production and provides a large segment of the employment base. Clay mineral extraction also occurs in the area. The Project Site is located on approximately a 315-acre undeveloped parcel and located in Section 22 Township 30 South, Range 24 East, on the USGS Quadrangle Map. Agriculture and related operations occur north, northeast, and northwest of the Project Site. According to Kern County Planning Department, the majority of the crop types within the affected environment and surrounding areas consist of cotton and alfalfa. One rural residence is located within the affected environment along Tupman Road. Oil fields are located to the south, southeast, and southwest of the Project Site. The California State Water Project extends along the northeast boundary of the adjacent parcel.

5.2.1.3 Waters of the United States

Section 404 of the Clean Water Act (CWA) requires authorization for all discharges of fill material in Waters of the U.S. To comply with these requirements, it is necessary to be able to delineate the location and boundaries for Waters of the U.S. throughout the arid Southwest. Due to the difficulties encountered when performing delineations in dryland fluvial systems of the arid Southwest, the U.S. Army Corps of Engineers (USACE) prepared a guidance document for making jurisdictional determinations for these dry regions (USACE 2001). Furthermore, the preamble to 33 Code of Federal Regulations (CFR) 328.3 of the *Federal Register* (51 FR 41217), states that the USACE does not generally consider "non-tidal drainage or irrigation ditches excavated on dry land" nor "[a]rtificial lakes or ponds created by excavating and/or diking dry

land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing" to be Waters of the U.S. Both of these guiding directives were employed in the preliminary Waters of the U.S. jurisdiction assessment which follows. A formal delineation effort for the Project will be conducted during the appropriate time of year. Following the formal delineation effort, a letter of concurrence will be submitted to the USACE following formal jurisdictional determinations. A copy of the jurisdictional determination letter will be submitted to the CEC when it has been received from USACE.

The definition of Waters of the U.S. are those areas that are currently used or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters subject to the ebb and flow of the tide and all interstate waters (including wetlands). With non-tidal waters, in the absence of adjacent wetlands, the extent of USACE jurisdiction is defined as the "ordinary high water mark." In dryland fluvial systems typical of desert areas, the most common physical characteristics indicating ordinary high water mark include a clear, natural scour line impressed on the bank; recent bank erosion; destruction of native terrestrial vegetation; and the presence of litter and debris. Jurisdictional determinations in arid areas should apply in the presence of high water characteristics of dryland fluvial systems to ensure that the horizontal extent of jurisdiction includes small to moderate storm events, yet not so expansive that it incorporates high water evidence from 25-year, 50-year, and 100-year storm events. Recent court rulings have interpreted a primary evidence of a potential jurisdictional Water of the U.S. is hydraulic connectivity with another jurisdictional Water of the U.S. To be subject to interstate or foreign commerce, there must be potential for a water course to join hydraulically with another surface water body, even ephemerally.

Formal delineations have not been conducted for the Project Site and off-site facilities, though a cursory examination has been conducted during site assessment surveys (Figure 5.2-1, Biological Resources Study Area Coverage). Formal delineations will be conducted during spring 2009 after the rainy season and hydrophytic plants have had an opportunity to respond to the rainfall.

The Project Site shows some topographic features or dry washes that exhibit evidence of conveying water during storm events. The dry washes contain vegetative composition similar to adjacent upland areas though coverage varies considerably. No hydrophytic vegetation or vegetation typically found in desert washes is present in the dry washes crossing the Project Site. Evidence of regular surface water flow (i.e., debris patterns, disturbed vegetation, erosion lines) during storm events appears to be present within some of these washes. A moderate-sized ephemeral, dry wash feature found on the Project Site shows fairly well defined bed and bank features, however, it appears to lack hydraulic connectivity to a navigable water body or other jurisdictional waters (Figure 5.2-2a, Waters of the U.S.). This wash is not likely to be classified as a Waters of the U.S., but may fall within the California Department of Fish and Game (CDFG) jurisdiction as a Waters of the State. The wash enters the Project Site from the south near the middle of the southern property line and flows to the northeast.

The natural gas pipeline linear, which runs from the southeastern portion of Cole's Levee along SR 119 and Tupman Road to the Project Site, crosses the Kern River on the SR 119 bridge, will be near a potential wetland (Figure 5.2-2a, Waters of the U.S.), and crosses at least six culvert crossings. The Kern River, the potential wetland, and some of the culvert crossings along Tupman Road may be classified as Waters of the U.S.; however, the placement of the natural gas

pipeline on existing bridge support structures and within road fills will avoid the placement of fill material within the potential Waters of the U.S.

The potable water pipeline runs from near the SR 119/Tupman Road intersection to the Project Site. The potable water pipeline will follow the same alignment as the gas pipeline, likely not resulting in fill to any potential Waters of the U.S.

The Alternative 1 carbon dioxide pipeline route proceeds due south from the southwestern corner of the Project Site; this linear will cross numerous small swales and washes and one ephemeral wash. These swales and washes are not likely to be classified as a Waters of the U.S., but may fall within the California DFG jurisdiction as a Waters of the State. The Alternative 2 carbon dioxide pipeline remains adjacent to existing roadways for the majority of the approximately 2 mile route and should not impact any Waters.

The two transmission line alternatives south of the West Side Canal crosses the Kern River and three ephemeral washes (Figures 5.2-2c, 5.2-2d, 5.2-2e and 5.2-2f, Waters of the U.S.). Design for the placement of the footings has not been finalized at this time, but the Project should be able to adjust the placement of footings to not fall within Waters. The access road for either Alternative to install and maintain the transmission line will also cross both ephemeral washes and will likely also cross the Kern River.

The Kern River is regionally large and biologically important jurisdictional Waters (Figure 5.2-2g, Waters of the U.S.). It flows southeastward past the Project Site, near the intersection of Tupman Road and SR 119, and then changes course and flows east-northeast through the city of Bakersfield. A by-pass channel of the Kern River continues southeast under SR 119 east of Tupman Road and flows into Lake Webb.

5.2.1.3.1 Wetlands

Formal wetland delineations have not been conducted for the Project Site and off-site facilities, though a cursory examination has been conducted during site assessment surveys. Formal delineations will be conducted during the rainy season after the first significant rainfall.

In the absence of human disturbance or unusual circumstances, an area must possess indicators (characteristics) of three parameters to be considered a jurisdictional wetland under Section 404 of the CWA. This method is referred to as the three-parameter approach and they are (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology.

During the site assessment surveys, the Kern River showed a well-defined “bed and bank” and woody hydrophytic vegetation (Figure 5.2-2g, Waters of the U.S.). Portions of the southeastern section of Cole’s Levee showed indications of ponded water and potentially hydrophytic herbaceous vegetation (Figure 5.2-2b, Waters of the U.S.). Formal wetland delineations will need to be conducted in these two areas to determine the presence and/or extent of wetland features.

5.2.1.3.2 California State Water Project

The California State Water Project conveys water from northern California to southern California for drinking water and irrigation purposes. The “Aqueduct” is a significant component of the California Department of Water Resources’ State Water Project. The concrete-lined channel has a typical cross section of 12 meters at the base and an average depth of 9 meters. The California State Water Project presents a unique situation from a jurisdictional

determination point of view; the water course is navigable, yet it was constructed through upland areas for the purposes of conveying water for drinking. The Project as designed will not impact the California State Water Project.

5.2.1.4 Special Status Species

The designation of special-status species includes all federal and state listed species and species proposed for listing under the federal and California Endangered Species Acts (ESA and CESA); federal species of concern; state species of special concern; and plant species designated as rare, threatened, or endangered (List 1B or List 2) by the California Native Plant Society (CNPS). Special-status species with the potential to occur in the Project vicinity were identified from the following data sources:

- U.S. Fish and Wildlife Service (USFWS) species lists provided for each 7.5-minute U.S. Geological Survey (USGS) quadrangle in the biological resources study area (called the East Elk Hills and Tupman quadrangles)
- A search of all species occurrences in the California Natural Diversity Database (CNDDDB) within a 5-mile radius of the Project Site and 1,000 feet of linears (CDFG 2008a; Figure 5.2-3 and 5.2-4)
- The CNPS Inventory of Rare and Endangered Plants for the East Elk Hills and Tupman quadrangles (CNPS 2007)
- 2001 Special-status plant species survey results at Elk Hills Oil Field, Kern County, California (Quad Knopf 2001)
- Occidental Elk Hills Oil Field, Kern County, California Biological Database (2008)

Table 5.2-1, Biological Resources Field Survey, summarizes the surveys performed for this biological resources study.

Table 5.2-2, Plant Species Observed in the Biological Resources Study Area, identifies all the listed and sensitive plant species that have some potential to occur in the Project vicinity. Table 5.2-3, Wildlife Species Observed in the Biological Resources Study Area, identifies all the listed and sensitive wildlife species with the potential to occur in the Project vicinity. These tables summarize the preferred habitats for species with potential to occur in the vicinity of the study area. Species with no suitable habitat in the vicinity of the Project are not discussed further in this document.

5.2.1.4.1 Threatened and Endangered Plant Species

Based on review of the CNDDDB and CNPS databases, two listed plants (Kern mallow and California jewel-flower) have a low chance of being found at the Project Site or along the off-site linear facilities. Species accounts are based on information available through Calflora (2008) and the CNPS website (2008).

Habitat in the Project Site was evaluated by URS biologist David Kisner, and subcontracted biologist Alex Brown, on 5 and 6 March 2008. The two water pipelines, the northern portion of both alternative transmission line corridors, and the natural gas pipeline corridor were assessed by Alex Brown and Julia Valenzuela between 13 April and 24 April 2008. Habitat along the

Project linear corridors west of the Project Site and south of the California State Water Project were evaluated by URS biologist David Kisner on 20 May 2008.

Kern Mallow (*Eremalche kernensis*)

Federal/State/CNPS Status: Endangered/None/List 1B.2

Kern mallow is an annual herb that occurs primarily in Kern and Tulare counties. A member of the *Malvaceae* family, it inhabits chenopod scrub and valley and foothill grasslands. Its habitat ranges in elevation from 70 to 1,000 meters. The blooming period is from March to May. The decline of this species is attributable to conversion of habitat to agricultural use, as well as grazing and energy development.

California jewel-flower (*Caulanthus californicus*)

Federal/State/CNPS Status: Endangered/Endangered/List 1B.1

California jewel-flower is an annual herb that occurs primarily in Fresno, Kern, and Tulare counties. A member of the *Brassicaceae* family, it inhabits chenopod scrub, pinyon and juniper woodlands, as well as valley and foothill grasslands. Its habitat ranges in elevation from 70 to 1,000 meters. The blooming period is from February to May. The decline of this species is attributable to agriculture, urbanization, energy development, and grazing, and possibly by invasion of non-native plants.

5.2.1.4.2 Other Sensitive Status Plant Species

Sensitive status plant species were assessed concurrently with the federal and state listed plant species. Species accounts are based on information available through Calflora (2008) and the CNPS website (2008).

Horn's Milk-vetch (*Astragalus hornii* var. *hornii*)

Federal/State/CNPS Status: None/None/List 1B.1

Horn's milk-vetch is an annual herb that occurs primarily in Kern County. A member of the *Fabaceae* family, it inhabits meadows, seeps, and alkaline lake margins. Its habitat ranges in elevation from 60 to 850 meters. The blooming period is from May to October. The decline of this species is attributable to an eradication effort in the early 1900s and habitat alteration.

Heartscale (*Atriplex cordulata*)

Federal/State/CNPS Status: None/None/List 1B.2

Heartscale has a growth form that ranges from annual herb to shrub and occurs primarily in Kern, Madera, Merced, Solano, and Tulare counties. A member of the *Chenopodiaceae* family, it inhabits chenopod scrub, meadows and seeps, and valley and foothill grasslands. Its habitat ranges in elevation from 1 to 375 meters. The blooming period is from April to October. The decline of this species is attributable to trampling and competition with non-native plants.

SECTION FIVE

Environmental Information

**Table 5.2-5
Special-Status Plant Species with Potential to Occur in the Project Area**

Common Name	Scientific Name	Listing Status			Likelihood of Occurrence in Project Area	Habitat Associations and Flowering/Greatest Activity Period for Area
		Federal	State	Other		
Plants						
Horn's milk-vetch	<i>Astragalus hornii</i> var. <i>hornii</i>	--	--	CNPS 1B.1	Moderate Recorded five miles southeast of project site along proposed linear.	Meadows, seeps, alkaline lake margins; May-October
Heartscale	<i>Atriplex cordulata</i>	--	--	CNPS 1B.2	Moderate-Low Found approximately five miles to southeast of project site and near northern waterline linear	Chenopod scrub, meadows, seeps, valley and foothill grassland; April-October
Subtle oranche	<i>Atriplex subtilis</i>	--	--	CNPS 1B.2	Very Low Not recorded in area	Valley and foothill grassland; June-August
Bakersfield smallscale	<i>Atriplex tularensis</i>	--	E	CNPS 1B.1	Very Low Not recorded in area	Chenopod scrub; June-October
Lost Hills crownscale	<i>Atriplex vallicola</i>	--	--	CNPS 1B.2	Moderate Found near northern waterline linear and approximately four miles to southeast	Chenopod scrub, vernal pools, valley and foothill grassland; April-August
Alkali mariposa lily	<i>Calochortus striata</i>	--	--	CNPS 1B.2	Very Low Found approximately ten miles to the southeast of project site	Chenopod scrub, Mojavean desert scrub, chaparral, meadows and seeps; April-June
California jewel-flower	<i>Caulanthus californicus</i>	E	E	CNPS 1B.1	Low Recorded approximately five miles south of project site	Chenopod scrub, pinyon and juniper woodlands, valley and foothill grassland; February-May
Slough thistle	<i>Cirsium crassicaule</i>	--	--	CNPS 1B.1	Moderate Recorded within a half mile of project site	Chenopod scrub, riparian scrub, marshes and swamps; May-August
Recurved larkspur	<i>Delphinium recurvatum</i>	--	--	CNPS 1B.2	High Found near project site and along linears	Chenopod scrub, cismontane woodland, valley and foothill grassland; March-June

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**Table 5.2-5
Special-Status Plant Species with Potential to Occur in the Project Area**

Common Name	Scientific Name	Listing Status			Likelihood of Occurrence in Project Area	Habitat Associations and Flowering/Greatest Activity Period for Area
		Federal	State	Other		
Kern mallow	<i>Eremalche kernensis</i>	E	--	CNPS 1B.2	Low Recorded near northern portion of waterline linear	Chenopod scrub, valley and foothill grassland; March-May
Hoover's eriastrum	<i>Eriastrum hooveri</i>	--	--	CNPS 4.2	High Record in project area and along linears.	Chenopod scrub, pinyon and juniper woodland, valley and foothill grassland; March-July
Tejon poppy	<i>Eschscholzia lemmonii ssp. kernensis</i>	--	--	CNPS 1B.1	Moderate Numerous populations have been recorded just over a mile from the project site	Chenopod scrub, valley and foothill grassland; March-May
Coulter's goldfields	<i>Lasthenia glabrata ssp. coulteri</i>	--	--	CNPS 1B.1	Very Low Not recorded in area	Playas, vernal pools, marshes and swamps; February-June
Showy madia	<i>Madia glabrata</i>	--	--	CNPS 1B.1	Very Low Found over ten miles to the northwest of the project site and over two miles from the waterline linear	Cismontane woodland, valley and foothill grassland; March-May
San Joaquin woollythreads	<i>Monolopia congdonii</i>	E	--	CNPS 1B.2	Very Low Not recorded in area	Chenopod scrub, valley and foothill grassland; February-May
Bakersfield cactus	<i>Opuntia basilaris var. treleasei</i>	E	E	CNPS 1B.1	Very Low Not recorded in area	Chenopod scrub, cismontane woodland, valley and foothill grassland; April-May
California chalk moss	<i>Pterygoneurum californicum</i>	--	--	CNPS 1B.1	Very Low Not recorded in area	Chenopod scrub, valley and foothill grassland
Oil neststraw	<i>Stylocline citroleum</i>	--	--	CNPS 1B.1	High Numerous observations within one mile of project site and along access road	Chenopod scrub, valley and foothill grassland; March-April

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**Table 5.2-5
Special-Status Plant Species with Potential to Occur in the Project Area**

Common Name	Scientific Name	Listing Status			Likelihood of Occurrence in Project Area	Habitat Associations and Flowering/Greatest Activity Period for Area
		Federal	State	Other		
Mason's neststraw	<i>Stylocline masonii</i>	--	--	CNPS 1B.1	Very Low Not recorded in area	Chenopod scrub, pinyon and juniper woodland; March-May

Notes:

Species recorded within the Desert Hot Springs USGS quad are in bold font.

E Federal/State Endangered

CNPS 1B Plants that are rare or endangered in California and elsewhere

CNPS 4 Plants that have limited distribution in California

1 Seriously endangered in California

2 Fairly endangered in California

3 Not very endangered in California

Lost Hills Crownscale (*Atriplex vallicola*)

Federal/State/CNPS Status: None/None/List 1B.2

Lost Hills crownscale is an annual herb that occurs primarily in Fresno, Kern, and San Luis Obispo counties. A member of the *Chenopodiaceae* family, it inhabits chenopod scrub, valley and foothill grasslands, and vernal pools. Its habitat ranges from 50 to 635 meters, and blooms from April to August. The decline of this species is attributable to grazing, agricultural conversion, and energy development.

Slough Thistle (*Cirsium crassicaule*)

Federal/State/CNPS Status: None/None/List 1B.1

Slough thistle is a perennial herb that occurs primarily in King, Kern, and San Joaquin counties. A member of the *Asteraceae* family, it inhabits chenopod scrub, marshes, swamps, and riparian scrub. Its habitat ranges in elevation from 3 to 100 meters and the blooming period is from May to August. The decline of this species is attributable to conversion of habitat to agricultural use and the introduction of non-native plants; slough thistle abundance fluctuates widely.

Recurved Larkspur (*Delphinium recurvatum*)

Federal/State/CNPS Status: None/None/List 1B.2

Recurved larkspur is a perennial herb that occurs primarily in Kern, Tulare, and San Luis Obispo counties. A member of the *Ranunculaceae* family, it inhabits chenopod scrub, cismontane woodland, and valley and foothill grasslands. Its habitat ranges in elevation from 3 to 750 meters. The blooming period is from March to June. The decline of this species is attributable to conversion of habitat to agricultural use, as well as grazing and trampling by livestock.

Hoover's Eriastrum (*Eriastrum hooveri*)

Federal/State/CNPS Status: Delisted/None/List 4.2

Hoover's woolly-star is an annual herb that occurs primarily in Fresno, Kern, and Tulare counties. Previously listed as threatened by USFWS, Hoover's woolly-star was delisted October 2003 (CDFG). A member of the *Brassicaceae* family, it inhabits chenopod scrub, pinyon and juniper woodlands, and valley and foothill grasslands. It ranges in elevation from 50 to 915 meters and its blooming period is from February to May. The decline of this species is attributable to agriculture, urbanization, energy development, grazing, and possibly competition with non-native plants.

Tejon Poppy (*Eschscholzia lemmonii* ssp. *kernensis*)

Federal/State/CNPS Status: None/None/List 1B.1

The Tejon poppy is an annual herb that is restricted to Kern County. A member of the *Papaveraceae* family, it inhabits chenopod scrub and valley and foothill grasslands. Its habitat ranges from 160 to 1,000 meters and its blooming period is from March to May. The decline of this species is attributable to grazing and invasion by non-native plants.

Oil Neststraw (*Stylocline citroleum*)

Federal/State/CNPS Status: None/None/List 1B.1

Oil neststraw is a perennial herb that occurs primarily in Kern County. A member of the *Asteraceae* family, it inhabits chenopod scrub, as well as valley and foothill grasslands. Its habitat ranges in elevation from 50 to 400 meters. The blooming period is from March to April. The species is “known from fewer than twenty occurrences from the East Elk Hills quadrangle... [and may be]... threatened by energy development and urbanization (CNPS 2008).

5.2.1.4.3 Threatened and Endangered Wildlife Species

Habitat in the Project Site was evaluated for its potential to support special-status wildlife species by URS biologist David Kisner and Alex Brown on 5 and 6 March 2008. The two water pipelines, the northern portion of both alternative transmission line corridors, and the natural gas pipeline corridor were each assessed for its potential to support special-status wildlife species by Alex Brown and Julia Valenzuela between 13 April and 24 April 2008. Habitat along the off-site linear facility corridors west of the Project Site and south of the California State Water Project were each evaluated for its potential to support special-status wildlife species by URS biologist David Kisner on 20 May 2008. Threatened and endangered wildlife species with potential to occur in the study area are discussed below and presented in Table 5.2-6, Special-Status Wildlife Species with Potential to Occur in the Project Area.

5.2.1.4.3.1 Reptiles**Blunt-Nosed Leopard Lizard (*Gambelia sila*)**

Federally Endangered/State Endangered, Fully Protected

The blunt-nosed leopard lizard inhabits sparsely vegetated alkali and desert scrub habitats. Blunt-nosed leopard lizards are carnivorous. They forage opportunistically on the ground, catching grasshoppers, cicadas and small lizards, including smaller leopard lizards. They commonly hunt by slowly stalking prey, then rapidly dashing in to capture it. Leopard lizards typically find shelter by using mammal burrows, shrubs, or structures such as fence posts. *G. sila* do not dig their own burrows. Females can create nests by altering unused mammal burrows to form a closed chamber (approximately 20) below the soil surface (Tollestrup 1983). Leopard lizard habitat is characterized by sparsely vegetated scrub and grassland habitats in flat areas. *G. sila* hibernate during the winter and are active from late March to late June or July. Metabolic rates and activity are regulated by ambient temperatures. *G. sila* mate from late April through May and the females usually lay eggs between May and June. The usual clutch size is three eggs, but can range from two to six. Females usually produce one clutch per year, although occasionally a second is produced. The incubation period is approximately 57 days. Females may breed during their first spring, but males may not breed until they are large enough to secure a territory (Tollestrup 1982, 1983). Blunt-nosed leopard lizard populations are located in scattered sites in the San Joaquin Valley and adjacent foothills. Found between elevations of 100 to 2,400 feet (Stebbins 1985) on alkali flats, large washes, arroyos, canyons, and low foothills. The decline of this species is attributable to conversion of habitat to agricultural land.

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Environmental Information

Table 5.2-6
Special-Status Wildlife Species with Potential To Occur in The Project Area

Common Name	Scientific Name	Listing Status			Likelihood of Occurrence in Project Area	Habitat Associations
		Federal	State	Other		
Invertebrates						
Kern shoulderband	<i>Helminthoglypta callistoderma</i>	--	--	IUCN:EN	Very Low Not found within five miles of site.	Unknown
Zavortink's protodufourea bee	<i>Protodufourea zavortinki</i>	--	--	--	Very Low Not found within five miles of site.	Unknown
Amphibians						
Western spadefoot toad	<i>Spea hammondi</i>	--	SC	--	Very Low Not found within five miles of site.	Inhabits sparsely vegetated alkali and desert scrub habitats in areas of low topographic relief. Preferred habitat includes semiarid grasslands, alkali flats, and washes.
Reptiles						
Blunt-nosed leopard lizard	<i>Gambelia sila</i>	E	E	FP	High found within one mile of site.	Inhabits sparsely vegetated alkali and desert scrub habitats in areas of low topographic relief. Preferred habitat includes semiarid grasslands, alkali flats, and washes.
Silvery legless lizard	<i>Anniella pulchra pulchra</i>	--	SC	--	Very Low Not found within five miles of site.	Inhabits coastal dune, valley foothill, chaparral, and coastal sage scrub habitats. Prefers sandy or loose organic soil suitable for burrowing. Soil moisture is essential to legless lizard success.

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Environmental Information

Table 5.2-6
Special-Status Wildlife Species with Potential To Occur in The Project Area

Common Name	Scientific Name	Listing Status			Likelihood of Occurrence in Project Area	Habitat Associations
		Federal	State	Other		
California horned lizard	<i>Phrynosoma coronatum</i>	--	SC	--	Low Not found within five miles of site.	Inhabits a wide range of habitats including grassland, oak woodland, and riparian habitats. Requirements include an exposed gravelly-sandy substrate.
Giant garter snake	<i>Thamnophis gigas</i>	T	T	--	Low Not found within five miles of site.	Requires adequate water during its active season, herbaceous wetland vegetation as cover, openings in wetland vegetation for basking, and higher elevations for refuge from flood waters during the dormant season.
San Joaquin whipsnake	<i>Masticophis flagellum ruddocki</i>	--	SC	--	Low Not found within five miles of site.	Inhabits valley grassland and saltbush scrub habitats. Utilizes mammal burrows for refuge.
Southwestern pond turtle	<i>Actinemys marmorata pallida</i>	--	SC	--	Low Not found within five miles of site.	Inhabits riparian zone and fresh water bodies; known to utilize associated upland habitats.
Birds						
White-faced ibis	<i>Plegadis chihi</i>	--	SC	--	Very Low Not found within five miles of site.	Inhabits and feeds in emergent wetlands. Requires extensive marshes for nesting.
Fulvous whistling-duck	<i>Dendrocygna bicolor</i>	--	SC	--	Very Low Not found within five miles of site.	Inhabits freshwater marshes, lakes, ponds, and rice fields.

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Table 5.2-6
Special-Status Wildlife Species with Potential To Occur in The Project Area

Common Name	Scientific Name	Listing Status			Likelihood of Occurrence in Project Area	Habitat Associations
		Federal	State	Other		
White-tailed kite	<i>Elanus leucurus</i>	--	--	FP	Very Low Not found within five miles of site.	Inhabit open grasslands with scattered trees for nesting and perching. Often frequent tree-lined river valleys with adjacent open areas.
Cooper's Hawk	<i>Accipiter cooperii</i>	--	--	--	Low Poor nesting habitat; migrants may pass through area	Inhabit coniferous or mixed deciduous forests. Avoids open areas without trees.
Swainson's hawk	<i>Buteo swainsoni</i>	SC	T	--	Very Low Not found within five miles of site.	Inhabits open grasslands and desert-like habitats, as well as agricultural areas.
Golden Eagle	<i>Aquila chrysaetos</i>	SC	--	FP	Moderate Poor nesting habitat; individuals may pass through area	Found in open and semi-open areas including tundra, shrublands, woodlands, grasslands, and coniferous forests. They primarily inhabit mountainous areas, but can also nest in wetland, riparian and estuarine habitats.
Prairie Falcon	<i>Falco mexicanus</i>	--	--	--	Low Poor nesting habitat; migrants may pass through area	Inhabits arid and semi-arid plains. Nests on rock cliffs in river gorges as well as mountainous regions.
American Peregrine Falcon	<i>Falco peregrinus</i>	--	E	FP	Low Poor nesting habitat; migrants may pass through area	Prefer open habitats such as grasslands, tundra and meadows. Nests on cliff faces and crevices.
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>	T	SC	--	Very Low Not found within five miles of site.	Breeds above high tide line on coastal beaches, sand spits, sparsely vegetated dunes, and beaches at creek or river mouths.

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Environmental Information

**Table 5.2-6
Special-Status Wildlife Species with Potential To Occur in The Project Area**

Common Name	Scientific Name	Listing Status			Likelihood of Occurrence in Project Area	Habitat Associations
		Federal	State	Other		
Mountain plover	<i>Charadrius montanus</i>	--	SC	--	Low Uncommon in area during winter; outside of breeding range.	Inhabits open grasslands, plowed fields and open sagebrush areas. Often roosts in depressions in the ground. Avoids areas with high or dense vegetative cover.
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	C	E	S	Very Low Poor nesting habitat; migrants may pass through area	Inhabit open woodlands with clearings and a dense shrub layer. Often frequent woodlands near streams, rivers or lakes.
Burrowing Owl	<i>Speotyto cunicularia</i>	--	SC	--	Occurs Individuals detected during survey in 2008.	Open, dry grasslands, deserts, and sometimes, ruderal areas along ditch levees. Requires burrows, principally those made by California ground squirrels.
Southwestern Willow Flycatcher	<i>Empidonax traillii eximius</i>	E	E	--	Very Low Poor nesting habitat; migrants may pass through area	Breeds in dense riparian habitats along rivers, streams or other wetlands.
Loggerhead shrike	<i>Lanius ludovicianus</i>	--	SC	--	Occurs Individuals detected during survey in 2008 at project site and along linears.	Inhabits open spaces bordered by vegetation.
Least Bell's Vireo	<i>Vireo bellii pusillus</i>	E	E	--	Very Low Poor nesting habitat; migrants may pass through area	Prefers dense, shrubby vegetation, woodlands, scrub oak, coastal chaparral, and mesquite brushlands, often near water in arid regions.

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Environmental Information

Table 5.2-6
Special-Status Wildlife Species with Potential To Occur in The Project Area

Common Name	Scientific Name	Listing Status			Likelihood of Occurrence in Project Area	Habitat Associations
		Federal	State	Other		
LeConte's Thrasher	<i>Toxostoma lecontei</i>	SC	SC	--	Moderate Potential breeding habitat on edges of project site and along linears.	Open desert wash, desert scrub, alkali desert scrub, and desert succulent shrub habitats, also occurs in Joshua tree habitat with scattered shrubs.
California horned lark	<i>Eremophila alpestris actia</i>	--	--	DFG:WL	Occurs Individuals detected during survey in 2008.	Inhabits open habitat, usually where trees and large shrubs are absent. Prefer to breed in short grasslands, rangelands and open fields.
Tricolored blackbird	<i>Agelaius tricolor</i>	SC	SC	--	Low Poor habitat for this species; foraging possible.	Nests in emergent wetland vegetation or near it. Roosts in large flocks in wetland vegetation or in trees.
Mammals						
Buena Vista lake shrew	<i>Sorex ornatus relictus</i>	E	--	SC	Low / Moderate Poor habitat for this species in project area; maybe found along linears near wetlands	Inhabits valley freshwater marsh with dense wetland vegetative cover and detritus.
Nelson's antelope squirrel	<i>Ammospermophilus nelsoni</i>	--	T	--	Occurs Individuals seen along linear in 2008; seen within one mile of project area in 2008.	Dry, sparsely vegetated loam soils. Need widely scattered shrubs, forbs and grasses in broken terrain with gullies and washes

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Environmental Information

Table 5.2-6
Special-Status Wildlife Species with Potential To Occur in The Project Area

Common Name	Scientific Name	Listing Status			Likelihood of Occurrence in Project Area	Habitat Associations
		Federal	State	Other		
Giant kangaroo rat	<i>Dipodomys ingens</i>	E	E	--	High found within one mile of this site in past years.	Saltbush scrub and sink scrub communities in the Tulare Lake Basin of the southern San Joaquin Valley. Requires soft friable soils, which escape seasonal flooding where it will dig burrows in elevated soil mounds at the base of shrubs. Western San Joaquin Valley in grassland and shrub associations, especially <i>Atriplex</i> .
Short-nosed kangaroo rat	<i>Dipodomys nitratoides brevinasus</i>	--	SC	--	High found within one mile of this site in past years.	Favors flat to gently sloping terrain. Requires soft friable soils, which escape seasonal flooding where it will dig burrows in elevated soil mounds at the base of shrubs
Tipton kangaroo rat	<i>Dipodomys nitratoides nitratoides</i>	E	E	--	High found within one mile of this site in past years.	Valley sink scrub and valley saltbush scrub in the Tulare basin. Sparse top moderate shrub cover is associated with high density populations. Terrain not subject to flooding in an important factor for permanent occupancy.
Tulare Grasshopper mouse	<i>Onychomys torridus tularensis</i>	--	SC	--	High found within one mile of this site in past years.	Arid shrub-land communities in hot, arid grassland and shrub-land associations

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**Table 5.2-6
Special-Status Wildlife Species with Potential To Occur in The Project Area**

Common Name	Scientific Name	Listing Status			Likelihood of Occurrence in Project Area	Habitat Associations
		Federal	State	Other		
San Joaquin pocket mouse	<i>Perognathus inornatus</i>	--	--	BLM	High found within one mile of this site in past years.	Typically found in grasslands and blue oak savannas. Needs friable soils.
Tule Elk	<i>Cervus elaphus nannodes</i>	--	--	--	Low Within one mile but contained	Typically found in grasslands and oak savannas.
San Joaquin kit fox	<i>Vulpes macrotis mutica</i>	E	T	--	Occurs Active dens seen on project site in 2008.	Chenopod scrub, grasslands, and other habitats. Sometimes forage in agricultural areas.
American badger	<i>Taxidea taxus</i>	--	SC	--	High Sign seen on project site in 2008; highly nomadic and likely to traverse linear and project area.	Abundant in drier open stages of most shrub, forest, and herbaceous habitats with friable soils.
Pallid Bat	<i>Antrozous pallidus</i>	--	SC	--	Very Low Not found within five miles of site. Individuals may fly over site.	
Townsend's big-eared bat	<i>Corynorhinus townsendii townsendii</i>	--	SC	--	Very Low Not found within five miles of site. Individuals may fly over site.	
Western mastiff bat	<i>Eumops perotis californicus</i>	--	--	SC	Very Low Not found within five miles of site. Individuals may fly over site.	Inhabits dry washes, flood plains, chaparral, oak woodland, grassland, montane meadows, and agricultural areas.

Notes:

- E Federal/State Endangered
- T Federal/State Threatened
- SC Federal/State Species of Concern
- FP State Fully Protected
- IUCN:EN International Union for Conservation of Nature and Natural Resources: Endangered
- BLM Bureau of Land Management Sensitive Species

Giant Garter Snake (*Thamnophis gigas*)

Federal/State Status: Threatened/Threatened

The giant garter snake is one of the largest garter snakes; attaining a total length of at least 63 inches. Females tend to be slightly longer and proportionately heavier than males. Its diet consists of small fish, tadpoles, and frogs. Adequate water during the early spring through mid-autumn to provide food and cover are essential habitat requirements. During their active season, wetland vegetation such as cattails and bulrushes provide essential cover and foraging habitat; openings alongside waterways facilitate basking. During the dormant season of winter, *T. gigas* require higher elevation uplands for cover and safety from flood water. Throughout the dormant season, *T. gigas* inhabit small mammal burrows that lie above flood elevations. Giant garter snakes breed through March and April, and females give birth to live young from late July through early September. Brood size ranges from 10 to 46 young, with an average brood size of 23. Young immediately disperse into dense cover and absorb their yolk sacs, after which they begin foraging independently. Sexual maturity averages 3 years for males and 5 years for females (Stebbins 2003).

The giant garter snake lives in agricultural wetlands and other waterways such as irrigation and drainage canals, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands in the Central Valley. Due to the direct loss of natural habitat, the giant garter snake relies heavily on rice fields in the Sacramento Valley, but also uses managed marsh areas in Federal National Wildlife Refuges and State Wildlife Areas. Giant garter snakes are usually absent from larger rivers due to a dearth of suitable habitat and emergent vegetative cover, and from areas with sand, gravel, or rock substrates. There have been few recent sightings of giant garter snakes in the San Joaquin Valley.

The species is now apparently extirpated or very rare in most of the former range in the San Joaquin Valley. Surveys in the 1970s and 1980s yielded some previously unknown localities and several cases of extirpation or at least severe population declines (USFWS 1993). The area of occupancy, number of sub-populations, and population size are probably continuing to decline, but the rate of decline is unknown. The decline of this species is primarily attributable to loss and degradation of habitat (USFWS 1999). Activities that may degrade habitat include maintenance of flood control and agricultural waterways, weed abatement, rodent control, discharge of contaminants into wetlands and waterways, and overgrazing in wetland or streamside habitats. Factors that may be significant in some areas include predation by and competition with introduced species, parasitism, and road kills (USFWS 1999). USFWS (1993) listed threats as habitat loss, flooding (in rice production areas), pollutants, vehicular traffic, livestock grazing, and introduced predators such as house cats and bullfrogs.

5.2.1.4.3.2 Birds**White-tailed Kite** (*Elanus leucurus*)

No Federal Status/California Fully Protected

The white-tailed kite inhabits the Western U.S., including California, Arizona, Oregon, and into Washington. *E. leucurus* frequent open grasslands with scattered trees for nesting and perching. These birds can be easily seen hovering in search of small mammals such as voles, which make up the majority of their diet. White tailed kites have no known migration pattern, although they do wander widely when prey is scarce. Monogamous pairs are formed in December, and remain

together year round. The pair builds a nest in January, and the female incubates four eggs while the male hunts for the pair. After fledging, the pair may raise a second brood. During the 1930s and 1940s, *E. leucurus* was threatened by extinction due to hunting and egg collecting. Since that time, however, the species has been recovering and expanding its range (Birdweb 2008).

Swainson's Hawk (*Buteo swainsoni*)

No Federal Status/State Threatened / Sensitive

The Swainson's hawk is found throughout the Western U.S. from southwest Canada south to west Texas. *B. swainsoni* migrate in winter to Argentina (England et al. 1997). Swainson's hawks inhabit open grasslands and desert-like habitats, including agricultural areas. Their diet consists of insects, small birds, mammals, reptiles, and amphibians. *B. swainsoni* form monogamous pairs, which breed and raise a brood once annually. The female lays from two to four eggs. The Swainson's hawk is threatened due to the use of deadly pesticides by Argentine farmers.

Golden Eagle (*Aquila chrysaetos*)

No Federal Status/State Fully Protected

The golden eagle is found throughout Eurasia, Africa, and North America. In North America, they live in the western part of the continent, ranging from Alaska to central Mexico. Small populations exist in the eastern U.S. and Canada. *A. chrysaetos* inhabit open to semi-open areas from sea level to 3,600 meters in elevation. They are found in open and semi-open areas including tundra, shrublands, woodlands, grasslands, and coniferous forests. Golden eagles primarily inhabit mountainous areas, but can also nest in wetland, riparian, and estuarine habitats. Their diet consists primarily of small mammals, but they also eat birds, reptiles, and fish. *A. chrysaetos* form monogamous pairs, which can persist for several years. Pairs raise one brood annually and the females lay one to four eggs (Birdweb 2008).

American Peregrine Falcon (*Falco peregrinus*)

No Federal Status/State Endangered, Fully Protected

Falco peregrinus are found worldwide except for rainforests and arctic regions. They are one of the world's most widespread terrestrial vertebrate species. Peregrine falcons migrate long distances between breeding and winter ranges; typically moving along coastal regions or mountain ranges. They inhabit open habitats including grasslands, tundra, and meadows. Their diet consists almost entirely of birds. They also prey upon reptiles and small mammals, including bats. Peregrine falcons form monogamous pairs that often persist through several breeding seasons. They have high nest site fidelity. *F. peregrinus* raise one brood annually, laying from two to six eggs, averaging four. The use of DDT threatened the peregrine falcon with extinction, however, the ban of the chemical in the U.S. resulted in a remarkable recovery of the species (Birdweb 2008).

Western Snowy Plover (*Charadrius alexandrinus nivosus*)

Federally Threatened/California Species of Special Concern

The western snowy plover breeds on the Pacific Coast of the U.S. from southern Baja California, Mexico, to southern Washington. It also breeds in the interior areas of Oregon, California, Nevada, Utah, New Mexico, Colorado, Kansas, Oklahoma, and Texas. *C. alexandrinus nivosus*

inhabits sandy or gravelly coastal beaches, estuarine salt ponds, alkali lakes, and the Salton Sea. At the coast, their diet consists of amphipods and insects collected from dry sand; whereas inland, it is primarily comprised of brine flies. Western snowy plovers nest in depressions in the sand. Adults have high breeding site fidelity. Broods range from two to six offspring, averaging three. Habitat degradation is the primary cause of the decline of this species, as well as nest failure due to predation, nest abandonment, and weather (Page et al. 1995).

Yellow-billed Cuckoo (*Coccyzus americanus*)

Federal Candidate Species/California Endangered, Sensitive

The yellow-billed cuckoo is somewhat common in the eastern U.S., but is rare in California. The bird breeds in North America, migrates through Central America, and winters in South America. *C. americanus* inhabit open woodlands with a dense shrub layer. Their diet consists primarily of large insects, but also includes bird eggs, snails, and small reptiles and amphibians. Yellow-billed cuckoos are likely monogamous, and usually raise one brood per year, occasionally two. Females lay one to five eggs, usually two to three. The decline of this species in California is attributed to development disrupting riparian woodlands where it lives (Birdweb 2008).

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

Federally Endangered/California Endangered

The Southwestern willow flycatcher breeds across southern Canada through the southern U.S., and winters from Central to South America. It inhabits moist, shrubby areas and their diet consists of insects. *E. traillii extimus* are generally monogamous, with polygyny being occasionally reported. One brood is raised per year, more rarely two broods are reared. Clutch size ranges from two to four eggs, averaging three (Craig, Williams 1998). The Southwestern willow flycatcher was placed on the Federal Endangered Species List in 1995. The Southwestern willow flycatcher has declined over the last 100 years primarily as a result of the extent of habitat fragmentation and degradation of riparian habitats. The largest remaining population in California is on the South Fork Kern River, Kern County (Unitt 1987).

Least Bell's Vireo (*Vireo bellii pusillus*)

Federally Endangered/California Endangered, Species of Special Concern

The least Bell's vireo was listed as endangered in 1986. At that time, the species had been extirpated from much of its historic range. In the last 10 years, least Bell's vireos have recovered somewhat, recolonizing the Santa Clara River in Ventura County to the north, and the Mojave River in San Bernardino County to the northeast. A large population of *V. bellii pusillus* inhabit the drainages of Marine Corps Base Camp Pendleton in San Diego County. They inhabit dense, shrubby vegetation, woodlands, scrub oak, coastal chaparral, and mesquite brushlands, often near water in arid regions. Their diet consists of a wide array of insects, including caterpillars. Least Bell's vireos are monogamous, but they can switch mates between nesting attempts within seasons and between years. Clutch size ranges from two to five eggs, most commonly three to four. The primary reasons for the decline of least Bell's vireos are the loss of riparian habitat and nest parasitism by cowbirds (Brown 1993).

5.2.1.4.3.3 *Mammals***San Joaquin Kit Fox** (*Vulpes macrotis mutica*)

Federally Endangered/California Threatened

The San Joaquin kit fox historically ranged throughout the San Joaquin Valley from Contra Costa County to northern Santa Barbara County. San Joaquin kit foxes remain widely dispersed but have greatly reduced numbers and isolated populations (Williams 1992). San Joaquin kit foxes primarily live in grassland and to a lesser extent, shrub and agricultural habitats. San Joaquin kit foxes predominantly eat rodents, ground squirrels, rabbits, hares, and ground-nesting birds. Its pups are born in late winter and early spring, and the male provides most of the food for the female while she is nursing. Kit foxes change dens frequently; often enlarging existing ground squirrel burrows to create new dens. Predation or competitive exclusion of kit foxes may occur in the presence of coyotes, introduced red foxes, domestic dogs, bobcats, and large raptors. Human threats to the San Joaquin kit fox include destruction of habitat, habitat degradation, predator and pest control programs, and accidents caused by proximity to humans such as electrocution, road-kills, and suffocation from accidental burial in dens (Williams 1992). Finally, natural factors such as drought, flooding, and rabies cause a significant percent of kit fox deaths. The San Joaquin kit fox is currently listed as a federally Endangered Species and a state of California Threatened Species (USFWS 1998).

Nelson's Antelope Squirrel (*Ammospermophilus nelsoni*)

No Federal Status/California Threatened

Nelson's antelope squirrels are permanent residents of the western San Joaquin Valley. Their habitat is generally composed of sandy loam soils, widely spaced alkali scrub vegetation, and dry washes. Their diet consists of insects, vegetation, small vertebrates, and seeds. They have been known to cache seeds underground (Hawbecker 1947). Nelson's antelope squirrels dig burrows or use kangaroo rat burrows for shelter, and utilize rocks and vegetation for cover (Grinnell and Dixon 1919). Activity is diurnal, yet declines during elevated mid-day temperatures. Breeding occurs from February to May; peaking in April. Nests are constructed within burrows. They typically range from 200 to 1,200 feet from southern Merced County south to Kern, Kings, and Tulare counties, as well as portions of eastern San Luis Obispo and Santa Barbara counties. In 1979, only about 20 percent of the original range was occupied (CDFG 1980a). The decline of this species is attributable to loss of habitat to cultivation and overgrazing, and the use of rodenticides (CDFG 1980). Badgers, kit foxes, red-tailed hawks, golden eagles, coyotes, and various snakes prey on Nelson's antelope squirrel. California ground squirrels (*Spermophilus beechyi*) have been known to displace *A. nelsoni* from burrows (Harris and Stearns 1991).

Giant Kangaroo Rat (*Dipodomys ingens*)

Federally Endangered / California Endangered

Giant kangaroo rats are nocturnal rodents occurring in scattered colonies along the western side of the San Joaquin Valley. They are typically found on fine, sandy loam soils with sparse annual grass and forb vegetation, and marginally found in low-density alkali desert scrub. Their diet primarily consists of seeds, which are cached in burrows (Shaw 1934) and green vegetation in spring. Level terrain and sandy loam soils are needed for burrowing. Optimal cover consists of

areas with almost no shrub overstory, and very few physiographic variations (Grinnell 1932, Shaw 1934, Hawbecker 1951).

Breeding season lasts from January to May; peaking in early spring. Litter size ranges from four to six individuals and young are born and reared in the burrows. Predators include kit foxes, badgers, coyotes, barn owls, rattlesnakes, and gopher snakes. *D. ingens* currently occupies about 2 percent of its former range (CDFG 1980). The decline of this species is attributable to loss of habitat to cultivation and overgrazing, and the use of rodenticides (CDFG 1980).

Tipton Kangaroo Rat (*Dipodomys nitratoides nitratoides*)

Federally Endangered/California Endangered

Tipton kangaroo rats are typically found in arid-land vegetative communities with flat or gently sloping terrain located within the floor of the Tulare Basin in the southern San Joaquin Valley. Tipton kangaroo rats generally occupy grassland with scattered shrubs and desert-shrub associations on friable soils. Burrows are commonly located in slightly elevated earth, canal embankments, and bases of shrubs and fences where mobile soils gather above the level of surrounding terrain. Soft soils generally support higher densities of Tipton kangaroo rats than other soil types (Williams 1992). Tipton kangaroo rats require terrain that is not subject to flooding to support a sustainable population. Reproduction occurs in the winter months with most females giving birth to only two young.

The historical geographic range of Tipton kangaroo rats encompassed over 1.7 million acres of arid land. Their populations occupied the valley floor of the Tulare Basin throughout level or nearly level terrain. Current occurrences are restricted to scattered, isolated areas. In the southern San Joaquin Valley this includes the Kern National Wildlife Refuge, Delano, and other scattered areas within Kern County. Agricultural and residential development and the widespread use of rodenticides are principally responsible for the decline of the species (Williams 1992).

Buena Vista Lake Shrew (*Sorex ornatus relictus*)

Federally Endangered/No State Status

The Buena Vista Lake shrew inhabits the marshes of the southern San Joaquin Valley. It is a subspecies of the ornate shrew, *S. ornatus ornatus*. Shrews primarily feed on invertebrates; particularly insects. The Buena Vista Lake shrew does not cache food in burrows, and must forage frequently throughout the day and night to maintain its rapid metabolic rate. During the hottest months, activity is mostly confined to cooler periods of the day and night. The reproductive period stretches from late February through September and early October. Females of this species may have from one to eight offspring per litter, though four to six is typical. Nothing is known about the reproductive and mating system of the Buena Vista Lake shrew, but the breeding season may begin in autumn and end with the onset of the dry season in May or June (Williams 1992).

The Buena Vista Lake shrew formerly occupied the marshlands of the San Joaquin Valley and the Tulare Basin. Its range has diminished due to the loss of lakes and sloughs in the area. It has been recorded from the Kern Lake Preserve area and the Kern National Wildlife Refuge. Its current distribution is unknown but likely to be very restricted due to the loss of habitat. The decline of this species is attributable to loss of habitat due to agricultural conversion (Williams 1992).

5.2.1.4.4 Other Sensitive Status Wildlife Species

Other sensitive status wildlife species were assessed concurrently when the federal and state listed wildlife species were assessed. Other sensitive status wildlife species with potential to occur in the study area are discussed below and presented in Table 5.2-6, Special-Status Wildlife Species with Potential to Occur in the Project Area.

5.2.1.4.4.1 Amphibians

Western Spadefoot Toad (*Spea hammondi*)

No Federal Status/California Species of Special Concern

The Western spadefoot toad is a California Species of Special Concern (CDFG 2006a) found from the Central Valley south to Baja California. It prefers open areas with sandy or gravelly soils. It is found in a variety of habitats including mixed woodlands, grasslands, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. The Western spadefoot is primarily nocturnal and terrestrial, only entering water bodies to breed. It spends the majority of its time burrowed in the ground. Breeding season depends on weather conditions but typically occurs between January and May. Eggs laid and attached to submerged vegetation are externally fertilized and mature in up to 6 days. Depending on temperature and food availability, tadpoles morph in 3 to 11 weeks. Adults are stout-bodied with relatively smooth skin and green or gray dorsum, with skin tubercles tipped with orange. They are white in color below and have a wedge-shaped black spade on each hind foot. Their eyes are pale gold with distinct vertical pupils. Juveniles are similar but have more distinct spotting. The Western spadefoot visually locates its invertebrate prey and captures it with its swift tongue. The decline of this species is attributable to loss of habitat to urbanization and agricultural land (Stebbins 2003).

5.2.1.4.4.2 Reptiles

Silvery Legless Lizard (*Anniella pulchra pulchra*)

No Federal Status/California Species of Special Concern

The silvery legless lizard is a subspecies of the California legless lizard, appearing gray or beige on top with a dark mid-dorsal line, and yellow below with fine lengthwise lines between scale rows. Legless lizards are most commonly found in coastal ranges but low-density populations have been found along the San Joaquin Valley floor. They utilize several habitat types: coastal dune, valley-foothill, chaparral and coastal scrub, seeking out loose, moist, organic soils. Silvery legless lizards burrow in the soil for shelter and forage for insect larvae, small adult insects, and spiders. It is a Forest Service Sensitive species and a California Species of Special Concern (CDFG 2006a). Agriculture, the introduction of exotic vegetation, housing development, sand-mining, golf courses, and off-road vehicle use threaten its existence.

California Horned Lizard (*Phrynosoma coronatum*)

No Federal Status/California Species of Special Concern

The California horned lizard is a flat-bodied lizard covered with spikes. Its historic range extended from Baja California, along the Pacific Coast to the Bay Area and inland as far north as the Shasta Reservoir. Its range is currently fragmented due to habitat destruction, development, and agriculture. Populations are also threatened by displacement of native ants, a primary prey

item that are threatened by the introduction of non-native ants. Prior to 1981, capture for the pet trade depleted population numbers. California horned lizards may be found in grasslands, woodlands, and chaparral that contain areas of loose, sandy soils from sea level to 8,000 feet (Stebbins 2003).

Southwestern Pond Turtle (*Actinemys marmorata pallida*)

No Federal Status/California Species of Special Concern

The Southwestern pond turtle is the only native terrestrial turtle found in California and is listed as a California Species of Special Concern. It is an aquatic turtle usually found in and around riparian areas or closely associated with freshwater. Its carapace is brown to olive-color without distinct markings. The plastron is light colored with light or dark markings. Males have a light, unmottled throat and lower facial area. The females and juveniles have mottled, dark-colored throats with varying degrees of dark and light markings. The southwestern pond turtle is distributed throughout the Pacific slope drainages from Klickitat County, Washington, to Baja California, Mexico. It occupies slow-flowing valley rivers with adjacent upland habitat for breeding. The mating season begins in late April and extends into May. The females migrate to an upland location, at times 400 meters from the aquatic site. The female excavates a shallow nest and deposits 1 to 13 thinly calcified eggs. Southwestern pond turtles become sexually mature in 7 to 11 years and are generally long-lived. As general opportunists, their diet consists of slow-moving aquatic invertebrates, larvae, carrion, and aquatic vegetation (Stebbins 2003).

San Joaquin Whipsnake (*Masticophis flagellum ruddocki*)

No Federal Status/California Species of Special Concern

The San Joaquin whipsnake is slender with smooth scales, large eyes and head, and thin neck. It can range from tan, olive-brown to yellowish brown. The whipsnake is diurnal and can be observed basking on roadsides. Its habitat is open, dry, treeless grasslands or chenopod scrub. The species is endemic to California and ranges from Sacramento Valley to San Joaquin Valley. It takes refuge in rodent burrows, beneath vegetation, or other objects providing shade. The San Joaquin whipsnake feeds on small mammals, bats, nestlings, adult birds, bird eggs, lizards, snakes, amphibians, and carrion. The San Joaquin whipsnake is threatened by the conversion of its habitat to row crops and urban development within its limited range (Stebbins 2003).

5.2.1.4.4.3 Birds

White-faced Ibis (*Plegadis chihi*)

No Federal Status/California Species of Special Concern

The white-faced ibis is a widespread species, with two distinct ranges – North to Central America and South America. Those in North and Central America cover most of the Western and Midwestern U.S. and most of Mexico. Breeding areas range as far north as southern Canada and as far east as Nebraska. The species inhabits and feeds in emergent wetlands such as fresh and saltwater marshes; requiring riparian vegetation to nest on as well as forage in. *P. chihi* breed once yearly, with clutches ranging in size from two to seven eggs, averaging 3.5 (Ryder, Manry 2005).

Fulvous Whistling-duck (*Dendrocygna bicolor*)

No Federal Status/California Species of Special Concern

The fulvous whistling-duck breeds across the world's tropical regions, including the U.S. Gulf Coast. Fulvous whistling-ducks breed once yearly, with clutches ranging in size from eight to 16 eggs. Nests are built on a stick platform in reeds. *D. bicolor* habitat includes freshwater lakes, rice fields, or reservoirs. Plentiful vegetation is necessary, as the ducks feed primarily on seeds and other plant parts. This species was in decline in the early 1960s due to pesticide application on rice fields. However, since that time populations of *D. bicolor* have stabilized (Hohman, Lee 2001).

Cooper's Hawk (*Accipiter cooperii*)

No Federal or State Status

Cooper's hawks are found in southern Canada through the U.S. They winter as far north as southern Ontario and as far south as Costa Rica. *A. cooperii* inhabit deciduous and mixed coniferous forests, as well as open woodland areas. They tend to avoid open areas without trees. Their diet consists of birds and small mammals, as well as reptiles, occasionally. *A. cooperii* form monogamous pairs that often mate for life. Pairs breed and raise a brood once annually. The female lays anywhere from three to six eggs; more commonly four or five. Cooper's hawk populations were in decline due to the use of DDT, but since its ban in 1972, populations have begun to recover. One threat facing Cooper's hawks is the loss and degradation of habitat, mostly due to logging activities (Birdweb 2008).

Mountain Plover (*Charadrius montanus*)

Federally Threatened/California Species of Special Concern

USFWS listed mountain plovers as threatened in 1999. Mountain plovers nest from northern Montana and North Dakota, southward through the Great Plains into southeastern New Mexico and Texas (National Geographic 2001). This species does not nest in California, however, most of these populations overwinter primarily in California, but with smaller numbers in Texas, Arizona, and Mexico, between mid-September and mid-March. In California they are found in interior valleys and plains at low elevations from the Sacramento Valley southward to San Diego County and eastward to the Mojave and Colorado deserts (Grinnell and Miller, 1944). Both breeding and wintering grounds are characterized as short grass prairie, shrub-steppe landscapes, low, rolling, grassy foothills, and agricultural fields. Mountain plovers are rarely found near water. Mountain plovers begin to arrive on their wintering grounds in California by September, but do not appear in large numbers until November and leave in late March and early April. The primary wintering sites in California are the Central Valley, Carrizo Plain, and Imperial Valley. The mountain plover is insectivorous. Clutch size ranges from one to six eggs, averaging three. The decline of this species is attributable to loss of nesting habitat, and habitat alteration due to the loss of primary grazers (Knoph 1996).

Burrowing Owl (*Athene cunicularia*)

No Federal Status/California Species of Special Concern

Burrowing owls were formerly a common, even locally abundant, resident throughout much of California, however, Grinnell and Miller (1944) noted a decline before the early 1940s. Populations have declined significantly throughout California and now, the highest densities appear to be found in state and federal wildlife refuges (Remsen 1978). Burrowing owls depend heavily on the presence of burrowing rodents, coyotes, badgers, and other mammals to create the burrows that they use for roosting and nesting. Man-made structures, such as cement culverts

and debris piles, may also be used (Kudrak 1999). Early in this century, efforts to control small mammal populations and predators led to a noticeable decline in this species (Grinnell and Miller 1944; Garrett and Dunn 1981). Negative pressures on owl populations have been supplemented by widespread conversion of grassland habitats to agriculture or other development. Shuford and Gardali (2002) list burrowing owls as a first priority (high vulnerability) species in California. Regional declines have been so dramatic that the CDFG has recently been petitioned to list this species as threatened in the state under the California ESA.

Burrowing owls prefer dry, open, grassy, usually treeless plains and gently rolling hills. They also inhabit man-made features, such as agricultural fields, airports, roadsides, golf courses, drainage ditches, and vacant lots, if prey and burrow sites are available. Their diet consists of insects, small frogs, lizards, and rodents. Burrowing owls typically nest between early April and late June, with most activity occurring in April in Kern County. Clutch size ranges from seven to nine eggs. Fledging occurs approximately two months after the eggs are laid (early June to late August), but family groups stay together at least into fall. Only one brood is raised each year.

Loggerhead Shrike (*Lanius ludovicianus*)

No Federal Status/California Species of Special Concern

The loggerhead shrike is most common in Central Canada through the Greater Midwest of the U.S. During its spring to summer migration, it can travel as far southwest as California, although the species is seen in decreasing numbers in that region. They inhabit open spaces bordered by vegetation. The loggerhead shrike is the only known predatory songbird. As it does not possess talons, it must impale its prey with its beak against a hard surface, such as a tree trunk. Its diet consists primarily of mice, but they will also eat insects, small amphibians, and small birds. Clutch size ranges from one to nine eggs, most commonly five to six (Birdweb 2008).

Le Conte's Thrasher (*Toxostoma lecontei*)

Federal Species of Special Concern/California Species of Special Concern

Le Conte's thrasher is uncommon to rare, non-migratory resident of southern California deserts from southern Mono County south to the Mexican border, and in western and southern San Joaquin Valley. This species primarily inhabits open desert wash, desert scrub, alkali desert scrub, and desert succulent shrub habitats, and also occurs in Joshua tree habitat with scattered shrubs. In the San Joaquin Valley, they are found primarily in habitats dominated by saltbush (*Atriplex* spp.), and areas of desert washes and flats with scattered bushes. Their diet consists of a variety of insects and other terrestrial arthropods, occasionally seeds, small lizards, and other small vertebrates (Bent 1948, Sheppard 1970). Their foraging activity is mostly limited to probing and digging in the soil and litter with their bill.

The Le Conte's thrasher nests in large saltbushes that can support a nest approximately 26 to 38 inches above the ground. Their breeding season begins in late January and lasts through early June, peaking from mid-March to mid-April. Breeding pairs remain together throughout the year. Female thrashers may have up to three broods during a breeding season, each with two to four eggs. The parents share the incubation of the eggs, which lasts 14 to 20 days. The young fledge 14 to 18 days after hatching.

The historic distribution of the San Joaquin Le Conte's thrasher included the west side of the San Joaquin Valley, from the Panoche Mountains, Fresno County, south to Maricopa, Kern County

(USFWS 1998). The current distribution of the San Joaquin Le Conte's thrasher is largely determined by the presence and structure of saltbush, extent of habitat fragmentation, and presence of competitors. The existing populations are within a set of habitat islands with large distances of unsuitable habitat separating them. Degradation, fragmentation, and loss of habitat to agriculture, irrigation, urbanization, oil and gas development, fire, and over-grazing are the primary causes for the decline of the San Joaquin Le Conte's thrasher (Remsen 1978).

California Horned Lark (*Eremophila alpestris actia*)

No Federal or State Status/DFG Watch List

The California horned lark ranges from Humboldt County in the north to northern Baja California in the south. *E. alpestris actia* inhabit open habitat, usually where trees and large shrubs are absent. They prefer to breed in short grasslands, rangelands, and open fields. Its diet consists of seeds, insects, spiders, and snails, as well as fruit, occasionally. California horned larks form monogamous pairs, but the pairs do not persist for more than one season. They frequently raise two broods per season. Clutches range from two to five eggs. The greatest threat to California horned larks is loss of habitat due to destruction and fragmentation (Beason 1995).

Tricolored Blackbird (*Agelaius tricolor*)

No Federal Status/California Species of Special Concern

This near-endemic species of California occurs throughout the Central Valley, Inner Coast, and Coast ranges from the Sacramento Valley southward into northwestern Baja California Norte, Mexico. Seasonal breeding aggregations also occur in the Klamath Basin of northern California and southern Oregon and in northern Oregon (National Geographic 2001). Although the overall breeding distribution of this species in California has remained relatively constant from historical to present times, the size of most colonies has declined dramatically during the past century. The principal factors for their decline are widespread destruction of wetland habitat and increased use of pesticides, which has negatively affected prey populations. Shuford and Gardali (2002) list tricolored blackbirds as a first priority (high vulnerability) species in California.

Tricolored blackbirds prefer to nest in dense colonies in freshwater marshes with an extensive bed of emergent vegetation, such as tules and cattails. This species is also known to nest in other types of vegetation, including sedges, nettles, willows, thistles, mustard, blackberry, wild rose, and dense grass (Grinnell and Miller 1944; Kudrak 1999). Their nests are constructed of mud and plant material and are generally placed on the ground or in emergent aquatic vegetation, either over or within a few feet of fresh water. Nesting occurs from mid-April through late July, during which time they typically raise two broods of young. Clutch size ranges from one to five eggs, averaging three to four. Nesting colonies are typically located adjacent to agricultural fields, pastures, and short grass habitats, in which they feed (Lehman 1994). Their diet consists of insects; particularly grasshoppers. After the nesting season, they concentrate in mixed flocks with other species of blackbirds to forage on the ground in open, grassy fields, agricultural lands, flooded fields, stock pens, pastures, and along the margins of ponds (Grinnell and Miller 1944; Lehman 1994).

5.2.1.4.4 Mammals**Short-nosed Kangaroo Rat (*Dipodomys nitratooides brevinasus*)**

No Federal Status/Species of Concern

Short-nosed kangaroo rats inhabit flat or gently sloping terrain and on hilltops in desert-shrub associations, primarily saltbushes and California ephedra. Short-nosed kangaroo rats generally occupy grassland with scattered shrubs and desert-shrub associations on friable soils. *D. nitratooides brevinasus* are nocturnal and active throughout the year. Life history is similar to other species of kangaroo rat (Williams 1992). Like other subspecies of the San Joaquin kangaroo rat, populations of the short-nosed kangaroo rat undergo dramatic population fluctuations, and sometimes disappear from an area (Williams et al. 1993).

Short-nosed kangaroo rats historically occupied arid lands along the western half of the San Joaquin Valley floor and hills from Merced County south to the foothills of the Tehachapi Range, and east and north inland, north of Bakersfield. Current populations mostly are small and fragmented. Approximations for the current range of *D. nitratooides brevinasus* estimate the occupied area is only about 3.75 percent of historical habitat. The decline of this species is attributable to loss of habitat to cultivation and overgrazing, and the use of rodenticides (CDFG 1980).

Tulare Grasshopper Mouse (*Onchomys torridus tularensis*)

No Federal Status/Species of Concern

The Tulare grasshopper mouse inhabits arid shrublands, particularly alkali sink, saltbush scrub, and upper Sonoran subshrub-scrub. The historic range extended from western Merced and eastern San Benito counties to Madera County and south to the Tehachapi Mountains. Current development and increased agricultural production have caused fragmentation, reduction, and degradation of its habitat (Williams 1992). Tulare grasshopper mouse has a stout body and short, relatively thick tail. The head, back and upper sides range in color from pale-brown to grayish or pinkish cinnamon while the underparts are distinctly white. The grasshopper mouse diet is composed of small animals and seeds including grasshoppers, scorpions, pocket mice, western harvest mice, spiders, and frogs. The mouse is nocturnal and active year round. Males have a home range of 3.2 hectares and females range for 2.4 hectares. Both male and female mice care for their young. Up to three litters are produced per year with two to six young. Most litters are born from May to July (Williams 1992).

San Joaquin Pocket Mouse (*Perognathus inornatus*)

No Federal or State Status/BLM Sensitive Species

The San Joaquin pocket mouse inhabits dry, open grasslands or scrub areas on fine-textured soils between 1,100 and 2,000 feet in the Central and Salinas valleys. Their diet consists primarily of seeds, with green vegetation and insects as a minor component. *P. inornatus* caches gathered seeds in their burrows. San Joaquin pocket mice inhabit shrubby ridge tops and hillsides (Hawbecker 1951). Burrows are excavated for shelter, with young born and reared within them. Reproduction likely takes place throughout the spring and early summer. The San Joaquin pocket mouse is nocturnal, and may become torpid during extreme heat or cold. Badgers, owls, weasels, skunks, kit foxes, and domestic cats likely prey on San Joaquin pocket mice.

Tule Elk (*Cervus elaphus nannodes*)

No Federal or State Status

The tule elk is a California endemic species. During the 1800s they were almost extirpated due to hunting and loss of habitat, but populations have recovered, now inhabiting more than 20 different areas in California (McCullough 1996). This large mammal travels in herds which range from just a few individuals to several hundred. Their diet consists of grasses, herbaceous plants, and conifer leaves. Females generally have one calf per year. The calves are generally nursed for about 5 months, but they begin eating vegetation within the first week of their lives (McCullough 1969). The primary predators of tule elk were mountain lions and bears, but humans were the only significant predator in the last 200 years.

American Badger (*Taxidea taxus*)

No Federal Status/California Species of Special Concern

Badgers are distributed throughout the western and midwestern U.S. and from Canada southward to Mexico (Hall 1981). In California they historically occurred over most of the arid and semi-arid portions of the state (Ingles 1965). Badger populations have declined drastically in California since the early 1900s, especially in the Central Valley, where they were once considered numerous (Grinnell 1937). They are now restricted to grassland and scrub habitats around the periphery of the valley because of agricultural conversion of grassland habitats (Williams 1986). Populations have been eliminated from much of the Coast Range and throughout most of the coastal plain of southern California due to poisoning, trapping, and shooting on grazing lands, agricultural development, and urbanization (Williams 1986).

Badgers inhabit a variety of habitats, including grasslands, savannas, mountain meadows, coastal sage scrub, and riparian scrub. A common feature of these habitats is friable soils and a high density of burrowing rodents such as gophers (*Thomomys*), kangaroo rats (*Dipodomys*), and ground squirrels (*Spermophilus*, *Ammospermophilus*), and marmots (*Marmota*). They also eat a variety of other animals, including mice, reptiles, birds, eggs, bees, and grasshoppers (Williams 1986). *T. taxus* litters range from one to five offspring, averaging three.

Bats

The following special-status bats are known to occur in California in the Project vicinity:

- Pallid bat (*Antrozous pallidus*) – California state species of concern
- Townsend's big-eared bat (*Corynorhinus townsendii townsendii*) – California state species of concern
- Western mastiff bat (*Eumops perotis*) – California state species of concern

These bat species are generally widespread throughout the western U.S. and Mexico but are sensitive to human-related impacts. Suitable roosting and nesting areas include caves, mines, tree snags, buildings, bridges, and other human-made structures. In California, these species generally mate during the late fall and give birth to their young between early May and the end of July (Eder 2005).

Some of these bat species may forage over the Project Site. The biological resources study area lacks natural bat roost habitat such as mines, cliffs, or caves. Impacts to breeding and roosting habitat present the biggest threat to declining bat populations in the state.

Pallid Bat (*Antrozous pallidus*)

No Federal Status/California State Species of Concern

The pallid bat inhabits rocky, outcrop areas where they commonly roost in rock crevices, caves, and mine tunnels. They also roost in attics, barns, behind signs, in hollow trees, and in abandoned adobe buildings. *Antrozous pallidus* ranges from Canada to Mexico and east to Utah, Colorado, and Texas (Eder 2005).

Townsend's Big-eared Bat (*Corynorhinus townsendii townsendii*)

No Federal Status/California State Species of Concern

The Townsend's big-eared bat inhabits desert scrub, mixed conifer forest and pinyon-juniper, or pine forest habitat. Within these communities, they are associated with caves, mines, lava tubes, and buildings. *Corynorhinus townsendii townsendii* ranges from British Columbia to central Mexico and east to Texas (Eder 2005).

Western Mastiff Bat (*Eumops perotis*)

No Federal Status/California State Species of Concern

The Western mastiff bat is the largest bat in North America, found in arid regions from central California to central Mexico. The Western mastiff bat roosts in rock crevices, particularly exfoliating slabs of granite or sandstone or buildings that provide similar structures. The roosts must be at least 2 to 3 meters above ground to enable sufficient drop time to achieve flight. Bees, wasps, and moths dominate its diet, along with larger insects like cicadas, dragonflies, and grasshoppers. Western mastiff bats commonly forage 100 to 200 feet above ground, but occasionally forage above 2,000 feet (Eder 2005). It is a California Species of Special Concern, most likely threatened by loss of habitat due to urbanization, marsh drainage, and cultivation of foraging fields (CDFG 2006). The use of insecticides may also be responsible through the decline of its food source and indirect poisoning.

5.2.2 Environmental Consequences

The Project will have significant impacts on vegetation and wildlife if it will:

- Cause a fish or wildlife population to drop below self-sustaining levels (CEQA Guidelines, Section 15065 (a))
- Threaten to eliminate a plant or animal community (CEQA Guidelines, Section 15065 (a))
- Substantially affect, reduce the number, or restrict the range of unique, rare, or endangered species of animal or plant, or the habitat of the species (CEQA Guidelines, Section 15065 (a), Appendix G (c), Appendix I (II.4.b) and (II.5.b))
- Substantially diminish or reduce habitat for fish, wildlife, or plants (CEQA Guidelines, Section 15065 (a), Appendix G (t))
- Interfere substantially with the movement of resident or migratory fish or wildlife species (CEQA Guidelines, Appendix G (d))

- Change the diversity of species, or number of any species of plants (including trees, shrubs, grass crops, and aquatic plants) or animals (birds, land animals including reptiles, fish and shellfish, benthic organisms, or insects) (CEQA Guidelines, Appendix I (II.4.1) and (II.5.a))
- Introduce new species of plants or animals into an area, or act as a barrier to the normal replenishment of existing species (CEQA Guidelines, Appendix I (II.4.c) and (II.5.c))
- Increase the rate of use of any natural resources (CEQA Guidelines, Appendix I (II.9))
- Deteriorate existing fish or wildlife habitat (CEQA Guidelines, Appendix I (II.5.d))

These criteria have been used to evaluate the Project's impact on vegetation and wildlife. Impacts to biological resources are discussed below. Impacts primarily related to construction of the Project, or specific to one plant or animals species, are described first under specific resource headings. Impacts primarily related to operation of the power plant, or that will affect a wider group of resources, are described in Section 5.2.2.3, Cumulative Impacts Analyses.

5.2.2.1 Waters of the U.S.

Potential Jurisdictional Waters identified during this assessment are beyond the Project boundaries and will not be affected by Project construction and operation activities. Other development activities in the region have already disrupted drainages and washes to such a degree that regular surface water flows do not exist at the Project Site and off-site linear facilities. It is anticipated existing access routes will be adequate for construction access. As such, no impacts to jurisdictional Waters are anticipated.

5.2.2.2 Waters of the State

Potential Jurisdictional Waters of the State identified during this assessment are beyond the Project boundaries and would not be affected by project construction and operation activities. It is anticipated existing access routes will be adequate for construction access. As such, no impacts to jurisdictional Waters of the State are anticipated.

5.2.2.3 Special-Status Species

5.2.2.3.1 Species Adversely Affected by Global Warming

The Project is designed to support the reduction of global greenhouse gas emissions and should reduce negative impacts to all species that are adversely affected by global warming, such as the recently listed polar bear.

5.2.2.3.2 Threatened and Endangered Plant Species

No threatened or endangered plant species were observed during surveys conducted to date nor are there any historic records of listed plant species being found on the Project Site; however, two species of listed plant species, Kern mallow (*Eremalche kernensis*) and California jewel-flower (*Caulanthus californicus*), have the potential to occur at the Project Site or along the off-site linear facilities. No other federally or state listed threatened or endangered plant species were identified as potentially occurring at the Project Site.

In order to ensure that no threatened or endangered plant species are affected by the Project, pre-construction surveys will be conducted prior to disturbance (see mitigation measure BIO-1 in Section 5.2.4). If threatened or endangered plant species are detected, the population will be avoided to the extent feasible (see mitigation measure BIO-2). With the implementation of mitigation measures BIO-1 and BIO-2, the impacts from the Project will be less than significant.

5.2.2.3.3 Other Plant Species

Based on the results of plant surveys conducted in the biological resources study area to date, a literature review of observances of these species, and impact assessment documents for adjacent projects, eight special-status plant species have the potential to be found on the Project Site and/or along the off-site linear facilities including: Horn's milk-vetch, heartscale, Lost Hills crownscale, slough thistle, recurved larkspur, Hoover's eriastrum, Tejon poppy, and Oil neststraw. To ensure no sensitive plant populations are significantly affected, rare plant surveys will be conducted prior to disturbance (see mitigation measure BIO-1). To the extent feasible, populations of sensitive plant species will be avoided (see mitigation measure BIO-2) but mitigation for impacts to sensitive plants will be required for certain species in certain areas (see mitigation measure BIO-3). With the implementation of mitigation measures BIO-1, BIO-2, and BIO-3, the impacts from the Project will be less than significant.

5.2.2.3.4 Threatened and Endangered Wildlife Species

Five threatened or endangered wildlife species (blunt-nosed leopard lizard, Nelson's antelope squirrel, giant kangaroo rat, Tipton kangaroo rat, and San Joaquin kit fox) are likely to occur at the Project Site or along the off-site linear facilities. In addition, eight sensitive wildlife species (golden eagle, burrowing owl, loggerhead shrike, Le Conte's thrasher, short-nosed kangaroo rat, Tulare grasshopper mouse, San Joaquin pocket mouse, and American badger) are also likely to occur at the Project Site or along the off-site linear facilities.

The following discussion identifies species-specific mitigation measures to avoid and minimize impacts to less than significant levels.

5.2.2.3.4.1 *Reptiles*

No take is anticipated for any reptile species described below; however, an incidental take permit will be obtained from federal and/or state agencies, as appropriate.

Blunt-nosed Leopard Lizard

All avoidance and mitigation measures required will be employed to ensure that blunt-nosed leopard lizards will not be taken as part of this Project. During a meeting on 4 June 2008 with CDFG, the Applicant was provided a draft map that indicates sightings of the lizard. The draft map also purports to identify a "core population" in the surrounding area, which includes the Project Site (CDFG 2008c). This information was not available in the CNDDDB database. The map also indicates the area due west of the Project Site has particularly high levels of observations. To assess the current population, the Applicant will conduct protocol surveys in 2008 to assess hatchling and sub-adult numbers along the off-site linear facilities and in the Project Site (see mitigation measure BIO-5). Protocol surveys for adult lizards will be conducted in 2009.

During construction to avoid harming, harassing, injuring, or killing any individuals or eggs, a series of silt fence "walls" will be erected and only when an area is deemed clear, will ground

disturbance be allowed (see mitigation measure BIO-6). In addition, efforts will be made to reduce alterations to the region which will benefit avian predators (see mitigation measure BIO-7). Potential impacts to leopard lizards caused by Project Site construction and operation, and associated vehicular traffic will be avoided by implementation of BIO-8.

To further protect this species, mitigation measures BIO-9 and BIO-10 will be implemented to ensure Project construction and operation personnel are aware of the threats to this species and how to respond if they encounter any lizards during construction or operations.

With implementation of mitigation measures BIO-5, BIO-6, BIO-7, BIO-8, BIO-9, BIO-10, BIO-18, BIO-19, and BIO-20 Project impacts to this species will be less than significant and direct impacts to this species will be avoided.

Giant Garter Snake

Impacts to this species are not expected to occur due to the lack of recent sign or observations of this species in the Project vicinity. To ensure that there are no impacts to this species, pre-construction surveys will be conducted (see mitigation measure BIO-11). If individuals are detected, additional surveys will be conducted (see mitigation measure BIO-12) to ensure the area is clear of all giant garter snakes.

To further protect this species, mitigation measures BIO-9 and BIO-10 will be implemented to ensure Project construction and operation personnel are aware of the threats to this species and how to respond if they encounter any snakes during construction or operations.

With implementation of mitigation measures BIO-9, BIO-10, BIO-11, and BIO-12, Project impacts to this species will be less than significant.

5.2.2.3.4.2 *Birds*

No take is anticipated for any bird species described below; however, an incidental take permit will be obtained from federal and/or state agencies, as appropriate.

White-tailed Kite

This species is not expected to be in the Project area; CNDDDB records indicate this species was observed in 1992 approximately 10 miles east of the Project Site. If this species is found within the Project area, impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

Swainson's Hawk

This species is not expected to be in the Project area; CNDDDB records indicate this species was observed in 1994 approximately 10 miles east of the Project Site. If this species is found within the Project area, impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

Golden Eagle

This species is not expected to be in the Project area. If this species is found within the Project area, impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

American Peregrine Falcon

This species is not expected to be in the Project area because the area has poor foraging and nesting habitat for this species. If this species is found within the Project area, impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

Western Snowy Plover

This species is not expected to be in the Project area because the area has poor foraging and nesting habitat for this species; CNDDDB records indicate this species was observed in 1978 approximately 7 miles southeast of the Project Site. If this species is found within the Project area, impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

Yellow-billed Cuckoo

This species is not expected to be in the Project area because the area has poor foraging and nesting habitat for this species; CNDDDB records indicate this species was observed in 1922 approximately 7 miles southeast of the Project Site. If this species is found within the Project area, impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

Southwestern Willow Flycatcher

This species is not expected to be in the Project area because the area has poor foraging and nesting habitat for this species; however, impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

Least Bell's Vireo

This species is not expected to be in the Project area because the area has poor foraging and nesting habitat for this species; however, impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

5.2.2.3.4.3 Mammals

No take is anticipated for any mammal species described below; however, an incidental take permit will be obtained from federal and/or state agencies, as appropriate.

San Joaquin Kit Fox

San Joaquin kit fox are known to use the Project Site. Active dens, including natal dens, were seen during the site visits in 2008. The Occidental of Elk Hills Inc., wildlife database also indicates that kit fox dens are found on the Project Site and in high concentrations to the west and northwest of the Project Site. Impacts to the San Joaquin kit fox will be mitigated to a less than significant level by the implementation of mitigation measures BIO-4, BIO-8, BIO-9, BIO-10, and BIO-16.

Giant Kangaroo Rat

Giant kangaroo rats are known to occur immediately to the west of the Project Site. Based on proximity of known individuals, habitat assessment and sign, giant kangaroo rats are presumed

to occur within the Project Site footprint. Pre-construction surveys will be conducted (see mitigation measure BIO-4) and live trapping and relocation of small mammals (see mitigation measure BIO-17) will be conducted to minimize impacts. Other potential impacts will be mitigated by measures BIO-8, BIO-9, and BIO-10.

With implementation of mitigation measures BIO-4, BIO-8, BIO-9, BIO-10, and BIO-17, Project impacts to this species will be less than significant.

Tipton's Kangaroo Rat

Tipton's kangaroo rats are known to occur immediately to the west of the Project Site. Based on proximity of known individuals, habitat assessment, and sign, Tipton's kangaroo rats are presumed to occur within the Project Site footprint. Pre-construction surveys will be conducted (see mitigation measure BIO-4) and live trapping and relocation of small mammals (see mitigation measure BIO-17) will be conducted to minimize impacts. Other potential impacts will be mitigated by measures BIO-8, BIO-9, and BIO-10.

With implementation of mitigation measures BIO-4, BIO-8, BIO-9, BIO-10, and BIO-17, Project impacts to this species will be less than significant.

Nelson's Antelope Squirrel

Nelson's antelope squirrels are known to occur immediately to the south of the Project Site. Based on proximity of known individuals, habitat assessment, and sign, Nelson's antelope squirrels are presumed to occur within the Project Site footprint. Pre-construction surveys will be conducted (see mitigation measure BIO-4) and live trapping and relocation of small mammals (see mitigation measure BIO-17) will be conducted to minimize impacts. Other potential impacts will be mitigated by measures BIO-8, BIO-9, and BIO-10.

With implementation of mitigation measures BIO-4, BIO-8, BIO-9, BIO-10, and BIO-17, Project impacts to this species will be less than significant.

Buena Vista Lake Shrew

Impacts to this species are not expected to occur on either the Project Site or off-site linear facilities due to the lack of recent sign or observations of this species in the Project vicinity and poor habitat. To ensure that there are no impacts to this species, work will be directed away from wetland habitat, pre-construction surveys will be conducted (see mitigation measure BIO-4), work areas will be cleared of small mammals prior to ground disturbance (see mitigation measure BIO-17), and an approved biologist will monitor ground disturbance activities (see mitigation measure BIO-18). If Buena Vista Lake shrews are detected in an area, CDFG and USFWS will be contacted (see mitigation measure BIO-19).

With implementation of mitigation measures BIO-4, BIO-17, BIO-18, and BIO-19, Project impacts to this species will be less than significant.

5.2.2.3.5 Other Special-Status Wildlife Species

5.2.2.3.5.1 *Amphibians*

Western Spadefoot Toad

This species is not expected to be in the Project area; however, potential impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-4, BIO-8, BIO-9, BIO-10, and BIO-18.

5.2.2.3.5.2 *Reptiles*

Silvery Legless Lizard

This species is not expected to be in the Project area; however, potential impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-4, BIO-8, BIO-9, BIO-10, and BIO-18.

California Horned Lizard

This species is not expected to be in the Project area. The closest documented sightings in the CNDDDB of this species was approximately 10 miles southeast of the Project Site in 2006; however, potential impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-4, BIO-8, BIO-9, BIO-10, and BIO-18.

San Joaquin Whipsnake

This species is not expected to be in the Project area. The closest documented sightings in the CNDDDB of this species was approximately 10 miles southeast of the Project Site in 2006; however, potential impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-4, BIO-8, BIO-9, BIO-10, and BIO-18.

Southwestern Pond Turtle

This species is not expected to be in the Project area though there is a slight chance that this species could be found adjacent to work areas near canals or the California State Water Project. Potential impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-4, BIO-8, BIO-9, BIO-10, and BIO-18.

5.2.2.3.5.3 *Birds*

White-faced Ibis

This species is not expected to be in the Project area because the area has poor foraging and nesting habitat for this species; CNDDDB records indicate this species was observed in 1922 approximately 7 miles southeast of the Project Site. If this species is found within the Project area, potential impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

Fulvous Whistling duck

This species is not expected to be in the Project area because the area has poor foraging and nesting habitat for this species; CNDDDB records indicate this species was observed in 1922 approximately 7 miles southeast of the Project Site. If this species is found within the Project area, impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

Cooper's Hawk

This species is not expected to be in the Project area. If this species is found within the Project area, impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

Prairie Falcon

This species is not expected to be in the Project area. If this species is found within the Project area, impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

Mountain Plover

This species is not expected to be in the Project area because the area has poor foraging and nesting habitat; CNDDDB records indicate this species was observed in 1990 approximately 1 mile northeast of the Project Site. If this species is found within the Project area, impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

Burrowing Owl

During initial Project Site visits in 2008, at least three burrowing owls were seen on the Project Site using fox dens. Surveys were inside of the breeding season for this species but no breeding evidence was observed.

Direct impacts to burrowing owls could occur during construction of the Project Site, construction laydown area, or pipeline routes/access road corridor. Destruction or degradation of burrows and destruction or degradation of foraging habitat within 350 feet of occupied burrows is considered significant impacts to this species (CDFG 1995).

Indirect impacts to nesting and foraging burrowing owls will extend 250 feet into suitable habitat from the limits of construction during the breeding season (February 1 through August 15) and 160 feet during the wintering season as outlined in CDFG (1995) guidelines. Noise and visual disturbance from construction of the Project may displace burrowing owls nesting within these distances from the site. To reduce potential impacts to a less than significant level, mitigation measures BIO-9, BIO-10, and BIO-15 will be implemented to identify and avoid nesting burrowing owls.

Loggerhead Shrike

Loggerhead shrikes were seen during the 2008 site assessment and along the raw water pipeline. The shrikes seen along the raw water pipeline could have been breeding in the area though no indication of breeding was evident. The shrike was exhibiting nesting behavior; the likely nest location was a large shrub located approximately 100 feet north of the raw water pipeline route.

No significant impacts to this species are anticipated in association with the development of the Project Site; therefore, no species-specific mitigation is recommended. Mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14 will minimize the potential impacts to this species and all nesting bird species.

Le Conte's Thrasher

This species is not expected to be in the Project area because the area has poor foraging and nesting habitat; CNDDDB records indicate this species was observed in 1989 approximately 1

mile east of the Project Site. If this species is found within the Project area, potential impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

California Horned Lark

This species was seen at the Project Site and along the process water pipeline during the 2008 site assessment. No evidence of breeding was detected at that time though there is suitable habitat; however, impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

Tricolored Blackbird

This species is not expected to be in the Project area because the area has poor foraging and nesting habitat; CNDDDB records indicate this species was observed in 2005 approximately 3 miles southeast of the Project Site. If this species is found within the Project area, potential impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14.

Migratory Bird Species

No direct impacts are anticipated to any of these species. No species-specific mitigation is recommended. However, mitigation measures BIO-9, BIO-10, BIO-12, BIO-13, and BIO-14 will minimize impacts to all nesting bird species.

"Pest" Bird Species

To ensure that the Project Site does not contribute to the expansion and population growth of "pest" bird species (i.e., European starlings, house sparrows, common ravens, American crows, rock doves, brown-headed cowbirds, etc.), mitigation measures BIO-7 and BIO-13 will be implemented. If pest species become established, adaptive management techniques will be implemented to reduce the indirect impacts to listed, sensitive, and/or native species of plants and animals.

5.2.2.3.5.4 *Mammals*

Short-nosed Kangaroo Rat

This species is expected to be in the Project area based on habitat requirements and sign. Impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-4, BIO-8, BIO-9, BIO-10, and BIO-18.

Tulare Grasshopper Mouse

This species is expected to be in the Project area based on habitat requirements and sign. Impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-4, BIO-8, BIO-9, BIO-10, and BIO-18.

San Joaquin Pocket Mouse

This species is not expected to be in the Project area; however, potential impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-4, BIO-8, BIO-9, BIO-10, and BIO-18.

Tule Elk

This species is not expected to be in the Project construction areas but a herd is found to the northeast of the Project Site at the Tule Elk State Reserve. Impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-4, BIO-8, BIO-9, BIO-10, and BIO-18.

American Badger

Sign from this species was found on the Project Site but this species is not expected to be in the Project area once construction activity levels increase; however, potential impacts to this species can be mitigated to a less than significant level by the implementation of mitigation measures BIO-4, BIO-8, BIO-9, BIO-10, BIO-16, and BIO-18.

Bats

No impacts to any bat species are anticipated; therefore, no mitigation is recommended.

5.2.2.4 Loss of Sensitive Habitat

To compensate for impacts to threatened and/or endangered plants or wildlife resulting from loss of habitat, the Applicant is proposing to purchase additional habitat (see mitigation measure BIO-20). The habitat that will be purchased will be located in the vicinity of the Project with habitat acceptable to USFWS and CDFG (see mitigation measure BIO-20).

5.2.2.5 Other Operational Effects of the Project

Operation of the Project may have additional effects on biological resources. These impacts are described below.

5.2.2.6 Noise

The Project will produce noise during both construction and operation, as described in Section 5.5, Noise. During construction, minimal noise will be generated in the evening and nighttime until operations are initiated. Noise may disturb some wildlife using adjacent areas. However, wildlife in the adjacent areas has likely become accustomed to habitual noise associated with existing development and highway traffic. Noise impacts to biological resources are expected to be less than significant.

5.2.2.7 Electrocuting Hazard

Additional transmission lines for the Project will increase collision and electrocution hazard for raptors. Although the potential for electrocution exists if birds collide with transmission lines or if raptors perch on towers in such a manner as to complete an electrical contact (touching two or more live electrical conductors or a live conductor and a grounded surface), electrocution is unlikely to occur on the transmission lines associated with the Project. The conductor distance between conductors or between conductors and the ground wire is such that it is unlikely a bird could complete a circuit and be electrocuted. The transmission lines to be constructed for the Project will have a minimum distance greater than the wingspan of any birds in the area. Electrocution is a hazard on small distribution lines where the lower voltages allow less

separation between conductors. Therefore, impacts with regard to bird electrocutions at transmission line routes are expected to be less than significant.

5.2.2.8 Collision Hazard

The transmission line interconnection (addressed previously with respect to electrocution hazard) could also pose some collision hazard to avian species that may simply fly into the lines. Between 9 and 9.5-miles of new transmission lines will be installed (depending on which alternative is chosen), and they will be installed within an area with numerous existing overhead lines. The new transmission line will be located in an area that does not bisect avian usage areas (nesting, forage, loafing) and is currently developed with several power transmission line routes. The significance of this impact will be less than significant.

The height of several project structures (e.g., HRSG stack, CO₂ vent, Air Separation Unit, gasification structure, etc.) will also increase collision potential for avian species. Some migrating bird species that fly at night are guided in part by constellations and can become confused by brightly lit tall structures. Fog or low cloud cover can further add to collision potential, although fog does not occur with much frequency in the Project study area. The stacks will not be adjacent to aquatic habitat that attracts large numbers of migratory birds. Although the number of potential collisions cannot be quantified, collision will likely occur relatively infrequently. This impact will be less than significant.

5.2.2.9 Air Pollutant Emissions

There are two primary potential air pollution issues associated with this project. The first potential issue involves the use of “raw water” in the cooling towers. This “raw water” contains salts which will be released into the air in the cooling tower vicinity and may be spread down wind. The second potential issue pertains to the release of potentially harmful emissions, namely CO, NO_x, and PM₁₀.

As discussed in greater detail in Section 5.1, Air Quality, particulates from the cooling towers, particularly salts, will be dispersed outside of the primary 315 acre Project Site. These particulates are likely to accumulate in the soils and on vegetation causing a slow buildup of salt in the region. However, the majority of plant species in the area are halophytic and the rate of accumulation is anticipated to be slow. The impact associated with salt accumulation is anticipated to be less than significant.

As discussed in greater detail in Section 5.1, Air Quality, and Section 5.6, Public Health, the emissions associated with this project will not pose a human health and safety issue. Based on the lack of human health and safety concerns, it is anticipated that there will be no significant impacts to the plants and animals found in the region.

5.2.2.10 Open Water / Wildlife Attractive Nuisances

The near proximity of the California State Water Project, a permanent source of water, to the Project Site reduces the likelihood that wildlife will be attracted to open bodies of water associated with the Project. The storm water retention basin has the potential to attract wildlife if the retention basin holds water for an extended period of time. The on-site retention basin is designed to contain a 50-year flood event. Once filled, under expected percolation and

evaporation rate, all of the surface water will be expected to be gone within a week. Since the surface water will be present for no more than 7 days immediately following a storm event, wildlife is not likely to be attracted to the area since other water sources will be available.

5.2.3 Cumulative Impacts Analyses

Past and current development in the Project vicinity has resulted in cumulatively significant impacts on biological resources, including special-status species and their habitats. Relevant future projects identified in Section 5.4.3, Cumulative Impacts Analyses, could, unless fully mitigated, further contribute to those impacts.

The southern San Joaquin Valley has undergone dramatic change in the last 200 years. The area has been changed hydrologically with the “taming” of the Kern River and the development of large tracts of mixed agricultural use. More recently, oil and gas development has occurred in the area along with the California Aqueduct, both of which have further impacted and fragmented the biological resources of the area.

Currently there are numerous smaller habitat conservation plans that are in place or are in the planning process, all of which are designed to mitigate impacts to the regional biological resources. This patch work of conservation plans has helped protect the resources of the area but long term viability of the preserves and the ability of the preserves to sustain viable populations of all sensitive species is still in doubt.

The Project will permanently impact approximately 315 acres but with mitigation BIO-20, this impact will be reduced to a less than significant level. The cumulative impact of this project is also expected to be less than significant and lands protected through mitigation measure BIO-20 may help ensure long term viability of the other sensitive species and the existing conservation plans.

5.2.4 Mitigation Measures

This section discusses mitigation measures proposed by the Applicant that will be implemented to reduce Project-related impacts to biological resources to less than significant levels. Impacts to biological resources and corresponding mitigation measures are summarized in Table 5.2-7 Project Proposed Mitigation Summary.

**Table 5.2-7
Project Proposed Mitigation Summary**

Mitigation Measure	Name	Action	Timing	Documentation
BIO-1	Rare Plant Pre-Construction Survey	Rare plant survey(s) will be conducted of the affected Project areas and adjacent areas within 200 feet of the affected areas.	early spring and through course of the year	BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)
BIO-2	Rare Plant Avoidance	Rare plants will be avoided, to the greatest extent feasible.	NA	NA

**Table 5.2-7
Project Proposed Mitigation Summary**

Mitigation Measure	Name	Action	Timing	Documentation
BIO-3	Rare Plant Mitigation	For impacts to plant species that can not be avoided, an appropriate area will be reseeded.	Seeds will be collected according to species; area will be monitored for 5 years	Annually through BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)
BIO-4	Terrestrial Wildlife Pre-construction Survey	Wildlife survey(s) will be conducted of the affected Project areas and adjacent areas within 200 feet of the affected areas.	Prior to ground disturbance.	BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)
BIO-5	Additional Population Assessment	BNLL surveys for hatchlings and sub-adults will be conducted.	Between 1 August and 15 September 2008	Letter memo to CEC, DFG, and USFWS.
BIO-6	Site Clearance Prior to Ground Disturbance	Prior to initial site preparation, the entire site will be passively cleared of BNLL.	March through April (dependant on weather), prior to ground disturbance	BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)
BIO-7	Predatory Bird Minimization Measures	Minimize the number and advantages birds will have near the Project Site and along the transmission lines	On going from the on-set of construction.	BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)
BIO-8	Vehicle Traffic Protection Measures	Minimize potential for road kill along egress.	On going from the on-set of construction.	BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)
BIO-9	Worker Education Program	Worker education program will be implemented for all construction personnel, regular drivers, and operation personnel	On going from the on-set of construction.	BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)
BIO-10	Operations and Maintenance Activities	Training for operation and maintenance personnel	On going from the on-set of construction.	

**Table 5.2-7
Project Proposed Mitigation Summary**

Mitigation Measure	Name	Action	Timing	Documentation
BIO-11	Giant Garter Snake Clearance Surveys	If any giant garter snakes are observed during the pre-construction surveys (BIO-4), additional surveys will be conducted in areas with potentially suitable habitat	Prior to ground disturbance.	BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)
BIO-12	Bird Pre-construction Surveys	Avian survey(s) will be conducted of the affected Project areas and adjacent areas within 200 feet of the affected areas. If listed species are detected, additional surveys will be conducted.	Prior to ground disturbance.	BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)
BIO-13	Bird Nesting Activity Surveys	Areas that will be attractive nest sites should be made “less appealing” and be regularly examined by a biologist.	During the height of the breeding season, all work areas, laydown sites, and equipment should be checked three times a week.	BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)
BIO-14	Bird Nest Protection	If eggs or young are in the nest, the nest will be protected.	Once the young have fledged or the nest has failed, as determined by an approved biologist, the nest will be removed and normal activities will resume.	
BIO-15	Burrowing Owl Pre-construction Surveys	The construction areas and adjacent areas within 500 feet of the work sites will be surveyed by an acceptable biologist for burrows that could be used by burrowing owl.	Prior to ground disturbance.	BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)
BIO-16	San Joaquin Kit Fox Mitigation	Dens will be examined and if vacant, excavated and collapsed.	Prior to ground disturbance.	BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)

**Table 5.2-7
Project Proposed Mitigation Summary**

Mitigation Measure	Name	Action	Timing	Documentation
BIO-17	Small Mammal Mitigation	During the initial site preparation of the Project Site (BIO-6), the entire area will need to be cleared.	March- April, prior to ground disturbance.	BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)
BIO-18	Ground Disturbance Monitoring for Terrestrial Wildlife	Approved biologists will be present when the top 18 inches of soil are initially disturbed at the Project Site and along linears.	During ground disturbance of top 18".	BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)
BIO-19	Reporting to Agencies	A monthly BRMIMP report will be submitted to the CEC, CDFG, and USFWS.	Monthly from the on-set of construction activities.	BIO-19: Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP)
BIO-20	Sensitive Habitat Mitigation	Permanent loss of habitat will be replaced at a ratio established with USFWS and CDFG.	Prior to ground disturbance.	Legal agreement in place prior to ground disturbance.

5.2.4.1 *Special-Status Species*

5.2.4.1.1 Special-Status Plant Species

Based on information gathered to date, special-status plant species will be affected by the Project. The following measures will be implemented to reduce impacts to special-status plants to a less than significant level.

BIO-1 Rare Plant Pre-Construction Survey

Approved biologists will conduct a rare plant survey of the affected Project areas and adjacent areas within 200 feet of the affected areas, or to the property boundary if less than 200 feet and permission from the adjacent landowner cannot be obtained. Surveys will be conducted in early spring to maximize the likelihood of detecting sensitive plants. Sensitive plants will be identified, counted, and mapped. Populations of sensitive plants will be monitored through the course of the year to determine how many mature and bloom. The results of all pre-construction surveys will be documented and submitted to the CEC, USFWS, and CDFG (see mitigation measure BIO-19).

BIO-2 Rare Plant Avoidance

If special-status plant species are present that will be affected by work in the Project Site, gas line corridor, water line corridor, or transmission line, impacts to the rare plants will

be avoided, to the greatest extent feasible. Avoidance measures may also include relocating tower footings or realignment of linear facilities.

BIO-3 Rare Plant Mitigation

For permanent impacts to plant species that can not be avoided, disturbance will be timed until after all available seeds can be collected from the parent plant(s). These seeds will be properly stored and then scattered over a suitable area near the “parental site” just prior to the first rains of the season.

Temporary disturbances that can not be avoided will be timed for after the blooming period; the seeds from the sensitive plants will be collected and properly stored, and the top soil will be salvaged. After work is completed in that area, the top soil will be replaced and the seeds will be redistributed just prior to the first rains of the season.

Both types of the abovementioned re-seeded areas will be demarcated in the field, mapped, and monitored for 5 years. Monitoring will be conducted during the early spring to determine if the target species are present and if weed species are common. Weeding will occur if weed species appear abundant or are adversely impacting the target species. Weeding will be done in a fashion that will minimize impacts to sensitive plant or animal species and other native species but may include hand weeding, weed whacking, or herbicide spraying. A follow-up monitoring effort will be conducted each year to determine how many of the target species set seeds.

An annual report will be submitted to the CEC, USFWS, and CDFG documenting the status of each population, weeding efforts that have been undertaken, and suggested work for the next season (see mitigation measure BIO-19).

It is anticipated that these measures will be sufficient to avoid significant impacts to any special-status plant species that may be present.

5.2.4.1.2 Threatened and Endangered Wildlife Species

Based on surveys conducted to date, listed wildlife species will be affected by the Project. The following measures will be implemented to ensure impacts to sensitive and listed species are less than significant and mitigated to the greatest extent feasible.

5.2.4.1.2.1 *Sensitive Wildlife Species Surveys*

BIO-4 Terrestrial Wildlife Pre-construction Survey

The Project will conduct a presence/absence survey of the affected areas and adjacent areas within 200 feet of the affected areas, or to the property boundary if less than 200 feet and permission from the adjacent landowner cannot be obtained. Efforts will include looking for blunt-nosed leopard lizard, giant garter snake, San Joaquin kit fox, Giant, Short-nosed, and Tipton’s kangaroo rats, Nelson’s antelope squirrel, burrowing owl, loggerhead shrike, Le Conte’s thrasher, horned lark and any other sensitive animals. All sightings and/or sign of sensitive wildlife will be mapped and data input to a global positioning system. The results of all pre-construction surveys will be documented and submitted to the CEC, USFWS, and CDFG (see mitigation measure BIO-19).

5.2.4.1.2.2 *Blunt-nosed Leopard Lizard*

Blunt-nosed leopard lizards are presumed to be present at the Project Site and associated linears and off-site work areas. Ensuring that blunt-nosed leopard lizards are not taken will be intricately interwoven with clearing the Project Site of kit fox and small mammals. Kit fox clearance is the first proposed step followed by concurrent removal of small mammals and exclusion of blunt-nosed leopard lizards. All feasible and prudent minimization and avoidance measures have been included as follows:

BIO-5 Additional Population Assessment

CDFG protocol surveys for hatchlings and sub-adults will be conducted between 1 August and 15 September 2008. The survey areas will include the Project Site, transmission corridor south of the West Side Canal, raw water pipeline corridor south of the West Side Canal, carbon dioxide pipeline, natural gas pipeline, and potable water pipeline. The additional information will help determine the timing of local hatching and assist in avoiding impacts to the species. Protocol surveys for adults and juveniles will be conducted in 2009 for the Project Site, transmission corridor south of the West Side Canal, raw water pipeline corridor south of the West Side Canal, carbon dioxide pipeline, natural gas pipeline, and potable water pipeline.

BIO-6 Site Clearance Prior to Ground Disturbance

To ensure that no lizards are taken during the initial site preparation, each area will need to be cleared prior to any ground disturbance. Ground clearance will begin along the entrance road and will continue west then northwest. Areas will be secured as they are cleared to ensure that no wildlife re-enters the area.

Beginning in March and into April, silt fences will be set to create approximately 100 meter by 100 meter squares or follow main roadways, whichever makes more logistical sense. The silt fence posts will be set into weighted "hazard cones" to avoid any ground disturbances. The silt fence itself will be placed on the ground and held in place with imported sand, sand bags, pipes, posts, and/or weighted waddles. The material used to secure the silt fence to the ground should ensure that small animals can not pass beneath it. Herbaceous vegetation will be removed by hand; shrubs will be avoided.

Once the silt fence has been established, the area will be visually surveyed during the day for wildlife and "trapped out" of small mammals (see mitigation measure BIO-17) during the night. All surveying and trapping efforts will minimize collapsing any small mammal burrows. Tracking stations will be used to determine if there are additional individuals within the area.

The areas will be surveyed for blunt-nosed leopard lizards daily when soil and air temperatures are within CDFG survey protocol limits. An area will be deemed clear of any blunt-nosed leopard lizards after there have been no signs or sightings for 10 survey days. If a blunt-nosed leopard lizard is seen within an area, the silt fence will be opened to allow the lizard to leave on its own accord. Once the lizard has left the area, the silt fence will be closed and surveys will be started anew.

If the silt fencing is compromised (by wind or other means) and left "open" for more than two hours, the area will be re-surveyed for wildlife. Surveys will not be required if the silt fence that is knocked over is between areas that have already been cleared.

To insure that BIO-6 is successful, ground disturbance will be monitored (BIO-18).

The results of the blunt nosed lizard surveys and area clearance will be documented and submitted to the CEC, USFWS, and CDFG (see mitigation measure BIO-19).

BIO-7 Predatory Bird Minimization Measures

Numerous species of bird are known to predate BNLLs and other sensitive vertebrate species. Site features should be mitigated to minimize the number and advantages these birds will have near the Project Site and along the transmission lines.

To minimize the number of predatory birds in the area, no raptors or corvids will be allowed to nest in the transmission towers within 1 mile of known BNLL habitat. Nests will be removed prior to egg laying in late winter/early spring. All bird nests removed will be documented and submitted to the CEC, USFWS, and CDFG (see mitigation measure BIO-19).

BIO-8 Vehicle Traffic Protection Measures

During construction, the edges of the road should be fenced with silt fence and the maximum speed limit should be set at 25 miles per hour (mph). An approved biologist should periodically check the road for sign of wildlife and open the fencing if a blunt-nosed leopard lizard is found on the road.

The final road design should incorporate permanent small wildlife-proof fencing (i.e., low out-sloped cement walls) and periodic “under passes” to allow both water flow small animals movement. The maximum speed limit should be set at 25 mph during day-light hours.

All road kill found will be documented and submitted to the CEC, USFWS, and CDFG (see mitigation measure BIO-19). If numerous animals are being killed by vehicle traffic, additional measures to preclude wildlife from accessing the roadway will be discussed. If wildlife can not be kept off of the road, the maximum vehicle speeds may need to be reduced further and/or have an approved biologist clear the road on a regular basis.

BIO-9 Worker Education Program

A worker education program will be implemented for all construction personnel, regular drivers, and operation personnel. All personnel will be required to read an educational brochure and attend an education class given by the approved biologist(s). The brochure and class will describe the sensitive species that could be encountered at the Project, the regulatory protection of the species, and appropriate measures to take upon discovery of a sensitive species or active bird nest.

Site personnel will be instructed to set equipment off the ground when possible to minimize access of small mammals. All work areas will be kept clean of trash and food items to minimize attracting wildlife into the work areas. Construction techniques to minimize potential adverse impacts will also be presented such as filling or covering excavations. If excavations are to be left open over night, ramps will be installed to allow wildlife to escape.

The names and affiliations of all people trained will be documented and submitted to the CEC, USFWS, and CDFG (see mitigation measure BIO-19).

BIO-10 Operations and Maintenance Activities

Operation and maintenance activities along the Project linears (i.e., access road, potable water line, gas transmission corridor, transmission lines) will be conducted by personnel instructed to be alert and aware for the presence of sensitive wildlife. If any sensitive wildlife is spotted, activities in the vicinity of the sighting will be halted and the animal will be allowed to move away from the activity area.

5.2.4.1.2.3 Giant Garter Snake

Although no giant garter snake(s) have been recorded recently, feasible and prudent minimization and avoidance measures have been included as follows:

BIO-11 Giant Garter Snake Clearance Surveys

If any giant garter snakes are observed during the pre-construction surveys (BIO-4), additional surveys will be conducted in areas with potentially suitable habitat. At least three surveys will be conducted at least 2 days apart in these areas under ideal weather conditions. All construction work that will be done in the area where the giant garter snake(s) were detected will be supervised by an approved biologist.

The results of all pre-construction surveys will be documented and submitted to the CEC, USFWS, and CDFG (see mitigation measure BIO-19).

5.2.4.1.2.4 Threatened or Endangered Bird Species

Although there have been no recent observations of Swainson's hawk, peregrine falcon, snowy plover, yellow-billed cuckoo, Southwestern willow flycatcher, or least Bell's vireo, the following feasible and prudent minimization and avoidance measures have been included:

BIO-12 Bird Pre-construction Surveys

Approved biologists will conduct focused avian surveys of the affected areas and adjacent areas within 200 feet of the affected areas, or to the property boundary if less than 200 feet and permission from the adjacent landowner cannot be obtained. Efforts will focus on rare and/or sensitive species and high quality habitat, but will identify all bird species present. Surveys will be conducted between 10 minutes before dawn and 10:30 a.m. under favorable weather conditions.

If listed species are detected, additional surveys will be conducted to determine if the rare or listed species have remained in the area. Surveys will continue twice weekly until the status of the individual(s) has been determined and surveys will continue as often as necessary to document potential impacts on the species. If there appears to be an adverse impact to the species, additional measures will be put in place to ensure impacts are less-than-significant. Additional measures may include stopping all work in the vicinity of the listed species, erecting visual barriers, limiting the duration of work in the area, or other measures set forth by the approved biologist or regulatory representative.

The results of all pre-construction surveys will be documented and submitted to the CEC, USFWS, and CDFG (see mitigation measure BIO-19).

BIO-13 Bird Nesting Activity Surveys

Every effort will be made to ensure that birds do not nest within or adjacent to active work zones. Areas that will be attractive nest sites should be made “less appealing” and be regularly examined by a biologist. During the height of the breeding season, all work areas, laydown sites, and equipment should be checked three times a week.

An approved biologist will also conduct focused searches for nesting birds of the affected areas and adjacent areas within 200 feet of the affected areas, or to the property boundary if less than 200 feet and permission from the adjacent landowner cannot be obtained. All bird species protected under the Migratory Bird Treaty Act (MBTA) will be surveyed for and all nests will be recorded. Particular attention will be paid to habitat that is suitable for nesting by listed birds species.

The results of all nesting surveys will be documented and submitted to the CEC, USFWS, and CDFG (see mitigation measure BIO-19) including nest fate and cause of all nest failures.

BIO-14 Bird Nest Protection

In work areas and laydown sites that will be disturbed during the anticipated breeding season, nests will be removed if they are found prior to egg laying in compliance with the MBTA. If eggs or young are in the nest, the nest will be protected. A suitable buffer, which will be established and demarcated based on the species of bird, nest location, and types of activity with the area as determined by the approved biologist. Once the young have fledged or the nest has failed, as determined by an approved biologist, the nest will be removed and normal activities will resume.

In areas that are not required to be disturbed during the breeding season, no nest surveys will be required. Any activity that is proposed within these areas will need to be assessed by an approved biologist to ensure no nests or nestlings protected by the MBTA will be harmed.

BIO-15 Burrowing Owl Pre-construction Surveys

Prior to ground disturbing activities, the construction areas and adjacent areas within 500 feet of the work sites, or to the edge of the property if less than 500 feet, will be surveyed by an acceptable biologist for burrows that could be used by burrowing owl. If a burrow is determined to be occupied, the following avoidance/minimization measures will be implemented:

- **During the Non-Breeding Season (August 1 – February 28):** If the burrow can be avoided until the burrowing owl naturally abandons the burrow, a buffer zone of 160 feet from the burrow will be demarcated and work within the buffer zone avoided. If the burrow cannot be avoided, then passive relocation techniques will be employed. Once it is confirmed the burrowing owl has abandoned the burrow, the burrow will be examined with a “burrow scope” and hand-excavated to ensure no harm or mortality to burrowing owls possibly remaining in the burrow.
- **During the Breeding Season (March 1 – July 31):** If the burrow can be avoided, a 250-foot buffer zone will be demarcated around the burrow, and no work activities will be conducted within the buffer area until the young are no longer

dependent on the burrow or the burrow has been abandoned. If the burrow is in a critical work area, the nest will be examined with a burrow scope to determine if eggs and/or young are present; if eggs or young are present, the burrow will be protected until the young are no longer dependent on the burrow. If no young or eggs are present, passive relocation techniques will be employed. Once it is confirmed the burrowing owl has abandoned the burrow, it will be hand-excavated to ensure no harm or mortality to burrowing owls possibly remaining in the burrow.

The results of all pre-construction surveys will be documented and submitted to the CEC, USFWS, and CDFG (see mitigation measure BIO-19).

5.2.4.1.2.5 Threatened or Endangered Mammal Species

Based on surveys conducted to date, San Joaquin kit fox, giant kangaroo rat, Tipton's kangaroo rat, and Nelson's antelope squirrel will be affected by the Project. Due to the habitat requirements and rarity, there should be no impacts to the Buena Vista Lake shrew. The following measures will be implemented to ensure impacts to sensitive and listed species are less than significant and mitigated to the greatest extent feasible.

BIO-16 San Joaquin Kit Fox Mitigation

Den excavation and removal will be timed to occur outside of the breeding season (February through May) (USFWS 1998) to avoid disturbing natal dens. Dens will be examined with both a burrow scope and 5 nights of tracking stations to determine if the dens are active. Inactive dens will be excavated with hand tools and then collapsed.

If a den is determined to be active or if an inactive den is determined to be active after hand excavation has been started, all activity around the den will stop and all people will vacate the area. The den will be monitored (eye-shine and/or track stations) over the next few nights to determine if the fox(es) have left the area. If the fox(es) have left the den, excavation will continue and the den will be collapsed after it is certain that no foxes are in the burrow.

The results of all den assessments, burrow scoping, and excavation activities will be documented and submitted to the CEC, USFWS, and CDFG (see mitigation measure BIO-19).

BIO-17 Small Mammal Mitigation

To ensure that impacts to small mammals are minimized, during the initial site preparation of the Project Site, each area will need to be cleared prior to any ground disturbance. Areas will be secured as they are cleared to ensure that no wildlife re-enters the area (in conjunction with BIO-6).

Beginning in March and into April, silt fences will be set to create approximately 100 meter by 100 meter squares or follow main roadways, whichever makes more logistical sense. The silt fence posts will be set into weighted "hazard cones" to avoid any ground disturbances. The silt fence itself will be placed on the ground and held in place with imported sand, sand bags, pipes, posts, and/or weighted waddles. The material used to secure the silt fence to the ground should ensure that small animals can not pass beneath it. Herbaceous vegetation will be removed by hand; shrubs will be avoided.

Once the silt fence has been established, the area will be visually surveyed during the day for wildlife and “trapped out” of small mammals during the night. All surveying and trapping efforts will minimize collapsing any small mammal burrows. Tracking stations will be used to determine if there are additional individuals within the area.

Small mammal trapping will be conducted for 5 consecutive nights or until no animals are caught on 2 consecutive nights per area. Traps will be set according to “sign” (burrows, trails, scat, etc.) and/or in areas of high habitat quality. Approximately 100 traps will be set within an area set approximately 10 meters apart. Traps will be set at dusk and checked prior to sunrise. Traps will be baited with sterile seed so as not to introduce non-native species into the area. Trapping will not be conducted on nights where nighttime temperatures are expected to drop below 50°F.

If the silt fencing is compromised (by wind or other means) and left “open” through the night, the area will be re-trapped for small mammals. Additional trapping will not be required if the silt fence that is knocked over is between areas that have already been cleared.

The results of the small mammal trapping and area clearance will be documented and submitted to the CEC, USFWS, and CDFG (see mitigation measure BIO-19).

5.2.4.2 Sensitive Wildlife Species Monitoring

BIO-18 Ground Disturbance Monitoring for Terrestrial Wildlife

Approved biologists will be present when the top 18 inches of soil are initially disturbed at the Project Site and along linears. The biologist(s) will watch for any sensitive animals and will stop work if wildlife is found in the area. If authorized to remove and/or relocate the species, the animal will be relocated to the nearest safe location. If the species can not be legally relocated, all work will be shut down and all personnel will be required to leave the area. The approved biologist will watch the wildlife in question from a distance until the individual has left the area. The results of all construction monitoring will be documented and submitted to the CEC, USFWS, and CDFG (see mitigation measure BIO-19).

BIO-19 Reporting to Agencies

A monthly Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP) report will be submitted to the CEC, CDFG, and USFWS. The report will be submitted by the 20th of the following month (i.e., the report for May will be submitted by June 20th). If the 20th falls on a weekend or holiday, the report will be due the first business day following the 20th. In order to reduce the use of paper, the BRMIMP may be submitted on CD and/or electronically, as directed by each agency.

Biologists associated with monitoring and surveying for sensitive species will receive written and/or verbal approval from the CEC, CDFG, and USFWS prior to conducting survey work. Biologists will be approved for specific tasks and/or species.

During construction, an approved biologist will examine active work areas every day prior to the onset of activities to ensure that there are no sensitive species in the area and that all wildlife barriers are still in place. Biologists will be responsible for inform

construction crews which areas are clear, and reporting significant observations of wildlife to the agencies within 24 hours.

Project-specific roadways will be examined for mortality and/or individual wildlife that is encroaching on the roadways.

Each installment of the BRMIMP will include:

- List of all approved biologists, their affiliation, and tasks and/or species.
- List of all peoples and their affiliations who have gone through on-site orientation since that last reporting.
- Detailed results of pre-disturbance surveys for plants and wildlife.
- Results of daily pre-construction surveys and road “sweeps.”
- List of wildlife relocated out of construction areas and/or off of roadways.
- List of all wildlife found dead on site including disposition and presumed cause of mortality.
- All active nests including species, location, stage, buffer area, and fate.
- All nests removed including species (if known), location, and stage.
- Monitoring results of restoration areas.
- All other important and relevant biological information.

5.2.4.3 Sensitive Habitat

BIO-20 Sensitive Habitat Mitigation

Permanent loss of habitat will be replaced at a ratio established with USFWS and CDFG. Approved mitigation banks and/or pre-approved land purchases will be utilized to replace the permanent loss of habitat. Land that will be used must have habitat suitable for the majority of species impacted and be protected from significant disturbance.

5.2.5 Laws, Ordinances, Regulations, and Standards

The Project will be constructed and operated in accordance with all LORS applicable to biological resources. Federal, state, and local LORS applicable to biological resources are discussed below in Table 5.2-8, Summary of LORS – Biological Resources.

**Table 5.2-8
Summary of LORS – Biological Resources**

LORS	Administering Agency	Applicability	AFC Section
Federal			
Endangered Species Act of 1973 and implementing regulations, Title 16 United States Code (USC) §1531 <i>et seq.</i> (16 USC 1531 <i>et seq.</i>), Title 50 Code of Federal Regulations (CFR) §17.1 <i>et seq.</i> (50 CFR 17.1 <i>et seq.</i>)	U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service	Designates and protects federally threatened and endangered plant and animals and their critical habitat.	5.2.1.4, 5.2.2.3, and 5.2.2.4
Section 7 of Fish and Wildlife Coordinating Act, 16 USC 742 <i>et seq.</i> , 16 USC 1531 <i>et seq.</i> , and 50 CFR 17.	USFWS	Requires consultation if any project facilities that could jeopardize the continued existence of an endangered species. Applicability depends on federal jurisdiction over some aspect of the project.	5.2.1.4 and 5.2.2.3
Section 10(a)(1)(A) of the ESA	USFWS	Requires a permit to “take” threatened or endangered species during lawful project activities. If there is no federal nexus for the project, a Habitat Conservation Plan (HCP) may be required.	5.2.1.4 and 5.2.2.3
Section 404 of the Clean Water Act of 1977 (33 USC 1251 <i>et seq.</i> , 33 CFR §§ 320 and 323)	U.S. Army Corps of Engineers (USACE)	Gives USACE authority to regulate discharge of dredge or fill material into Waters of the U.S. including wetlands	5.2.1.3 and 5.2.2.1
Section 401 of the Clean Water Act of 1977	Regional Water Control Board	Requires applicant to conduct water quality impact analysis for the project when using 404 permits and for discharge to waterways.	5.2.1.3, 5.2.2.1, and 5.2.2.2
Migratory Bird Treaty Act 16 USC §§703-711	USFWS	Prohibits the non-permitted “take” of native migratory birds, their nests, or eggs.	5.2.2.3 and 5.2.4
State			
California Endangered Species Act of 1984, Fish and Game Code, §2050 through §2098	California Department of Fish and Game (CDFG)	Protects California’s endangered and threatened plant and animal species.	5.2.1.4 and 5.2.2.3
Title 14, California Code of Regulations (CCR) §§670.2 and 670.5	CDFG	Lists plant and animals of California declared to be threatened or endangered.	5.2.1.4 and 5.2.2.3
Fish and Game Code Fully Protected Species §3511: Fully Protected Birds §4700: Fully Protected Mammals §5050: Fully Protected Reptiles and Amphibians §5515: Fully Protected Fishes	CDFG	Prohibits the taking of listed plants and animals that are Fully Protected in California.	5.2.1.4 and 5.2.2.3

**Table 5.2-8
Summary of LORS – Biological Resources**

LORS	Administering Agency	Applicability	AFC Section
Fish and Game Code, §1930 Significant Natural Areas	CDFG	Identifies and protects Significant Natural Areas of California.	5.2.1
Fish and Game Code, §1580, Designated Ecological Reserves	CDFG	Identifies Designated Ecological Reserves of California.	5.2.1
Fish and Game Code, §1600, Streambed Alteration Agreement	CDFG	Reviews projects for impacts on waterways, including impacts to vegetation and wildlife from sediment, diversions, and other disturbances.	5.2.1.3, 5.2.2.1, and 5.2.2.2
Native Plant Protection Act of 1977, Fish and Game Code, §1900 <i>et seq.</i>	CDFG	Designates state rare and endangered plants and provides specific protection measures for identified populations.	5.2.1.4, 5.2.2.3, and 5.2.4
CDFG Policies and Guidelines, Wetlands Resources Policy	CDFG	Provides for the protection, preservation, restoration, enhancement, and expansion of wetland habitats in California, including vernal pools	5.2.1.3, 5.2.2.1, and 5.2.2.2
Public Resources Code, §§25500 & 25527	CDFG, USFWS	Prohibits siting of facilities in certain areas of critical concern for biological resource, such as ecological preserves, refuges, etc.	5.2.1.1, 5.2.1.2, 5.2.1.4, and 5.2.2.3
Title 20 CCR §§1702 (q) and (v)	CDFG, USFWS	Protects “areas of critical concern” and “species of special concern” identified by local, state, or federal resource agencies within the project area, including the CNPS.	5.2.1.4 and 5.2.2.3
Title 14 CCR Section 15000 <i>et seq.</i>	CDFG, USFWS	Describes the types and extent of information required to evaluate the effects of a proposed project on the biological resources of a project site.	5.2
California Desert Native Plant Act, Food and Agriculture Code §80001 through §80006	California Agricultural Commission	Protects California desert native plants from unlawful harvesting on both privately and public owned lands.	5.2.1.4 and 5.2.2.3
Local			
Kern County General Plan	Kern County	Provides guidance on the types of development activity and allowable uses for those areas within the county limits.	5.2.1 and 5.2.2

5.2.5.1 Federal

- 5.2.5.1.1 Endangered Species Act of 1973 and implementing regulations, Title 16 United States Code (USC) §1531 *et seq.* (16 USC 1531 *et seq.*), Title 50 Code of Federal Regulations (CFR) §17.1 *et seq.* (50 CFR 17.1 *et seq.*)

The ESA includes provisions for the management and protection of federally listed threatened or endangered plants and animals and their designated critical habitats. Section 10(1)(A) of the ESA requires a permit to take threatened or endangered species during lawful project activities. If there is not a federal nexus for the project, a Habitat Conservation Plan (HCP) may be necessary. The administering agency of the above authority is the USFWS for terrestrial, avian, and most aquatic species, and the National Marine Fisheries Service (NMFS) for anadromous species.

- 5.2.5.1.2 Section 7 of Fish and Wildlife Coordinating Act, 16 USC 742 *et seq.*, 16 USC 1531 *et seq.*, and 50 CFR 17.

The Fish and Wildlife Coordinating Act requires consultation if any federal agency action is required for project facilities that could jeopardize the continued existence of an endangered species. Applicability depends on federal jurisdiction over some aspect of the project.

The administering agency for this authority is the USFWS.

- 5.2.5.1.3 Section 404 of the Clean Water Act of 1977 (33 USC 1251 *et seq.*, 33 CFR §§ 320 and 323)

This section of the Clean Water Act gives the USACE authority to regulate discharges of dredge or fill material into Waters of the U.S., including wetlands.

The administering agency of this authority is the USACE.

- 5.2.5.1.4 Section 401 of the Clean Water Act of 1977

This section of the Clean Water Act requires the Applicant to conduct water quality impact analysis for the project when using Section 404 permits and for discharges to waterways.

The administering agency of this authority is the USACE.

- 5.2.5.1.5 Migratory Bird Treaty Act 16 USC §§703-711

The Migratory Bird Treaty Act includes provisions for protection of migratory birds, including the non-permitted take of migratory birds.

The administering agencies for this authority are the USFWS and CDFG.

5.2.5.2 State

- 5.2.5.2.1 California Endangered Species Act of 1984, Fish and Game Code, §2050 through §2098

The California Endangered Species Act includes provisions for the protection and management of plant and animal species listed as endangered or threatened, or designated as candidates for such listing. The Act includes a consultation requirement “to ensure that any action authorized by a state lead agency is not likely to jeopardize the continued existence of the species” (§2090).

Plants of California declared to be endangered, threatened, or rare are listed at 14 CCR §670.5. 14 CCR § 15000 *et seq.* describes the types and extent of information required to evaluate the effects of a proposed project on biological resources of a project site.

The administering agency for this authority is CDFG.

5.2.5.2.2 Fish and Game Code Fully Protected Species

- §3511: Fully Protected Birds
- §4700: Fully Protected Mammals
- §5050: Fully Protected Reptiles and Amphibians
- §5515: Fully Protected Fishes

The Fish and Game Code prohibits the taking of listed plants and animals that are Fully Protected Species in California.

The administering agency for this authority is CDFG.

5.2.5.2.3 Fish and Game Code, §1930 Significant Natural Areas

This section of the code designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools and significant wildlife habitats. These Significant Natural Areas are listed in the California Natural Diversity Database (CNDDDB).

The administering agency for the above authority is CDFG.

5.2.5.2.4 Fish and Game Code, §1580, Designated Ecological Reserves

The CDFG commission designates land and water areas as significant wildlife habitats to be preserved in natural condition for the general public to observe and study.

The administering agency for the above authority is CDFG.

5.2.5.2.5 Fish and Game Code, §1600, Streambed Alteration Agreement

This section of the code reviews projects for impacts on waterways, including impacts to vegetation and wildlife from sediment, diversions, and other disturbances.

The administering agency for the above authority is CDFG.

5.2.5.2.6 Native Plant Protection Act of 1977, Fish and Game Code, §1900 *et seq.*

This 1977 Act designates state rare and endangered plants and provides specific protection measures for identified populations.

The administering agency for the above authority is CDFG.

5.2.5.2.7 CDFG Policies and Guidelines, Wetlands Resources Policy

This policy provides for the protection, preservation, restoration, enhancement, and expansion of wetland habitats in California, including vernal pools.

The administering agency for the above authority is CDFG, California Environmental Protection Agency (Cal/EPA), and the Colorado River Basin Regional Water Quality Control Board.

5.2.5.2.8 Public Resources Code, §§25500 & 25527

According to the Public Resources Code, the siting of facilities in certain areas of critical concern for biological resource, such as ecological preserves, wildlife refuges, estuaries, and unique or irreplaceable wildlife habitats or scientific or ecological value, is prohibited. If there is no alternative, strict criteria are applied.

The administering agencies for the above authority are the USFWS and CDFG.

5.2.5.2.9 Title 20 CCR §§1702 (q) and (v)

This Title protects “areas of critical concern” and “species of special concern” identified by local, state, or federal resource agencies within the project area, including the CNPS.

5.2.5.2.10 Title 14 CCR Section 15000 *et seq.*

This Title describes the types and extent of information required to evaluate the effects of a proposed project on biological resources of a project site.

The administering agencies for the above authority are the USFWS and CDFG.

**5.2.5.2.11 California Desert Native Plant Act, Food and Agriculture Code
§80001 through §80006**

The California Desert Native Plant Act protects California desert native plants from unlawful harvesting on both privately- and publically-owned lands. The Act protects specific species of native desert plants from being harvested from their natural state for sale, possession, replanting, or other purposes. The removal of plants on one’s own property for the purpose of construction or developing the property is allowed.

5.2.5.3 Local**5.2.5.3.1 Kern County General Plan**

The Kern County General Plan provides guidance on the types of development activity and allowable uses for those areas within the county limits. In particular section 1.10.5 pertains to the protection and management of threatened and endangered species and riparian areas within the county (Kern County Planning Department 2007).

5.2.6 Involved Agencies and Agency Contacts

Table 5.2-9, Agency Contacts, identifies agencies contacted for this evaluation. Due in part to the timing of the Project start and personnel schedules, meetings with USFWS and DFG did not occur at the beginning of the field season. Information has been shared during meetings between DFG and Occidental of Elk Hills where the Applicant has been present.

The two primary talking points pertain to the initiation of Section 7 consultation with USFWS on behalf of the EPA and discussing the Project’s impact on the proposed Occidental of Elk Hills habitat conservation plan.

Additional talking points will include ensuring sensitive species surveys scheduled for late 2008 and through 2009 meet USFWS, DFG, and CEC requirements. These discussions have not

occurred prior to this point because optimal survey periods had already lapsed prior to the start date of the AFC process. Additional meetings are scheduled for August 2008.

**Table 5.2-9
Agency Contacts**

Issue	Agency	Contact/Title	Telephone	E-mail
Initial Section 7 Consultation/Survey protocols	U.S. Fish and Wildlife Service	Susan Jones, San Joaquin Valley Branch Chief	916-414-6600	Susan_P_Jones@fws.gov
Occidental of Elk Hills HCP/Survey protocols	California Department of Fish and Game	Julie Vance, Senior Environ. Scientist. Central Region.	559-243-4014 x 222	JVANCE@dfg.ca.gov
Survey protocols	California Energy Commission	Rick York	916-654-3945	ryork@energy.state.ca.us

5.2.7 Permits Required and Permit Schedule

This section describes the required permits related to biological resources for the Project. The following table summarizes these required permits. Additional details on information required for each permit application and where the required information can be found in this document is provided in Table 5.2-10, Biological Permits Required and Scheduled Timing.

**Table 5.2-10
Biological Permits Required and Scheduled Timing**

Responsible Agency	Permit/Approval	Schedule
U.S. Fish and Wildlife Service	Section 7 consultation for listed species	

5.2.8 References

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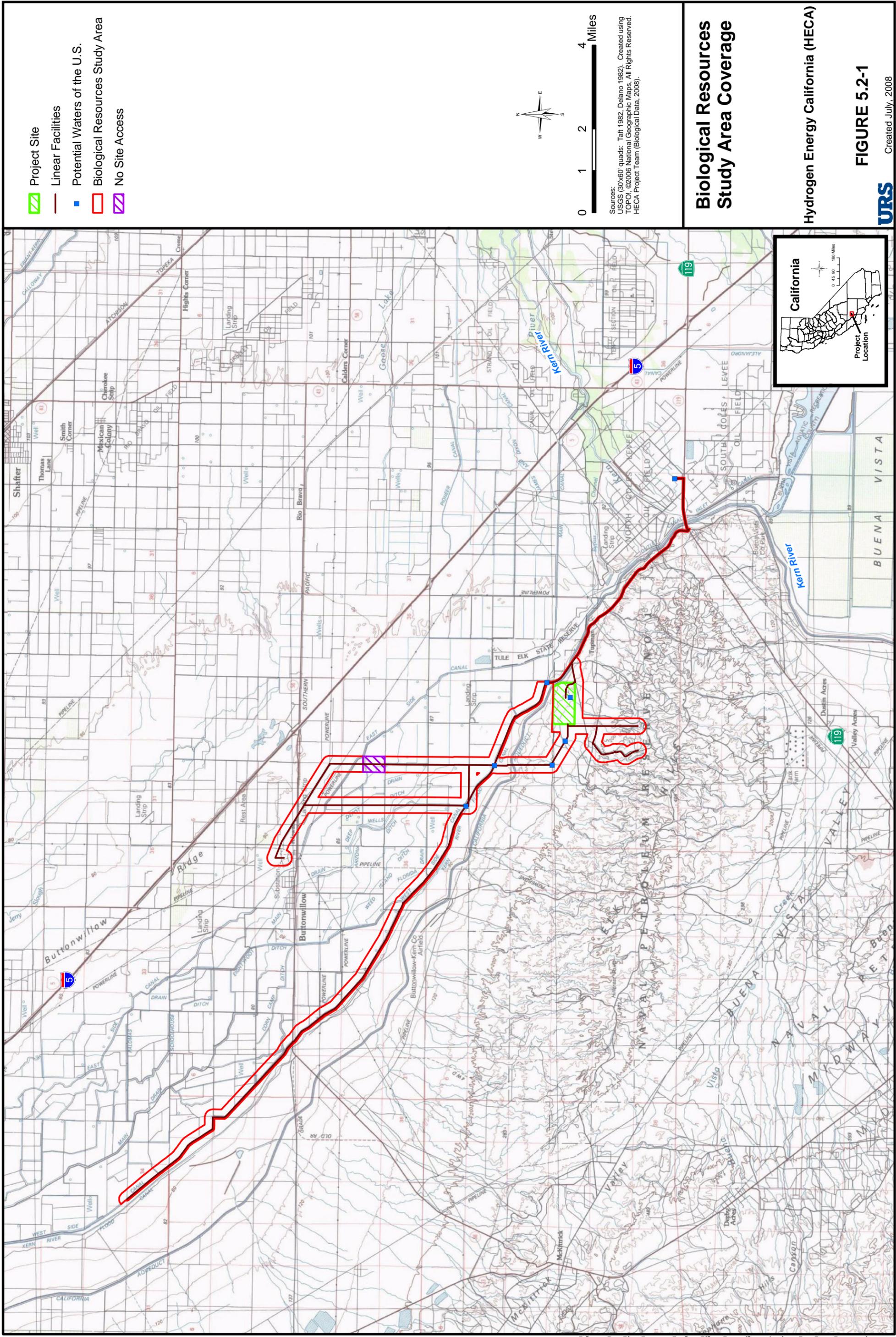
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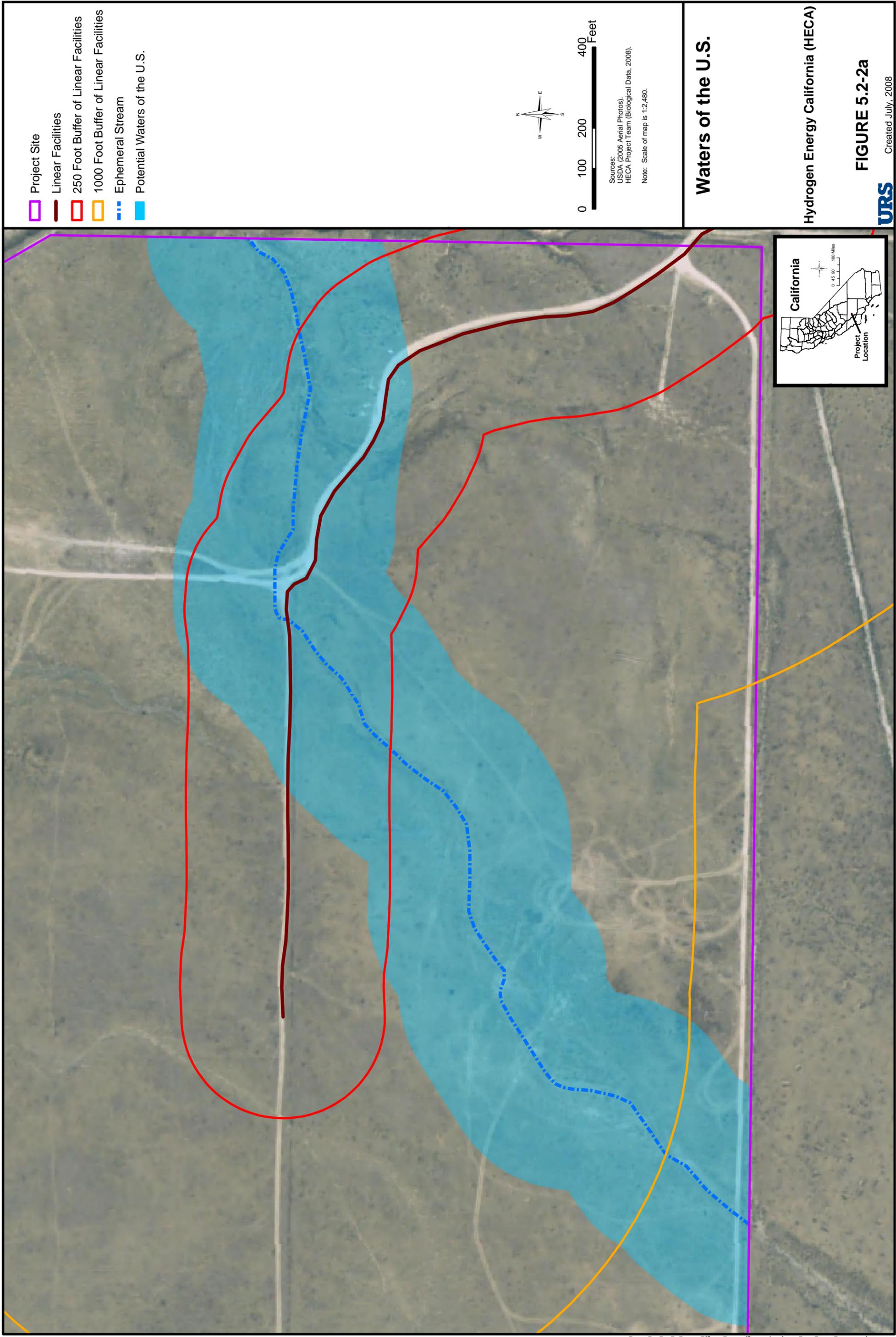
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- Project Site
- Linear Facilities
- 250 Foot Buffer of Linear Facilities
- 1000 Foot Buffer of Linear Facilities
- Ephemeral Stream
- Potential Waters of the U.S.



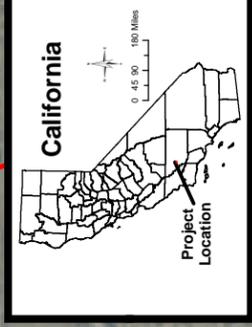
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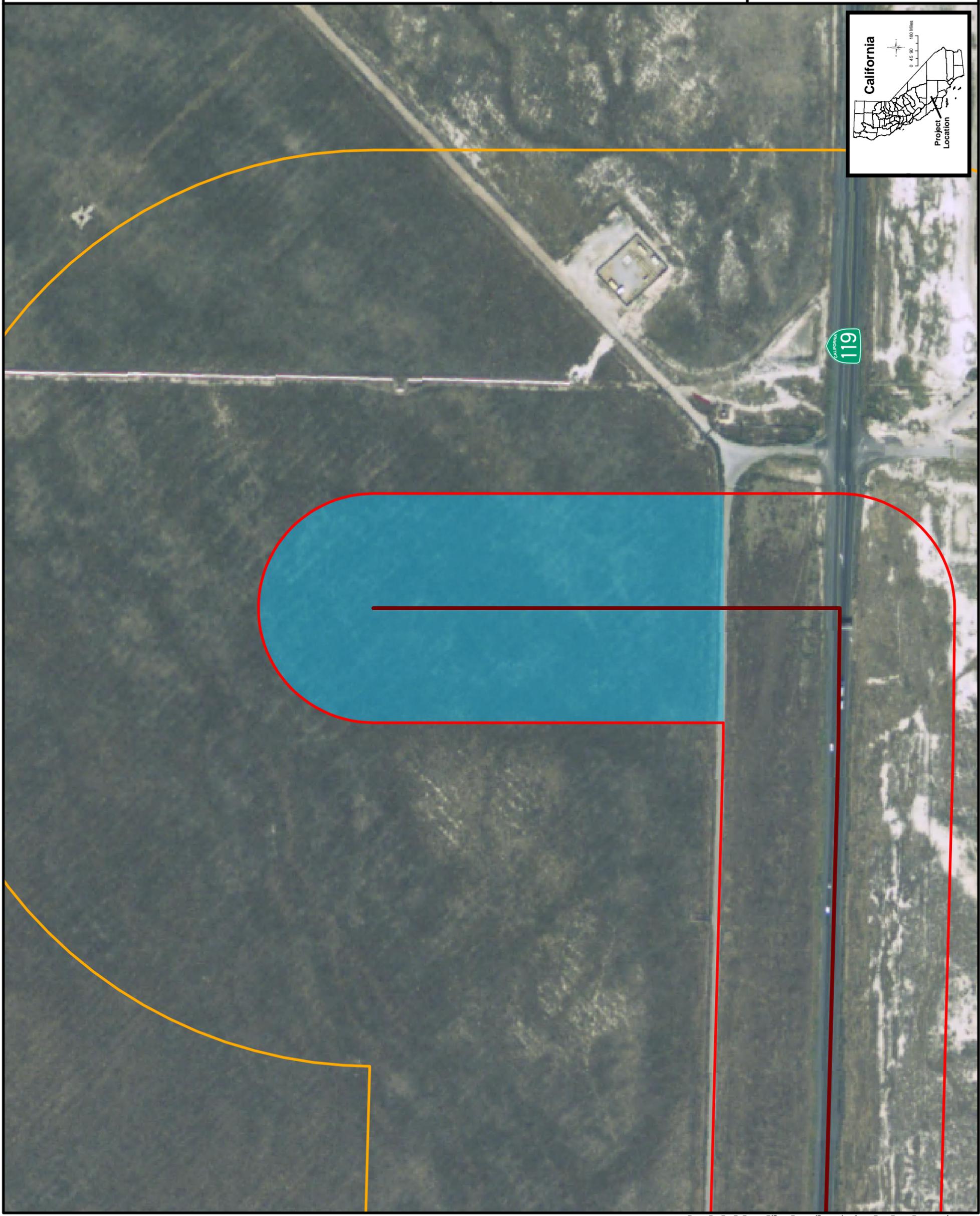
Waters of the U.S.

Hydrogen Energy California (HECA)

FIGURE 5.2-2a

Created July, 2008





- Linear Facilities
- 250 Foot Buffer of Linear Facilities
- 1000 Foot Buffer of Linear Facilities
- Potential Waters of the U.S.



Sources:
 USDA (2005 Aerial Photos).
 HECA Project Team (Biological Data, 2008).

Waters of the U.S.

Hydrogen Energy California (HECA)

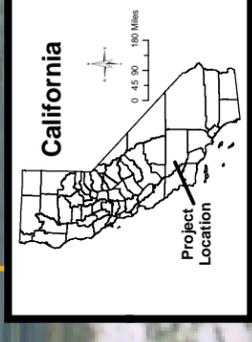
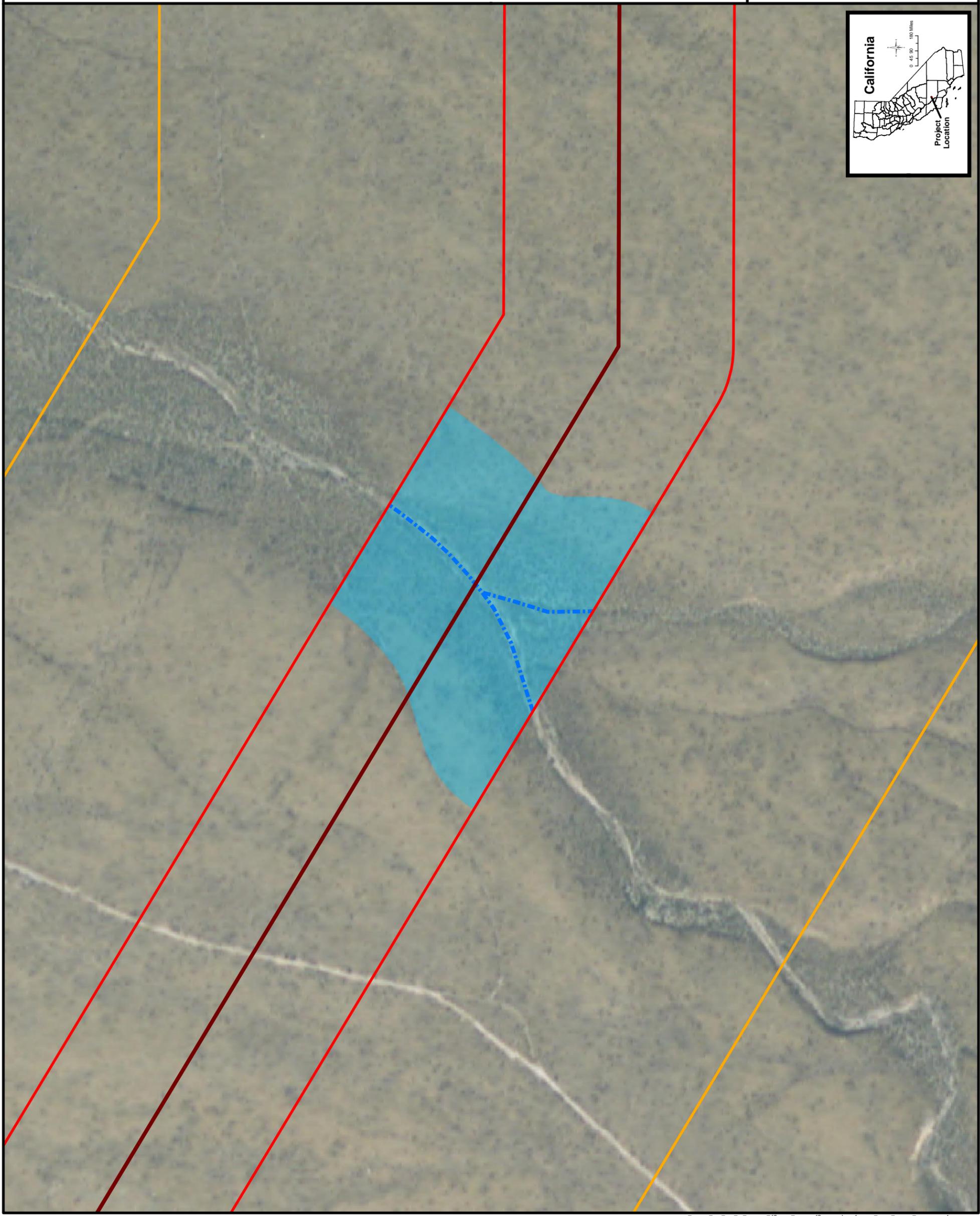


FIGURE 5.2-2b

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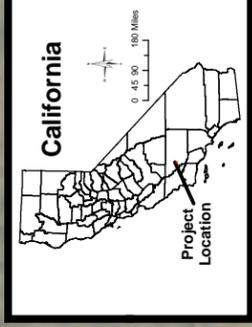




-  Linear Facilities
-  250 Foot Buffer of Linear Facilities
-  1000 Foot Buffer of Linear Facilities
-  Ephemeral Stream
-  Potential Waters of the U.S.



Sources:
 USDA (2005 Aerial Photos).
 HECA Project Team (Biological Data, 2008).



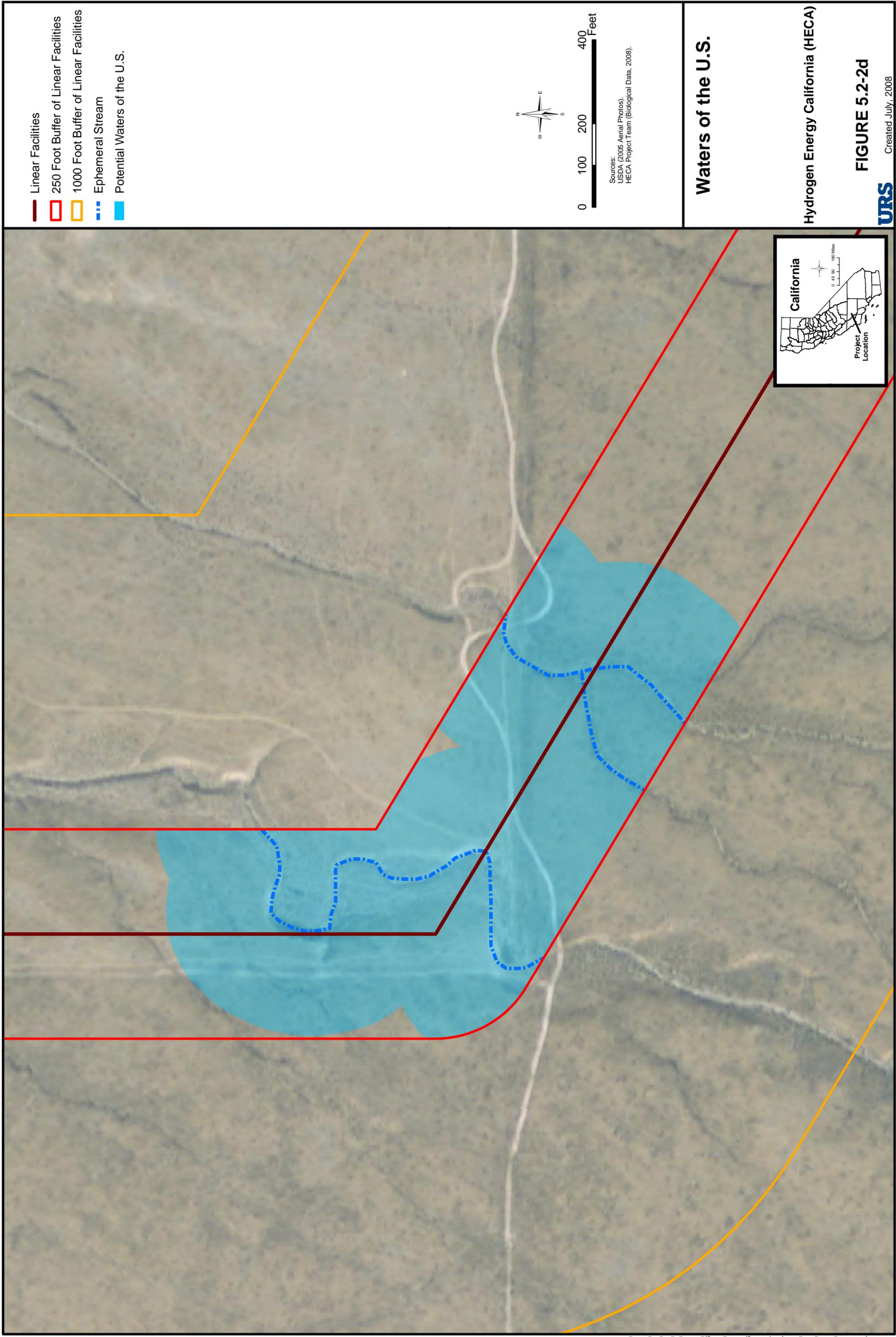
Waters of the U.S.

Hydrogen Energy California (HECA)

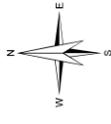
FIGURE 5.2-2c

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- Linear Facilities
- 250 Foot Buffer of Linear Facilities
- 1000 Foot Buffer of Linear Facilities
- Ephemeral Stream
- Potential Waters of the U.S.



Sources:
 USDA (2005 Aerial Photos).
 HECA Project Team (Biological Data, 2008).

Waters of the U.S.

Hydrogen Energy California (HECA)

FIGURE 5.2-2d

Created July, 2008

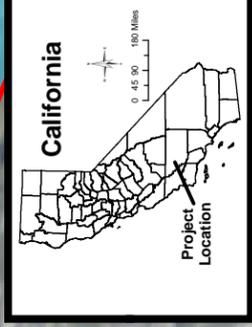




-  Linear Facilities
-  250 Foot Buffer of Linear Facilities
-  1000 Foot Buffer of Linear Facilities
-  Potential Waters of the U.S.



Sources:
 USDA (2005 Aerial Photos).
 HECA Project Team (Biological Data, 2008).



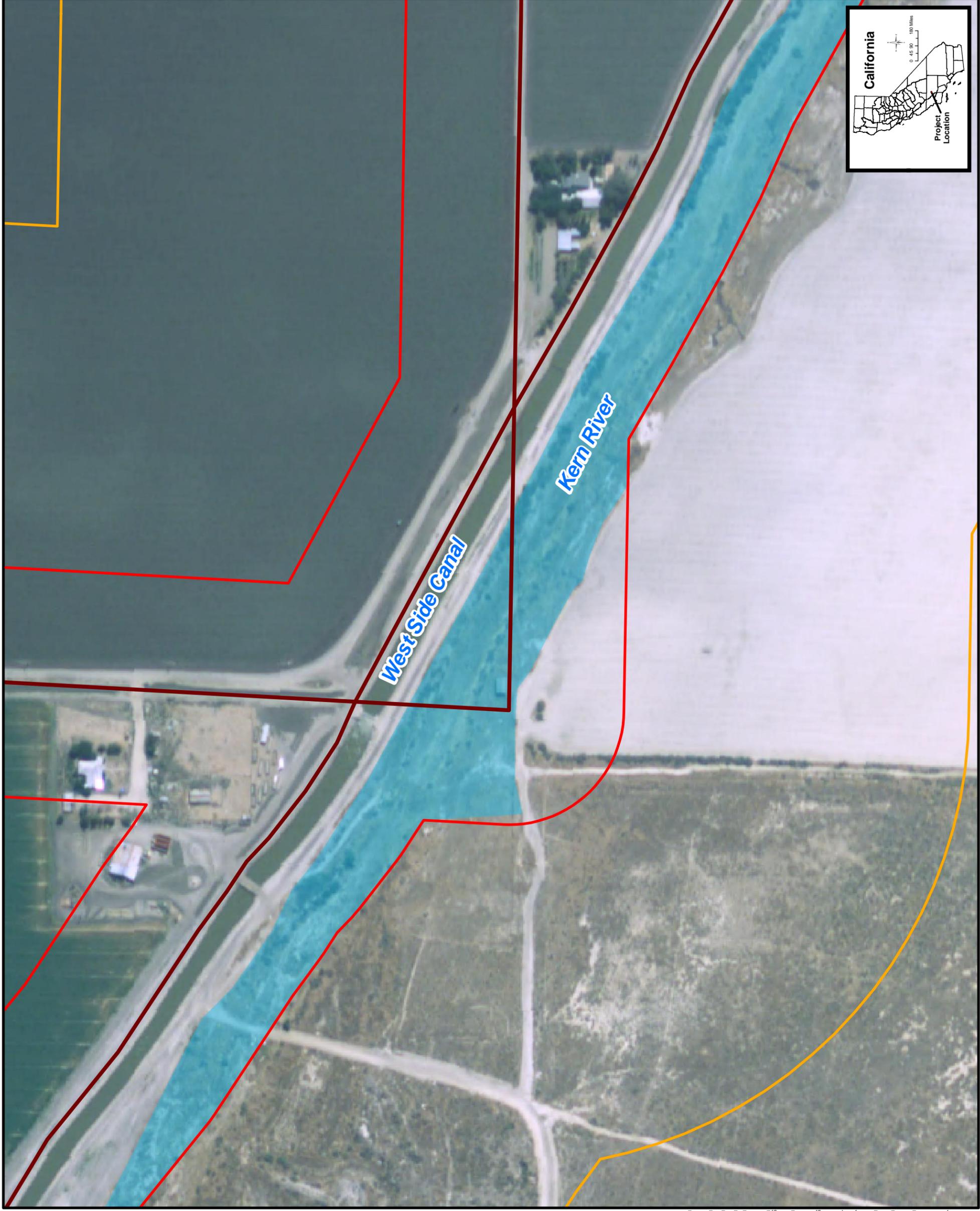
Waters of the U.S.

Hydrogen Energy California (HECA)

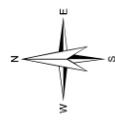
FIGURE 5.2-2e

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-  Linear Facilities
-  250 Foot Buffer of Linear Facilities
-  1000 Foot Buffer of Linear Facilities
-  Potential Waters of the U.S.



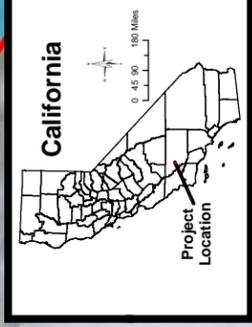
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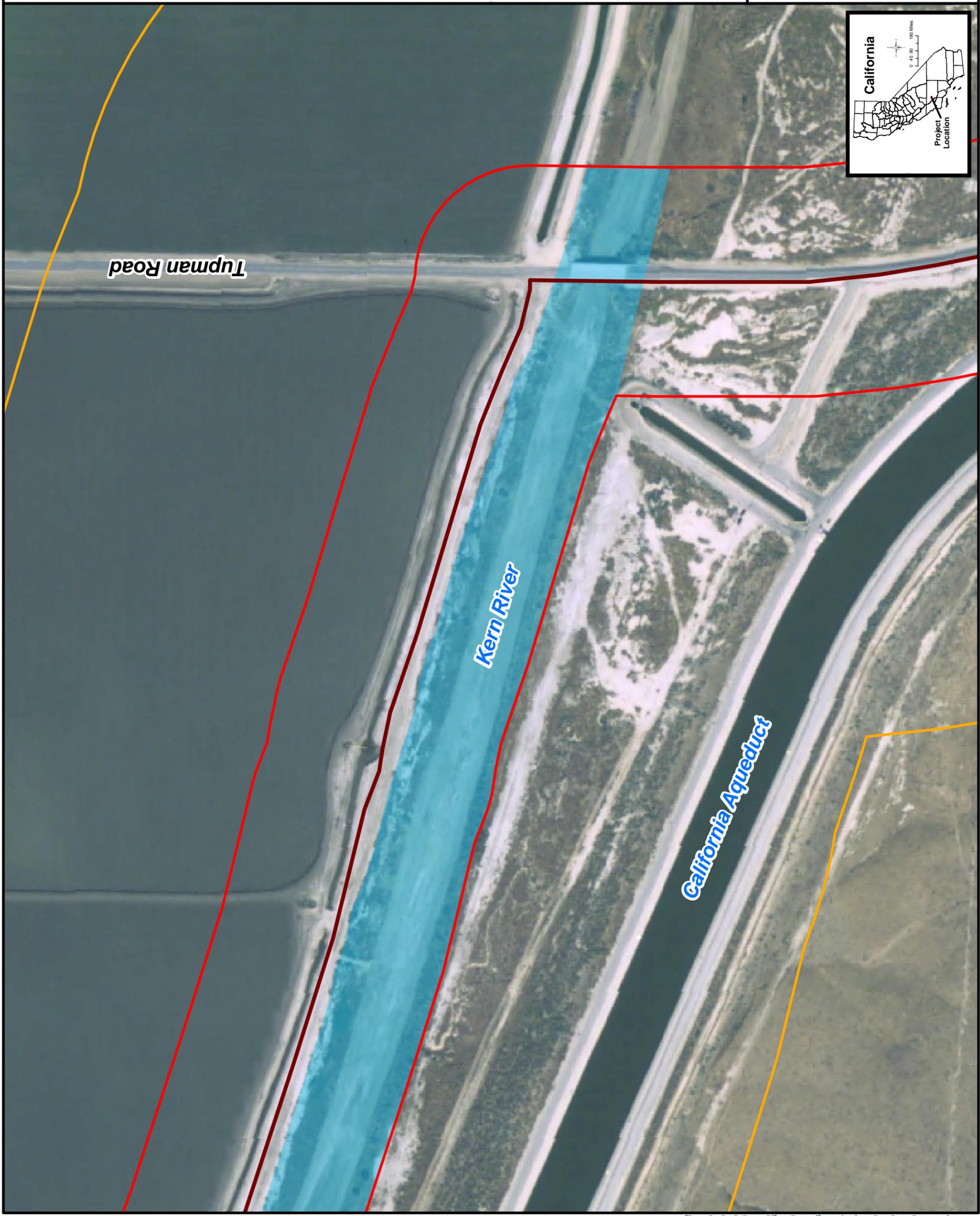
Waters of the U.S.

Hydrogen Energy California (HECA)

FIGURE 5.2-2f

Created July, 2008





-  Linear Facilities
-  250 Foot Buffer of Linear Facilities
-  1000 Foot Buffer of Linear Facilities
-  Potential Waters of the U.S.



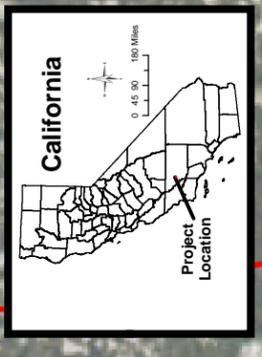
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 HECA Project Team (Biological Data, 2008).

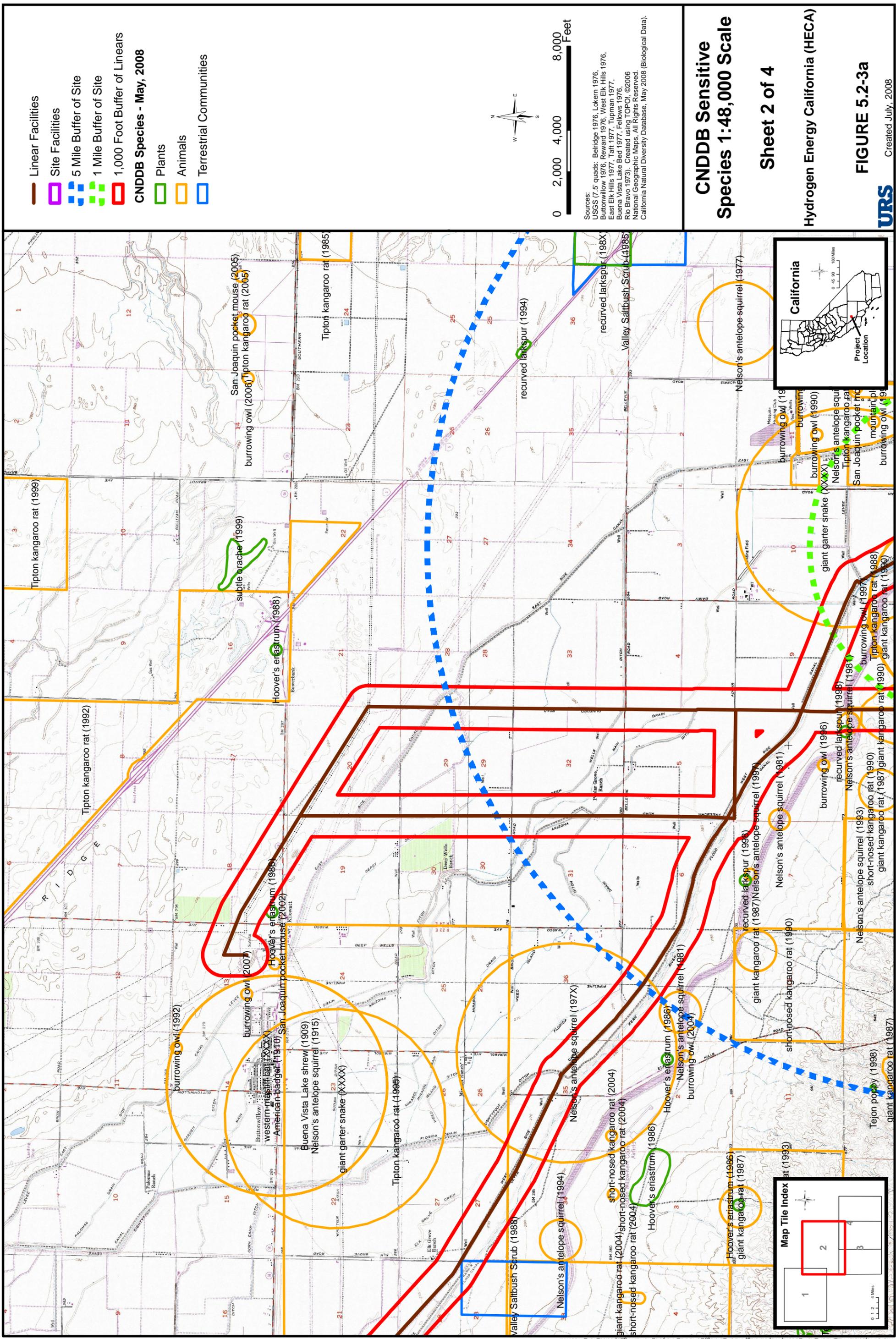
Waters of the U.S.

Hydrogen Energy California (HECA)

FIGURE 5.2-2g

Created July, 2008





- Linear Facilities
- Site Facilities
- 5 Mile Buffer of Site
- 1 Mile Buffer of Site
- 1,000 Foot Buffer of Linears
- CNDDDB Species - May, 2008
- Plants
- Animals
- Terrestrial Communities

0 2,000 4,000 8,000 Feet

Sources:
 USGS (7.5' quads: Belridge 1976, Loken 1976, Buttonwillow 1976, Reward 1976, West Elk Hills 1976, East Elk Hills 1977, Tatt 1977, Tupman 1977, Buena Vista Lake Bed 1977, Fellows 1976, Rio Bravo 1973). Created using TOPOI. ©2006 National Geographic Maps, All Rights Reserved. California Natural Diversity Database, May 2008 (Biological Data).

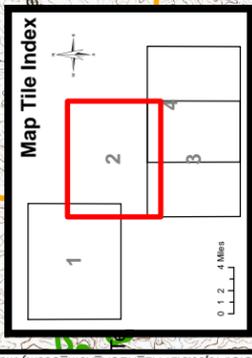
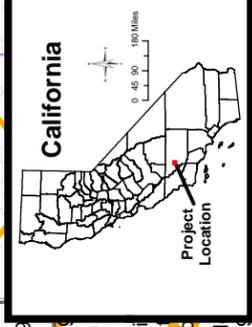
CNDDDB Sensitive Species 1:48,000 Scale

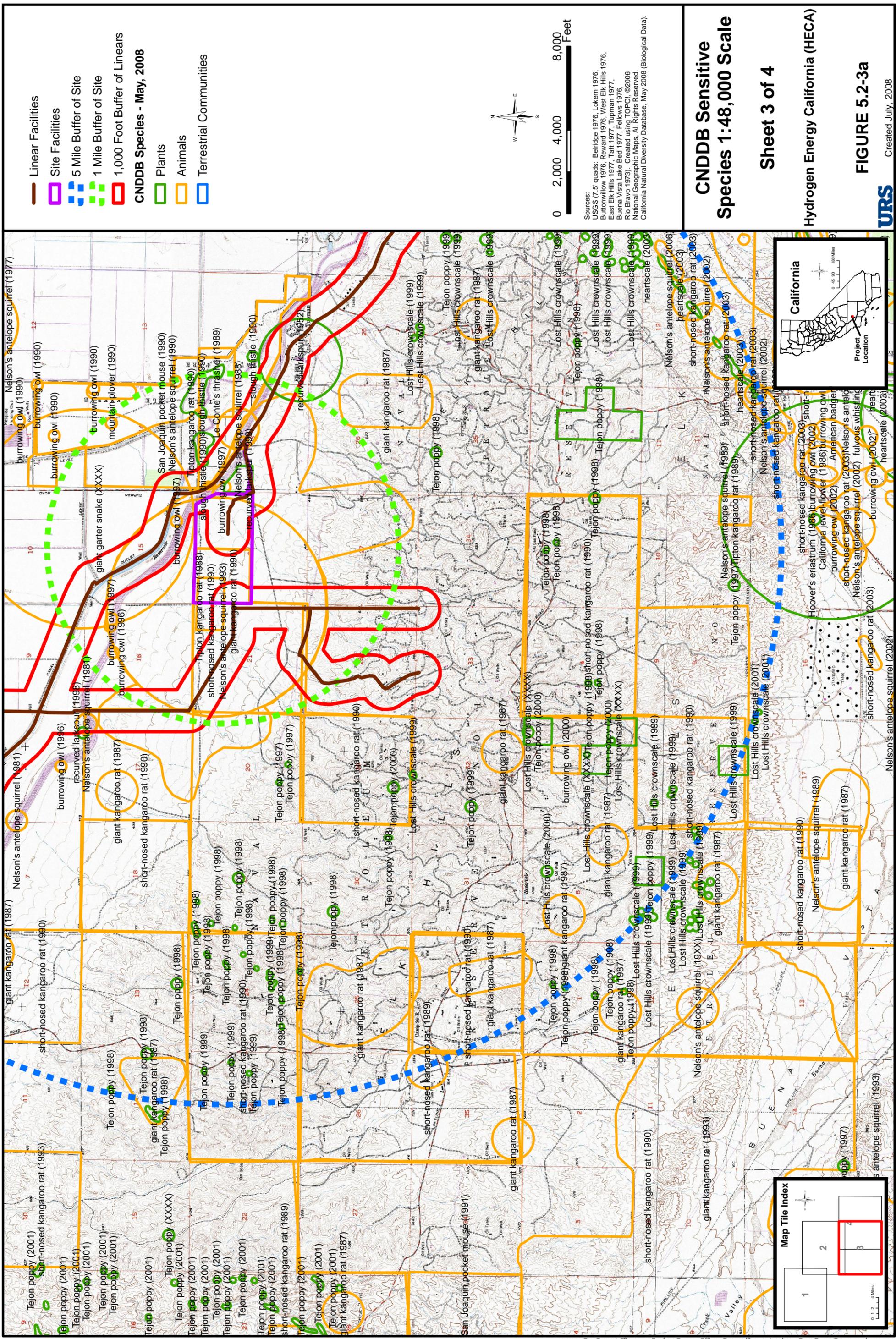
Sheet 2 of 4

Hydrogen Energy California (HECA)

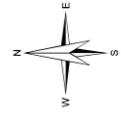
FIGURE 5.2-3a

Created July, 2008





- Linear Facilities
- Site Facilities
- 5 Mile Buffer of Site
- 1 Mile Buffer of Site
- 1,000 Foot Buffer of Linears
- CNDDDB Species - May, 2008
- Plants
- Animals
- Terrestrial Communities



Sources:
 USGS 7.5' quads: Belridge 1976, Lokern 1976, Butonwillow 1976, Reward 1976, West Elk Hills 1976, East Elk Hills 1977, Tatt 1977, Tupman 1977, Buena Vista Lake Bed 1977, Fellows 1976, Rio Bravo 1973). Created using TOPOI. ©2006 National Geographic Maps, All Rights Reserved. California Natural Diversity Database, May 2008 (Biological Data).

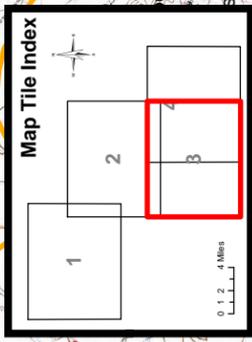
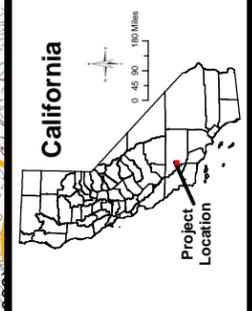
CNDDDB Sensitive Species 1:48,000 Scale

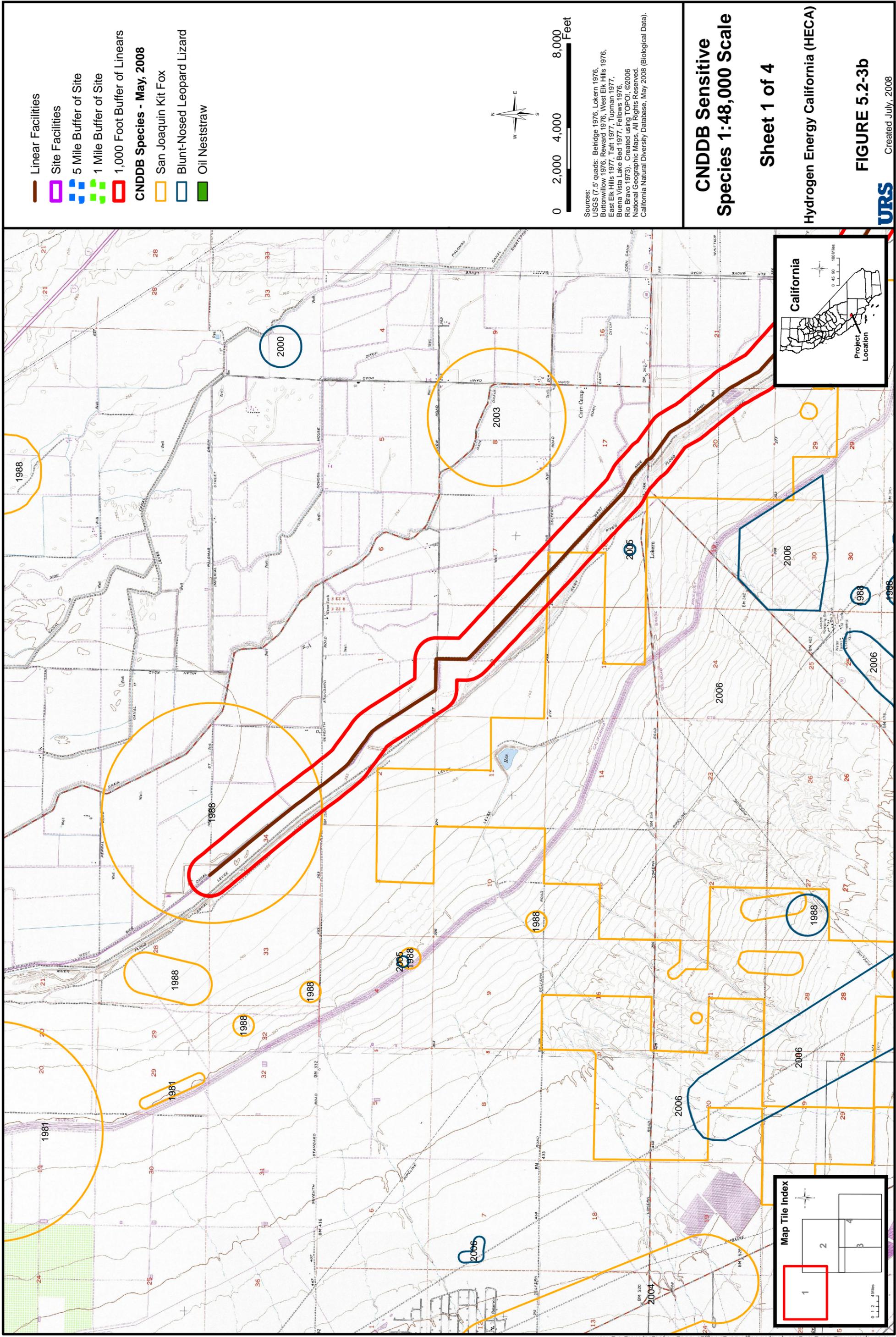
Sheet 3 of 4

Hydrogen Energy California (HECA)

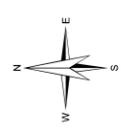
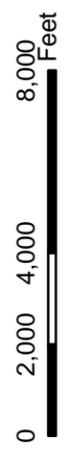
FIGURE 5.2-3a

Created July, 2008





- Linear Facilities
- Site Facilities
- 5 Mile Buffer of Site
- 1 Mile Buffer of Site
- 1,000 Foot Buffer of Linears
- CNDDDB Species - May, 2008**
- San Joaquin Kit Fox
- Blunt-Nosed Leopard Lizard
- Oil Neststraw



Sources:
 USGS (7.5' quads: Belridge 1976, Loken 1976, Buttonwillow 1976, Reward 1976, West Elk Hills 1976, East Elk Hills 1977, Tatt 1977, Tupman 1977, Buena Vista Lake Bed 1977, Fellows 1976, Rio Bravo 1973). Created using TOPOI. ©2006 National Geographic Maps, All Rights Reserved. California Natural Diversity Database, May 2008 (Biological Data).

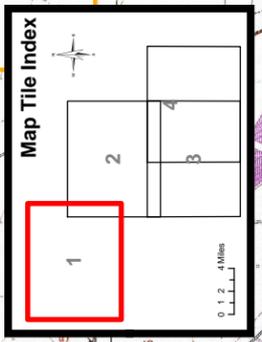
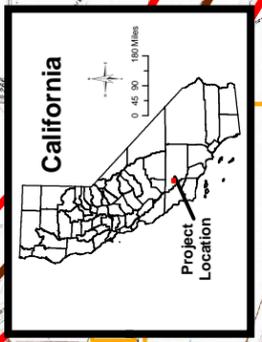
CNDDDB Sensitive Species 1:48,000 Scale

Sheet 1 of 4

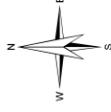
Hydrogen Energy California (HECA)

FIGURE 5.2-3b

Created July, 2008



-  Linear Facilities
-  Site Facilities
-  5 Mile Buffer of Site
-  1 Mile Buffer of Site
-  1,000 Foot Buffer of Linears
- CNDDDB Species - May, 2008**
-  San Joaquin Kit Fox
-  Blunt-Nosed Leopard Lizard
-  Oil Neststraw



Sources:
 USGS (7.5' quads: Belridge 1976, Loken 1976, Buttonwillow 1976, Reward 1976, West Elk Hills 1976, East Elk Hills 1977, Tatt 1977, Tupman 1977, Buena Vista Lake Bed 1977, Fellows 1976, Rio Bravo 1973). Created using TOPOI, ©2006 National Geographic Maps, All Rights Reserved. California Natural Diversity Database, May 2008 (Biological Data).

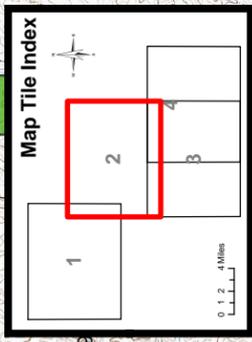
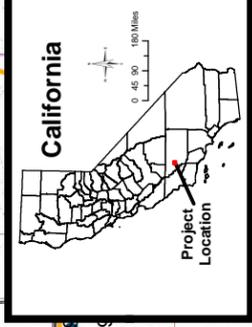
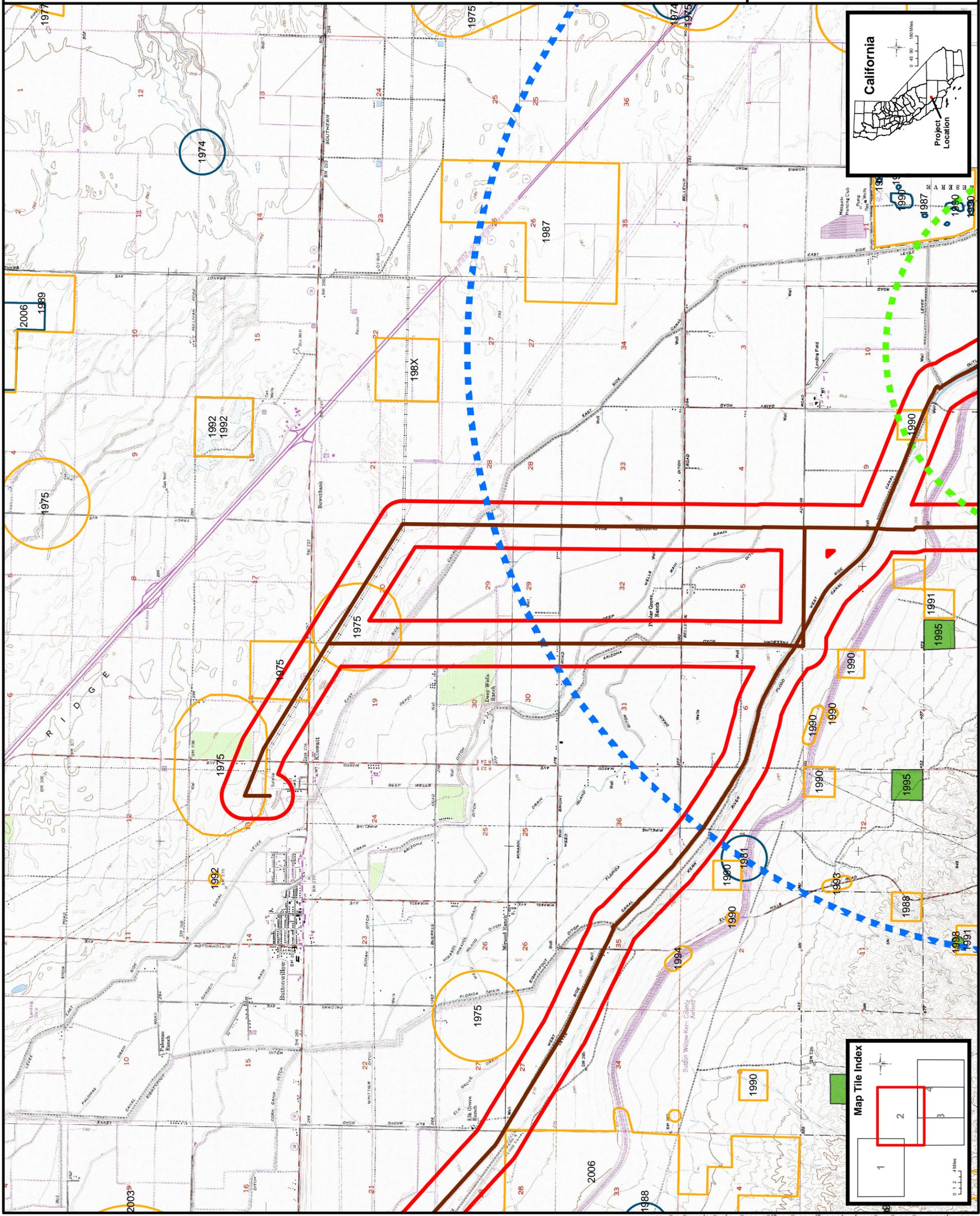
CNDDDB Sensitive Species 1:48,000 Scale

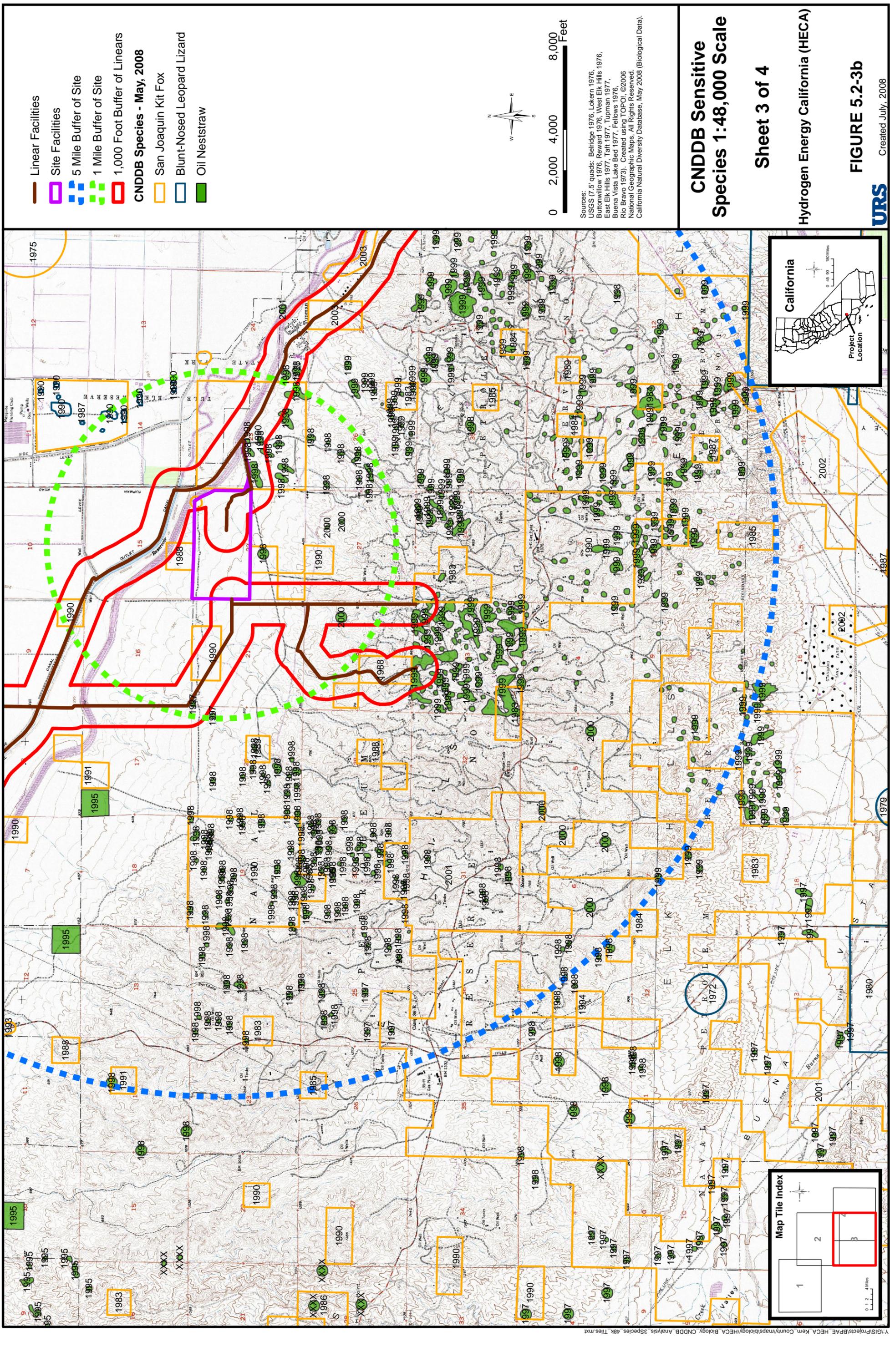
Sheet 2 of 4

Hydrogen Energy California (HECA)

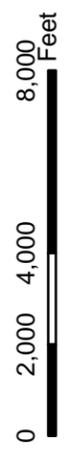
FIGURE 5.2-3b

Created July, 2008





- Linear Facilities
- Site Facilities
- 5 Mile Buffer of Site
- 1 Mile Buffer of Site
- 1,000 Foot Buffer of Linears
- CNDDB Species - May, 2008
- San Joaquin Kit Fox
- Blunt-Nosed Leopard Lizard
- Oil Neststraw



Sources:
 USGS 7.5' quads: Belridge 1976, Lokern 1976, Buttonwillow 1976, Reward 1976, West Elk Hills 1976, East Elk Hills 1977, Tatt 1977, Tupman 1977, Buena Vista Lake Bed 1977, Fellows 1976, Rio Bravo 1973). Created using TOPOI, ©2006 National Geographic Maps, All Rights Reserved. California Natural Diversity Database, May 2008 (Biological Data).

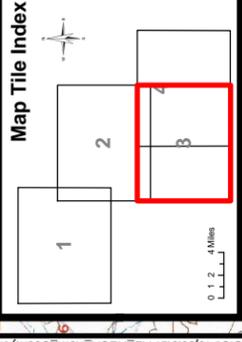
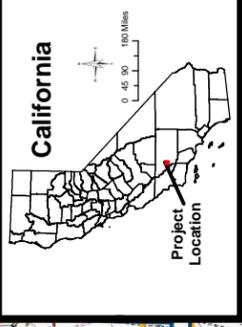
CNDDB Sensitive Species 1:48,000 Scale

Sheet 3 of 4

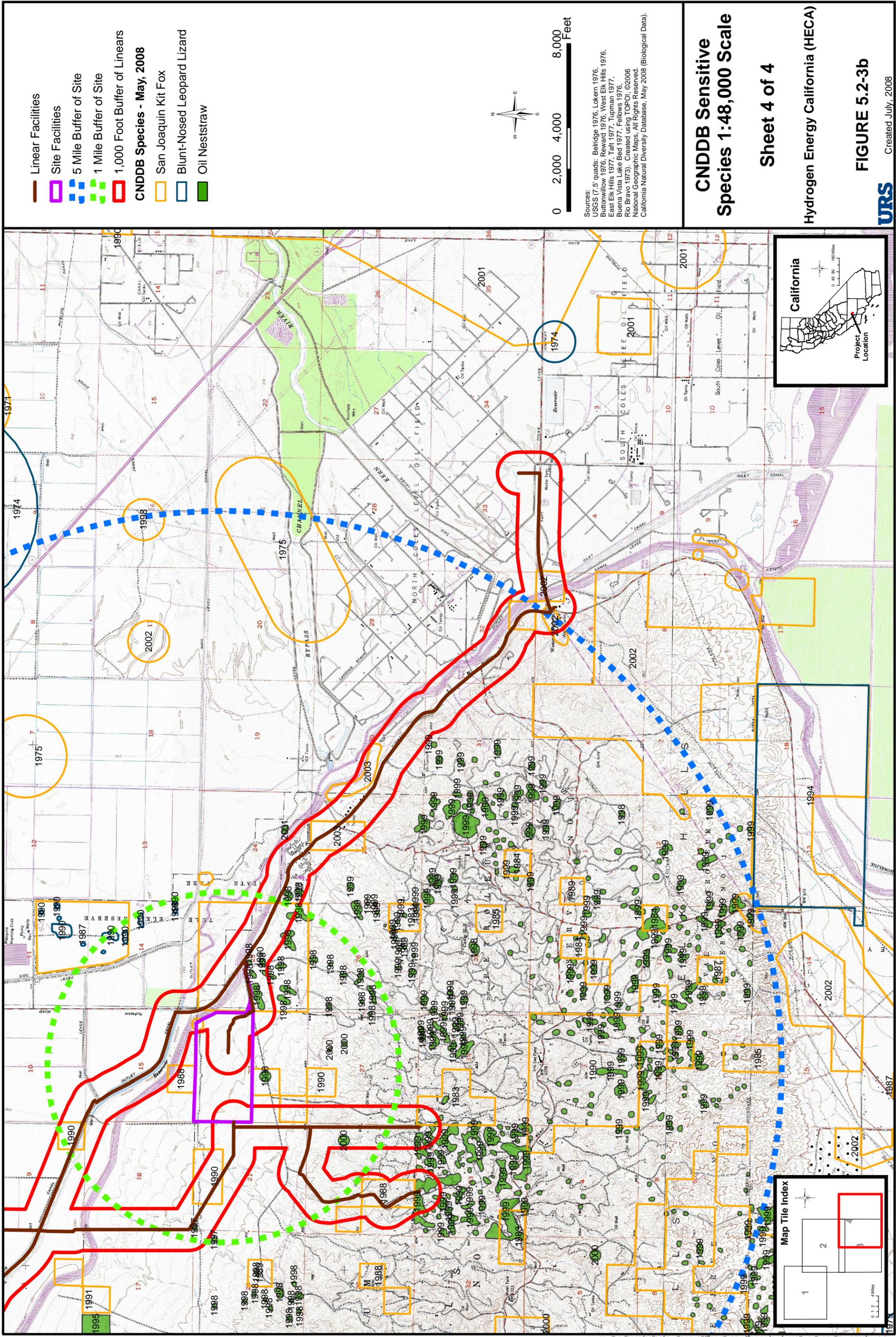
Hydrogen Energy California (HECA)

FIGURE 5.2-3b

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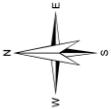


Y:\GIS\Projects\BPAE_HECA_Kern_County\maps\biology\HECA_Biology_CNDDB_Analysis_3Species_4k_Tiles.mxd



- Linear Facilities
- Site Facilities
- 5 Mile Buffer of Site
- 1 Mile Buffer of Site
- 1,000 Foot Buffer of Linears
- CNDDB Species - May, 2008**
- San Joaquin Kit Fox
- Blunt-Nosed Leopard Lizard
- Oil Neststraw

0 2,000 4,000 8,000 Feet



Sources:
 USGS (7.5' quads: Belridge 1976, Lokern 1976, Buttonwillow 1976, Reward 1976, West Elk Hills 1976, East Elk Hills 1977, Tatt 1977, Tupman 1977, Buena Vista Lake Bed 1977, Fellows 1976, Rio Bravo 1973). Created using TOPOI. ©2006 National Geographic Maps, All Rights Reserved. California Natural Diversity Database, May 2008 (Biological Data).

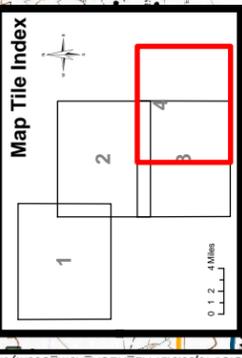
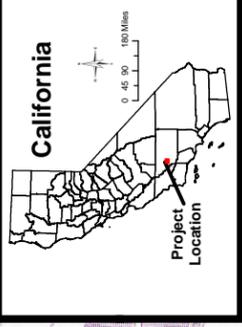
CNDDB Sensitive Species 1:48,000 Scale

Sheet 4 of 4

Hydrogen Energy California (HECA)

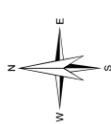
FIGURE 5.2-3b

Created July, 2008



Y:\GIS\Projects\BPAE_HECA_Kern_County\maps\biology\HECA_Biology_CNDDB_Analysis_Species_48k_Tiles.mxd

-  Project Site
-  Site Access Road
-  Linear Facilities
-  Biological Resources Study Area
- CNDDDB Species - May, 2008**
-  Plants
-  Animals



Sources:
 USGS (7.5' quads: East Elk Hills 1977, Tupman 1977). Created using TOPOI, ©2006 National Geographic Maps. All Rights Reserved.
 California Natural Diversity Database, May 2008 (Biological Data).

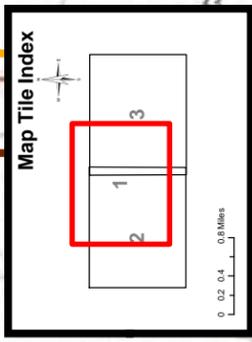
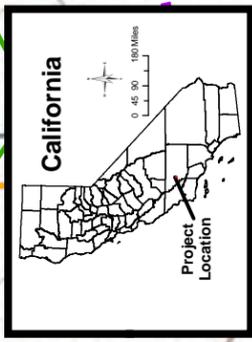
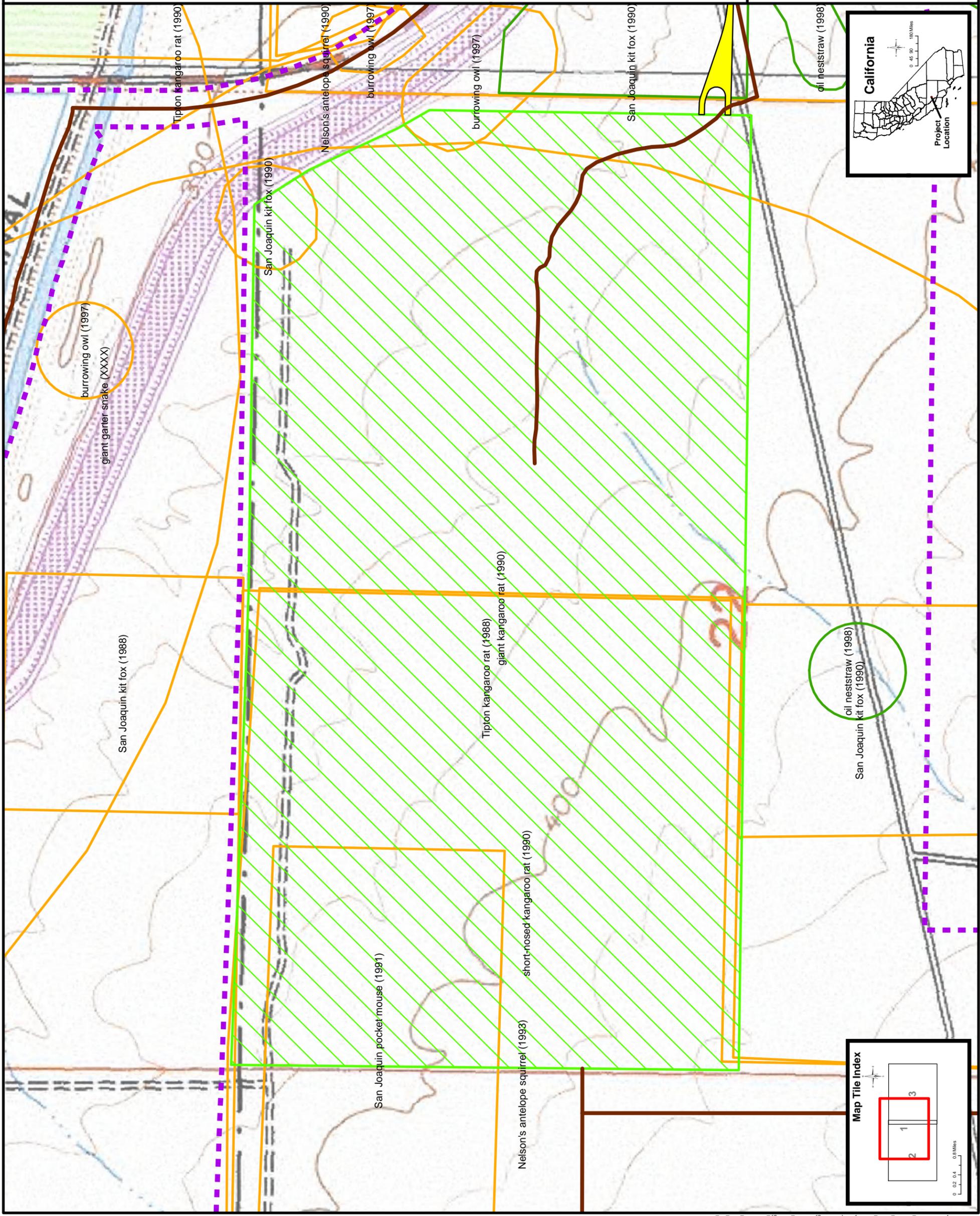
CNDDDB Sensitive Species 1:6,000 Scale

Sheet 1 of 3

Hydrogen Energy California (HECA)

FIGURE 5.2-4

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Legend

- Project Site
- Site Access Road
- Linear Facilities
- Biological Resources Study Area
- CNDDDB Species - May, 2008
- Plants
- Animals

Scale
0 250 500 1,000 Feet

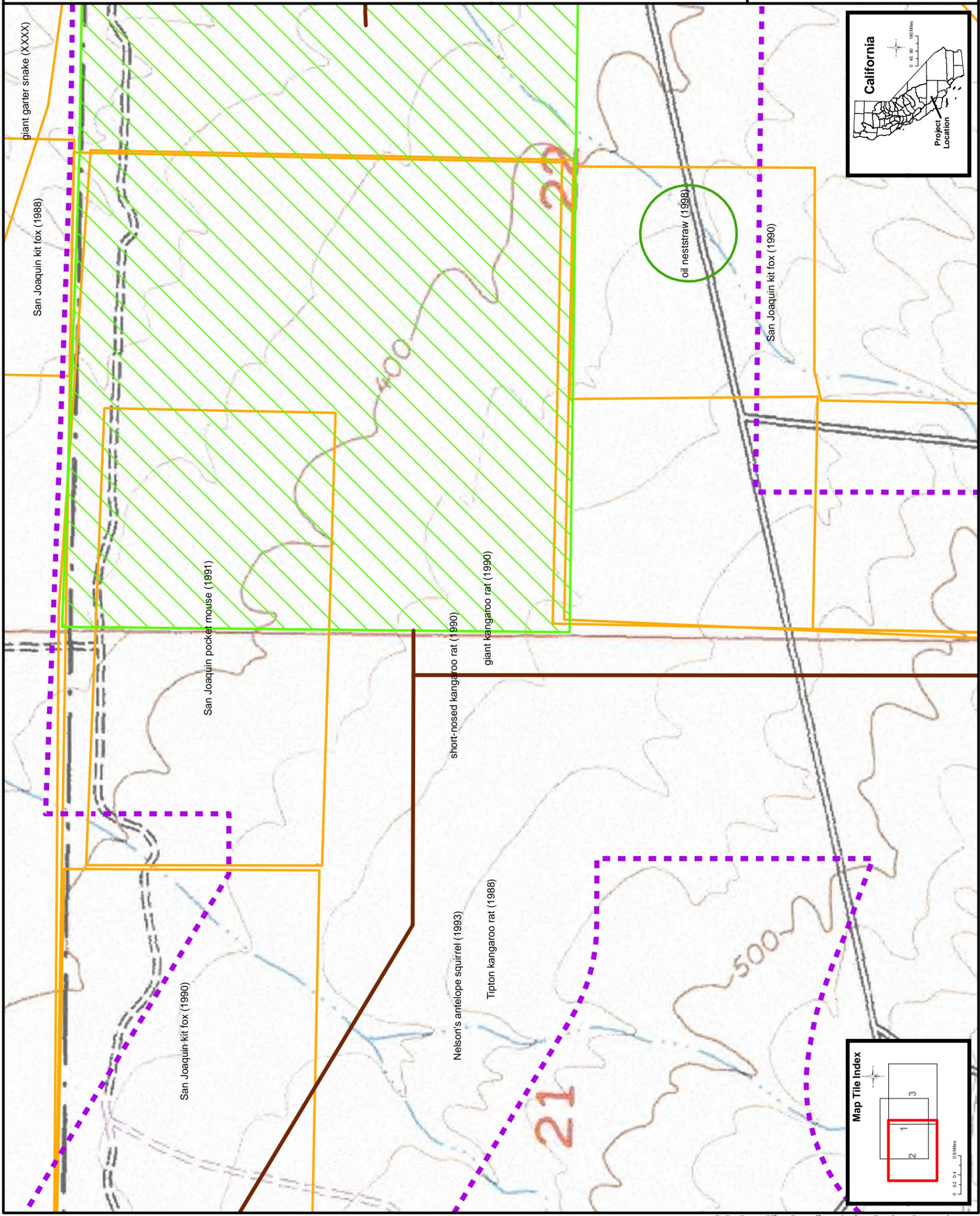
Map Orientation
N
W E S

Sources:
USGS (7.5' quads: East Elk Hills 1977, Tupman 1977). Created using TOPOI, ©2006 National Geographic Maps. All Rights Reserved.
California Natural Diversity Database, May 2008 (Biological Data).

Project Information
CNDDDB Sensitive Species 1:6,000 Scale
Sheet 2 of 3
Hydrogen Energy California (HECA)

Figure Reference
FIGURE 5.2-4
Created July, 2008

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DATA ADEQUACY WORKSHEET

Revision No. 0 Date _____

Technical Staff: _____

Technical Senior: _____

Adequacy Issue: Adequate Inadequate

Project: _____

Docket: _____

Biological Resources

Technical Area: _____

Project Manager: _____

Siting Regulations	Information	AFC Page Number And Section Number	Adequate Yes Or No	Information Required To Make Afc Conform With Regulations
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	p5.2-6 5.2.1 p5.2-6 5.2.1.1 p5.2-6 5.2.1.2 p5.2-9 5.2.1.4 p5.2-36 5.2.2.1 p5.2-36 5.2.2.2 p5.2-49 5.2.4.1 p5.2-56 5.2.4.2		
Appendix B (g) (13) (A)	A regional overview and discussion of terrestrial and aquatic biological resources, with particular attention to sensitive biological resources within ten (10) miles of the project. Include a map at a scale of 1:100,000 (or other suitable scale) showing sensitive biological resource location(s) in relation to the project site and related facilities and any boundaries of a local Habitat Conservation Plan or similar open space land use plan or designation. Sensitive biological resources include the following:	p5.2-6 5.2.1 Table 5.2-4 Figure 5.2-3a & b Figure 5.2-4		
Appendix B (g) (13) (A) (i)	species listed under state or federal Endangered Species Acts;	p5.2-9 5.2.1.4 Table 5.2-5 Table 5.2-6		
Appendix B (g) (13) (A) (ii)	resources defined in sections 1702(q) and (v) of Title 20 of the California Code of Regulations;	p5.2-9 5.2.1.4 Table 5.2-5 Table 5.2-6		
Appendix B (g) (13) (A) (iii)	species identified as state Fully Protected;	p5.2-9 5.2.1.4 Table 5.2-5 Table 5.2-6		
Appendix B (g) (13) (A) (iv)	species covered by Migratory Bird Treaty Act;	p5.2-9 5.2.1.4 Table 5.2-6		

Adequacy Issue: Adequate Inadequate **DATA ADEQUACY WORKSHEET**

Revision No. 0 Date _____

Technical Staff: _____

Technical Senior: _____

Project: _____

Docket: _____

Biological Resources

Adequacy Issue: Adequate Inadequate

Technical Area: _____

Project Manager: _____

Siting Regulations	Information	AFC Page Number And Section Number	Adequate Yes Or No	Information Required To Make Afc Conform With Regulations
Appendix B (g) (13) (A) (v)	species and habitats identified by local, state, and federal agencies as needing protection, including but not limited to those identified by the California Natural Diversity Database, or where applicable, in Local Coastal Programs or in relevant decisions of the California Coastal Commission; and	p5.2-9 5.2.1.4 Table 5.2-5 Table 5.2-6 Figure 5.2-3a & b Figure 5.2-4		
Appendix B (g) (13) (A) (vi)	fish and wildlife species that have commercial and/or recreational value.	None expected to be present		
Appendix B (g) (13) (B)	Include a list of the species actually observed and those with a potential to occur within 1 mile of the project site and 1,000 feet from the outer edge of linear facility corridors. Maps or aerial photographs shall include the following:	Table 5.2-2 Table 5.2-3 Table 5.2-5 Table 5.2-6		
Appendix B (g) (13) (B) (i)	Detailed maps at a scale of 1:6,000 or color aerial photographs taken at a recommended scale of 1 inch equals 500 feet (1:6,000) with a 30 percent overlap that show the proposed project site and related facilities, biological resources including, but not limited to, those found during project-related field surveys and in records from the California Natural Diversity Database, and the associated areas where biological surveys were conducted. Label the biological resources and survey areas as well as the project facilities;	Figure 5.2-1 Table 5.2-3 Table 5.2-4		

DATA ADEQUACY WORKSHEET

Revision No. 0 Date _____

Technical Staff: _____

Technical Senior: _____

Adequacy Issue: Adequate Inadequate

Project: _____

Docket: _____

Biological Resources

Project Manager: _____

Siting Regulations	Information	AFC Page Number And Section Number	Adequate Yes Or No	Information Required To Make Afc Conform With Regulations
Appendix B (g) (13) (B) (ii)	<p>A depiction of the extent of the thermal plume at the surface of the water if cooling water is proposed to be discharged to a water source. Provide the location for the intake and discharge structures on an aerial photograph(s) or detailed maps. Water sources include, but are not limited to, waterways, lakes, impoundments, oceans, bays, rivers, and estuaries; and</p>	Does not apply for this project		
Appendix B (g) (13) (B) (iii)	<p>An aerial photo or wetlands delineation maps at a scale of (1:2,400) showing any potential jurisdictional and non-jurisdictional wetlands delineated out to 250 feet from the edge of disturbance if wetlands occur within 250 feet of the project site and/or related facilities that would be included with the US Army Corps of Engineers Section 404 Permit application. For projects proposed to be located within the coastal zone, also provide aerial photographs or maps as described above that identify wetlands as defined by the Coastal Act.</p>	Fig 5.2-2		
Appendix B (g) (13) (C)	<p>A discussion of the biological resources at the proposed project site and related facilities. Related facilities include, but are not limited to, laydown and parking areas, gas and water supply pipelines, transmission lines, and roads. The discussion shall address the distribution of vegetation community types, denning or nesting sites, population concentrations, migration corridors, breeding habitats, and other appropriate biological resources including the following:</p>	<p>p5.2-6 5.2.1 p5.2-6 5.2.1.1 p5.2-6 5.2.1.2 p5.2-9 5.2.1.4</p>		

DATA ADEQUACY WORKSHEET

Revision No. 0 Date _____

Technical Staff: _____

Technical Senior: _____

Adequacy Issue: Adequate Inadequate

Project: _____

Docket: _____

Biological Resources

Technical Area: _____

Project Manager: _____

Siting Regulations	Information	AFC Page Number And Section Number	Adequate Yes Or No	Information Required To Make Afc Conform With Regulations
Appendix B (g) (13) (C) (i)	A list of all the species actually observed;	Table 5.2-2 Table 5.2-3		
Appendix B (g) (13) (C) (ii)	A list of sensitive species and habitats with a potential to occur (as defined in (A) above); and	Table 5.2-5 Table 5.2-6		
Appendix B (g) (13) (C) (iii)	If cooling water is taken directly from or discharged to a surface water feature source, include a description of the intake structure, screens, water volume, intake velocity hydraulic zone field of influence, and the thermal plume dispersion area as depicted in response to B(ii) above. Describe the thermal plume size and dispersion under high and low tides, and in response to local currents and seasonal changes. Provide a discussion of the aquatic habitats, biological resources, and critical life stages found in these affected waters. For repower projects that anticipate no change in cooling water flow, this information shall be provided in the form of the most recent federal Clean Water Act 316(a) and (b) studies of entrainment and impingement impacts that has been completed within the last five (5) years. For new projects or repower projects proposing to use once-through cooling and anticipating an increase in cooling water flow, provide a complete impingement and entrainment analysis per guidance in (D)(ii), below.	Does not apply for this project		

Adequacy Issue: Adequate Inadequate DATA ADEQUACY WORKSHEET Revision No. 0 Date _____

Technical Area: **Biological Resources** Project: _____ Technical Staff: _____

Project Manager: _____ Docket: _____ Technical Senior: _____

Siting Regulations	Information	AFC Page Number And Section Number	Adequate Yes Or No	Information Required To Make Afc Conform With Regulations
Appendix B (g) (13) (D)	A description and results of all field studies and seasonal surveys used to provide biological baseline information about the project site and associated facilities. Include copies of the California Natural Diversity Database records and field survey forms completed by the applicant's biologist(s). Identify the date(s) the surveys were completed, methods used to complete the surveys, and the name(s) and qualifications of the biologists conducting the surveys. Include:	Appendix BIO-1 Appendix BIO-2 p5.2-1 5.2 p5.2-9 5.2.1.4		
Appendix B (g) (13) (D) (i)	Current biological resources surveys conducted using appropriate field survey protocols during the appropriate season(s). State and federal agencies with jurisdiction shall be consulted for field survey protocol guidance prior to surveys if a protocol exists;	Table 5.2-1 Appendix BIO ONE		

Siting Regulations	Information	AFC Page Number And Section Number	Adequate Yes Or No	Information Required To Make Afc Conform With Regulations
Appendix B (g) (13) (D) (ii)	<p>If cooling water is proposed to be taken directly from or discharged to a surface water feature source, seasonal aquatic resource studies and surveys shall be conducted. Aquatic resource survey data shall include, but is not limited to, fish trawls, ichthyoplankton and benthic sampling, and related temperature and water quality samples. For new projects or repower projects anticipating a change in cooling water flows, sampling protocols shall be provided to the Energy Commission staff for review and concurrence prior to the start of sampling. For repower projects not anticipating a change in cooling water flows, this information shall be provided in the form of the most recent federal Clean Water Act 316(b) impingement and entrainment impact study completed within five (5) years of the AFC filing date; and</p>	Does not apply for this project		
Appendix B (g) (13) (D) (iii)	<p>If the project or any related facilities could impact a jurisdictional or non-jurisdictional wetland, provide completed Army Corps of Engineers wetland delineation forms and/or determination of wetland status pursuant to Coastal Act requirements, name(s) and qualifications of biologist(s) completing the delineation, the results of the delineation and a table showing wetland acreage amounts to be impacted.</p>	p5.2-6 5.2.1.3 p5.2-8 5.2.1.3.1 p5.2-8 5.2.1.3.2		
Appendix B (g) (13) (E)	<p>Impacts discussion of the following:</p>			

Siting Regulations	Information	AFC Page Number And Section Number	Adequate Yes Or No	Information Required To Make Afc Conform With Regulations
Appendix B (g) (13) (E) (i)	all impacts (direct, indirect, and cumulative) to biological resources from project site preparation, construction activities, plant operation, maintenance, and closure. Discussion shall also address sensitive species habitat impacts from cooling tower drift and air emissions;	p5.2-35 5.2.2 p5.2-36 5.2.2.1 p5.2-36 5.2.2.2 p5.2-36 5.2.2.3 p5.2-44 5.2.2.4 p5.2-44 5.2.2.5 p5.2-44 5.2.2.6 p5.2-44 5.2.2.7 p5.2-45 5.2.2.8 p5.2-45 5.2.2.9 p5.2-45 5.2.2.10		
Appendix B (g) (13) (E) (ii)	facilities that propose to take water directly from, and/or discharge water to surface water features, daytime and nighttime impacts from the intake and discharge of water during operation, water velocity at the intake screen, the intake field of influence, impingement, entrainment, and thermal discharge. Provide a discussion of the extent of the thermal plume, effluent chemicals, oxygen saturation, intake pump operations, and the volume and rate of cooling water flow at the intake and discharge location; and	Does not apply for this project		
Appendix B (g) (13) (E) (iii)	Methods to control biofouling and chemical concentrations, and temperatures that are currently being discharged or will be discharged to receiving waters.	Does not apply for this project		
Appendix B (g) (13) (F)	A discussion of all feasible mitigation measures including, but not limited to the following:			
Appendix B (g) (13) (F) (i)	All measures proposed to avoid and/or reduce adverse impacts to biological resources;	p5.2-46 5.2.4 Table 5.2-7		

Siting Regulations	Information	AFC Page Number And Section Number	Adequate Yes Or No	Information Required To Make Afc Conform With Regulations
Appendix B (g) (13) (F) (ii)	All off-site habitat mitigation and habitat improvement or compensation, and an identification of contacts for compensation habitat and management;	p5.2-56 BIO-20 5.2.4.2		
Appendix B (g) (13) (F) (iii)	Design features to better disperse or eliminate a thermal discharge;	Does not apply for this project		
Appendix B (g) (13) (F) (iv)	All measures proposed to avoid or minimize adverse impacts of cooling water intake. This shall include a Best Technology Available (BTA) discussion. If BTA is not being proposed, the rationale for not selecting BTA must be provided; and	Does not apply for this project		
Appendix B (g) (13) (F) (v)	Educational programs to enhance employee awareness during construction and operation to protect biological resources.	p5.2-56 BIO-9 5.2.4.2		
Appendix B (g) (13) (G)	A discussion of compliance and monitoring programs to ensure the effectiveness of impact avoidance and mitigation measures incorporated into the project.	p5.2-56 BIO-18 BIO-19 5.2.4.2		
Appendix B (g) (13) (H)	Submit copies of any preliminary correspondence between the project applicant and state and federal resource agencies regarding whether federal or state permits from other agencies such as the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the U.S. Army Corps of Engineers, the California Department of Fish and Game, and the Regional Water Quality Control Board will be required for the proposed project.	N/A		

Siting Regulations	Information	AFC Page Number And Section Number	Adequate Yes Or No	Information Required To Make Afc Conform With Regulations
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	p. 5.2-57 5.2.5 Table 5.2-8		
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	p5.2-63 5.2.7		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	p5.2-63 5.2.6		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	p5.2-63 5.2.7		

