



TOPAZ SOLAR FARM: A CASE STUDY IN HABITAT ENHANCEMENT - Renewable Energy Generation Supports Biodiversity -

The Topaz Solar Farm proposed by First Solar offers 550 megawatts (MW) of non-polluting solar electricity, enough to power the equivalent of 160,000 average homes. Topaz has been under development since 2006 and will start construction this year, offering a solar generation resource critical to meeting California's Renewable Energy Portfolio Standard (recently expanded to 33%). The Topaz site was selected for its availability of existing transmission capacity on-site (avoiding the need to build new transmission lines), its excellent solar resource, and its predominant use as actively tilled, low-productive cropland.

First Solar, advised by species experts such as Dan Meade of Althouse and Meade; Bryan Cypher, Associate Director and Research Ecologist, Endangered Species Recovery Program, California State University, Stanislaus; Paul W. Collins, Curator of Vertebrate Zoology, Santa Barbara Museum of Natural History; and Thomas E. Olson, M.S., Wildlife Biologist, Thomas Olson Biological Consulting, and in close consultation with San Luis Obispo County, wildlife agencies, and environmental stakeholders, has undertaken a comprehensive three-year program of biological surveys of existing conditions, resource avoidance through layout optimization, and preparation of a mitigation package designed to fully mitigate any impacts to species on-site.

This conservation/mitigation package provides a greater than 3:1 ratio of mitigated to impacted land in order to meet California and Federal Endangered Species Act standards. A total of over 11,000 acres of kit fox habitat will be protected in perpetuity in the project vicinity. It is fully expected, based on extensive biological science, that the project will assure an ongoing population of kit fox and other listed species that is equal to or greater than existing populations within the Project Study Area. This will be achieved by implementing onsite stewardship measures described below in addition to the offsite measures.

The Topaz Solar Farm design also includes a variety of onsite stewardship measures, especially within the 75% of the project area that is actively tilled cropland. These include restoration of grassland, inclusion of artificial kit fox dens and escape tunnels, kit fox friendly fencing, and discontinuation of the use of rodenticides. With ongoing five-year monitoring efforts, the project may demonstrate an improvement in kit fox population within the project fenced area.

The goal of these efforts has been to demonstrate how passive, photovoltaic solar generation can support habitat enhancement and protection.

Biological Surveys

First Solar has conducted extensive biological and other studies on the almost 10,000-acre Project Study Area to determine the most suitable locations for project facilities to occupy approximately 3,500 acres of fenced area. These surveys had the following key findings:

- Through extensive agency consultation and wildlife surveys on the Project Study Area, it has been determined that the project site contains no federal or state listed plants and only three listed animal species, the San Joaquin kit fox and two species of fairy shrimp.
- The habitat for the two listed fairy shrimp species will be completely avoided and protected with 250-foot radius avoidance buffers.
- Surveys found no giant kangaroo rats, blunt-nosed leopard lizards, California tiger salamanders, California condors, California red-legged frogs or Kern primrose sphinx moths present on the project site.
- Surveys have verified that species use of the tilled agricultural fields, except for roadway passages alongside these areas, is much lower than of the grasslands, and support the restoration of such areas to more suitable, managed grassland habitat.
- The most recent kit fox scat surveys, conducted in November 2010, found evidence of the presence of only three kit fox individuals within the proposed fenced area of Alternative 3B.1.¹ See BR Maps 2 and 2b for 2009 and 2010 scat survey results.
 - Scat surveys will be continued for the first five years of project operation to provide a scientific analysis of the success of the proposed onsite habitat stewardship measures.

Project Revisions: Alternative 3B.1

The revised Topaz layout, Alternative 3B.1, has been found to be an Environmentally Superior Alternative in the Final EIR. Alternative 3B.1 is the result of a series of discussions about the Topaz layout with environmental stakeholders, the county, the California Department of Fish and Game (CDFG), the U.S. Fish and Wildlife Service (USFWS), and the U.S. Army Corps of Engineers. It is a reduced acreage layout that maintains the project's ability to meet its 550 MW Power Purchase Agreement obligation.

In Alternative 3B.1, the fenced area for solar arrays and other facilities will cover only approximately 3,500 acres, concentrated on highly disturbed agricultural lands. Only 25% of the Alternative 3B.1 fenced area is situated on non-native grasslands, lands that have been previously tilled, and the balance (75%) is situated on actively tilled cropland. This alternative incorporates a number of beneficial changes

¹ Kit fox scat surveys conducted in 2009 found 14 individuals within the proposed Alternative 3B.1 fenced area. The 2009 scat surveys were conducted from August 18 through September 1, and from November 11 - 21. The August survey period occurred during a time when annual population numbers tend to be high, and when family groups are still together prior to dispersal (Brian Cypher, pers. com. 2010; Maldonado 2010). November is a more appropriate time of year to determine a baseline number of resident kit fox because dispersal and early mortality are more likely to have occurred and breeding foxes are not yet sequestered in their dens (Cypher et al. 2000, Smith 2010 pers. com).

from the original project options described in the Draft EIR (Option A and Option B). Alternative 3B.1 offers the following environmental benefits:

1. Consolidated project area:
 - a. Alternative 3B.1 results in a reduction of overall project fenced area by about 15% to approximately 3,500 acres (from approximately 4,100 acres for Option A and approximately 4,000 acres for Option B). Note that this is an over 40% reduction from the configuration submitted to the county in July 2008 that encompassed 6,200 acres.
 - b. Arrays were moved away from the eastern and southwestern edges of the project area to avoid wildlife movement corridors. This can be seen by comparing the area of the outermost boundary of the layout to previous layouts. If you draw a boundary around the outside edge of the Alternative 3B.1 layout, the area is about 30% less than the Option A proposal.
2. Avoidance of sensitive areas
 - a. Complete avoidance of land under Williamson Act contracts
 - b. Increased avoidance of grassland areas, resulting in a 52% reduction in grassland habitat within the project's fenced area (from 1,721 grassland acres for Option A to 833 grassland acres for Alternative 3B.1)
 1. Of the 833 acres of grassland within the project, 535 acres are of low quality for San Joaquin kit fox due to farming in 2004 and 2005, and subsequent weedy vegetation.
 - c. The layout still avoids all wetlands, vernal pools, and locations with potential fairy shrimp habitat, an achievement further enhanced by the complete avoidance of the south half of Sections 4 and 5 in the design of Alternative 3B.1.
 - d. Alternative 3B.1 avoids all natal dens and all but two active kit fox dens identified in 2009 and 2010 surveys. (See BR Map 3)
3. Majority disturbed land
 - a. More than 75% of the project site is located on currently disturbed cropland.
 - b. Current dry-land cropping practices on the project land reduce habitat suitability for kit fox by changing the vegetative structure of the landscape, reducing prey availability, increasing predation risk, and fragmenting adjacent potentially usable habitat areas.
 - c. Cropping practices in the Carrizo Plain have utilized rodenticides extensively in the past which are known to kill kit fox.
 - d. Heavy equipment used for plowing and harvesting likely results in direct mortality through entombment or plow implement strikes of kit foxes.
 - e. Through on-site stewardship measures, the project lands will be returned to grassland habitat beneath the PV arrays, and measures will be implemented to encourage potential onsite kit fox habitat during project operation.

4. Preservation of Wildlife Movement Corridors

- a. The Alternative 3B.1 layout was reconfigured to preserve and enhance wildlife movement corridors on both sides of the project, including the elimination of arrays in an area approximately 1.25 miles wide along the eastern edge of the project.
 1. Now, rather than containing arrays, all of Section 35 and one-third of Section 34—both quality grassland habitat—are preserved. In addition, one quarter of Section 27, which is actively tilled land, has been set aside to further expand the width of the wildlife corridor.
- b. We have avoided placing arrays in the southern half of Sections 4 and 5, south of the highway. This land is grassland habitat and provides a corridor for animals traveling to the west of the project site. In order to further preserve this movement to the west, we have removed arrays from one-third mile triangular areas in the southwest corners of Sections 32 and 5.
- c. In order to avoid these movement corridors identified as important by the wildlife agencies, we have found every possible buildable location within the disturbed land.
 1. See the attached Topaz Solar Farm Constraints map, for a depiction of the Alternative 3B.1 layout's avoidance of sensitive resource constraints and preservation of wildlife movement corridors.

As a result, Alternative 3B.1 is the only Environmentally Superior Alternative that does not have Class I cumulative biological impacts.

Proposed Conservation/Mitigation Land Package

Full mitigation would be achieved through site design habitat avoidance and minimization measures implemented during project construction and operation and through protection and enhancement of more than 11,000 acres of off-site kit fox habitat, most of which would be located in important wildlife movement corridors.

The revised layout presented in Alternative 3B.1 allows for significant amounts of contiguous habitat to be preserved within the wildlife movement corridor between the Topaz and California Valley Solar Ranch project sites. In consultation with environmental stakeholders and wildlife agencies, First Solar has pursued as much mitigation land as is available in this corridor area.

The proposed package of conservation lands to mitigate impacts to kit fox, which is under review by CDFG and USFWS, has been directed at meeting recovery plan goals of habitat protection and population interchange. Therefore, the proposed off-site conservation lands

1. Provide habitat appropriate to sustain resident kit fox and/or
2. Protect and enhance corridors for movement into and out of the Carrizo Plain region.

The conservation lands will also provide enhanced habitat via the restoration of grasslands from previously tilled cropland.

Most of the proposed conservation lands are contiguous with the project site. These areas include current grassland and cropland habitats. Much of this land has been surveyed for biological resources by Althouse and Meade. Survey data shows that current utilization of these potential conservation lands by kit fox varies by habitat quality. Kit fox utilization is expected to improve if land use is changed from cropland to properly managed grassland.

Twenty-three parcels are proposed as conservation lands. Habitat types found on these parcels range from well-maintained California annual grassland to plowed cropland. Conservation properties with grassland habitat are primarily (88.4%) on flat ground (slopes 0 to 10%), and support kit fox. Conservation properties on cropland are also mostly on flat ground (75.7%), and have the potential to support many more kit fox after enhancement. Properties that have little to no slope are considered most valuable for kit fox.

In addition, the proposed conservation land package will provide extensive protected habitat in perpetuity for a number of other non-listed species, including ground squirrels, badgers, burrowing owls, and the ungulates—tule elk and pronghorn antelope. Restoration techniques for some of the northern mitigation lands will include the planting of *Atroplex*, a native shrub which is an important source of summer forage for pronghorn antelope.

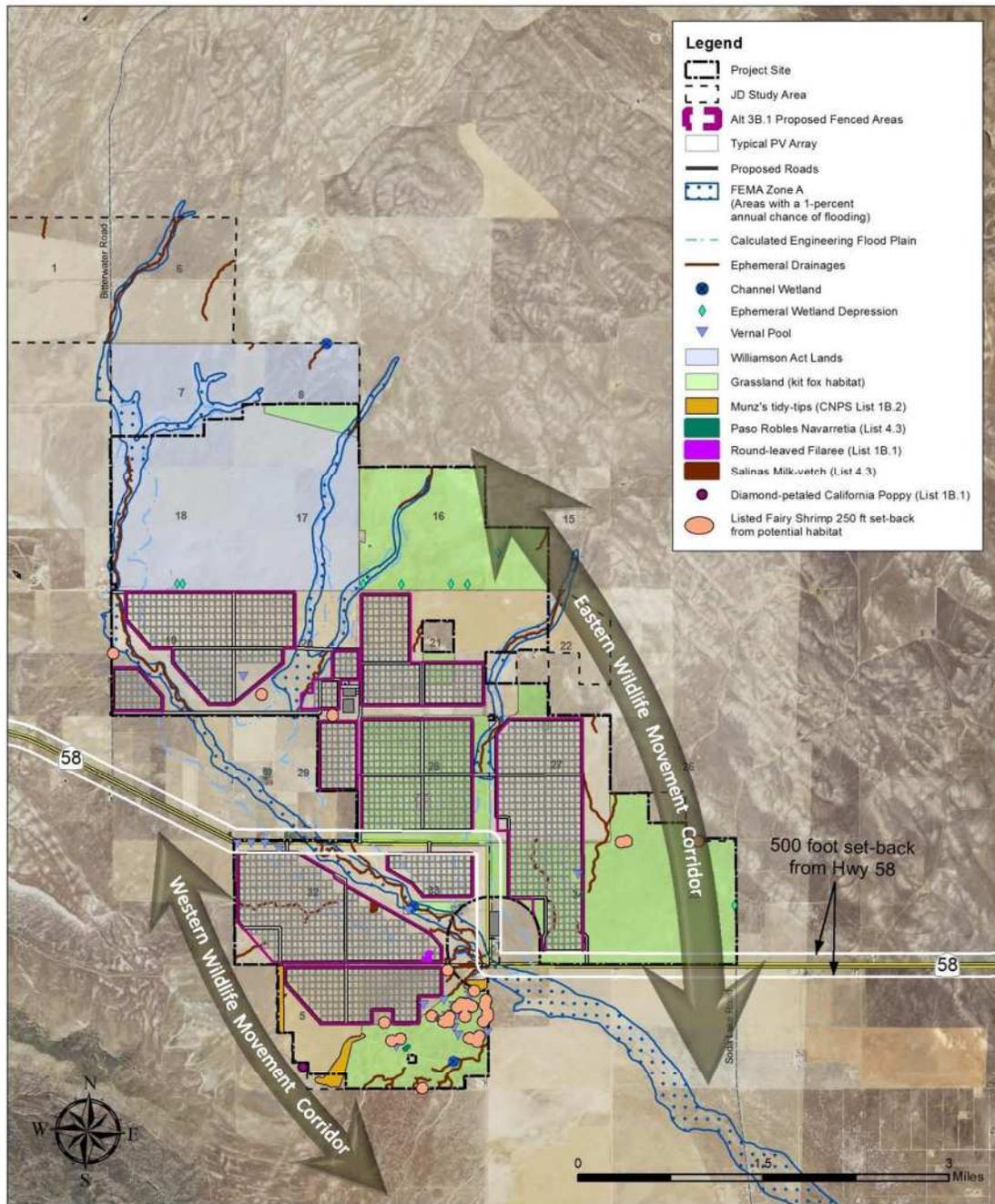
Summary

The Topaz project team and our biological advisors greatly appreciate the ongoing input from environmental stakeholders. The low-impact project proposal and the strong conservation/mitigation land package are due in large part to this collaborative process. These efforts have earned support for Topaz from environmental groups such as the San Luis Obispo Chapter of the California Native Plant Society and the Community Environmental Council. Please contact Ashley Kenny at akenny@firstsolar.com or 510-625-7408 if you have any questions.

Sincerely,

Kathryn Arbeit
Topaz Project Director

Topaz Solar Farm Constraints

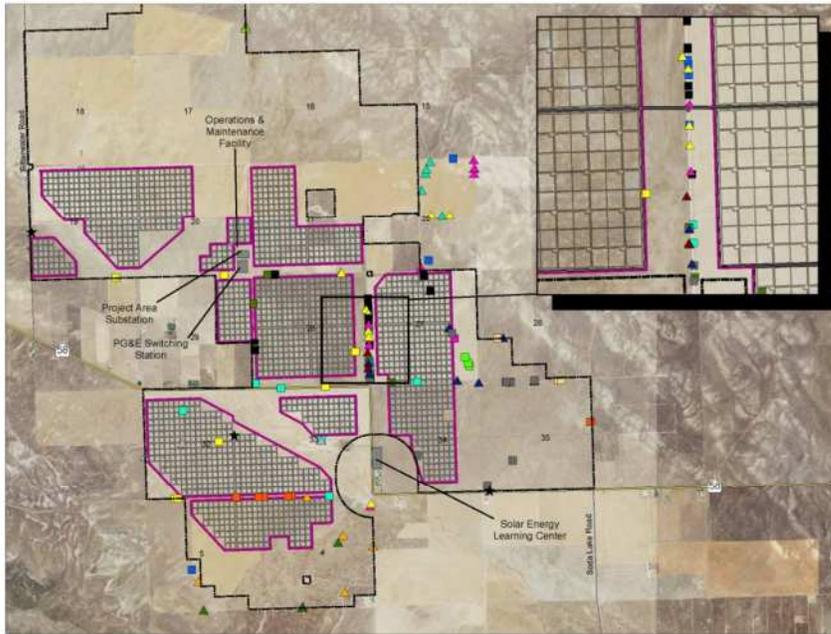



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550 MW Solar Farm Project
 2009 NAIP Aerial Photograph
 Flood Insurance Rate Map Panels
 06079C0975F and 06079C1200F
 Map Updated March 24, 2011



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 1602 Spring Street
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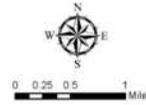


Legend

- Project Site
- ▨ Typical PV Array
- ▭ Alt 3B.1 Perimeter Fences
- ★ Red Fox

Map Symbol	Sex	SJKF Individual	Number of Detections
□	Male	2	8
■	Male	3	14
▨	Male	7	6
▭	Male	8	4
▮	Male	9	0
▯	Male	13	4
▰	Male	14	6
▱	Male	15	1
▲	Male	17	7
△	Male	18	13
▴	Female	1	4
▵	Female	4	3
▾	Female	5	6
▿	Female	6	2
◀	Female	10	4
▶	Female	11	5
◁	Female	12	7
▷	Female	16	8
◂	Female	18	10

Scat collection locations from Smith 2010 (2009 data)
Genetic results from Maltonado 2010

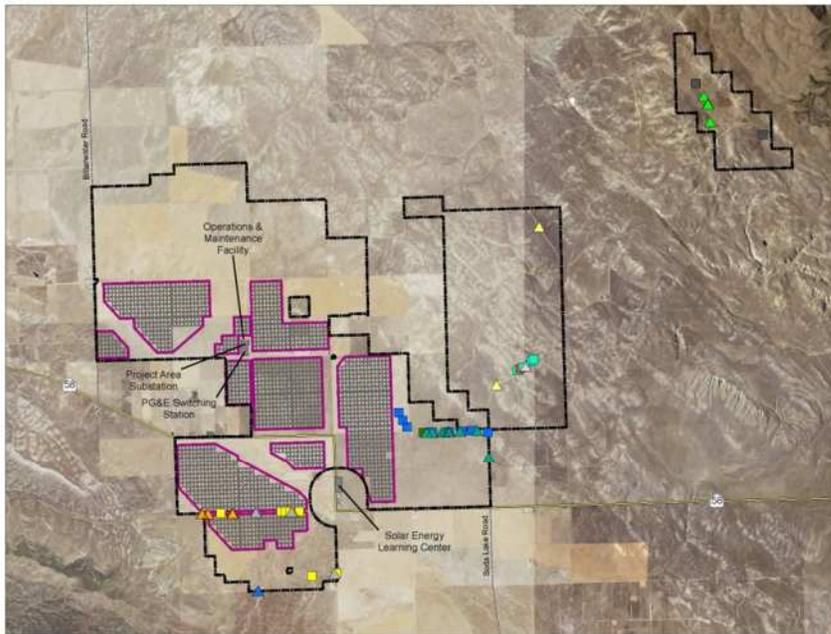


BR Map 2a. San Joaquin Kit Fox 2009 Genetic Results

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2009 San Luis Obispo County
NAIP Aerial Photography
Map Updated: March 14, 2011

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Legend

- Study Areas
- ▨ Typical PV Array
- ▭ Alt 3B.1 Perimeter Fences

Map Symbol	Sex	SJKF Individual	Number of Detections
▴	Female	1*	4
▵	Female	20	1
▾	Female	21	11
▿	Female	24	7
◀	Male	2*	6
▶	Male	28	10
◁	Male	29	2
▰	Female	22	1
▱	Female	23	2
▲	Female	25	4
△	Male	26	4
▴	Male	27	4
▾	Male	7*	1

Scat collection locations from Smith 2011 (2010 data)
Genetic results from Maltonado 2011 (in prep)

*Detected in 2009



Topaz Solar Farms
Mitigation Properties

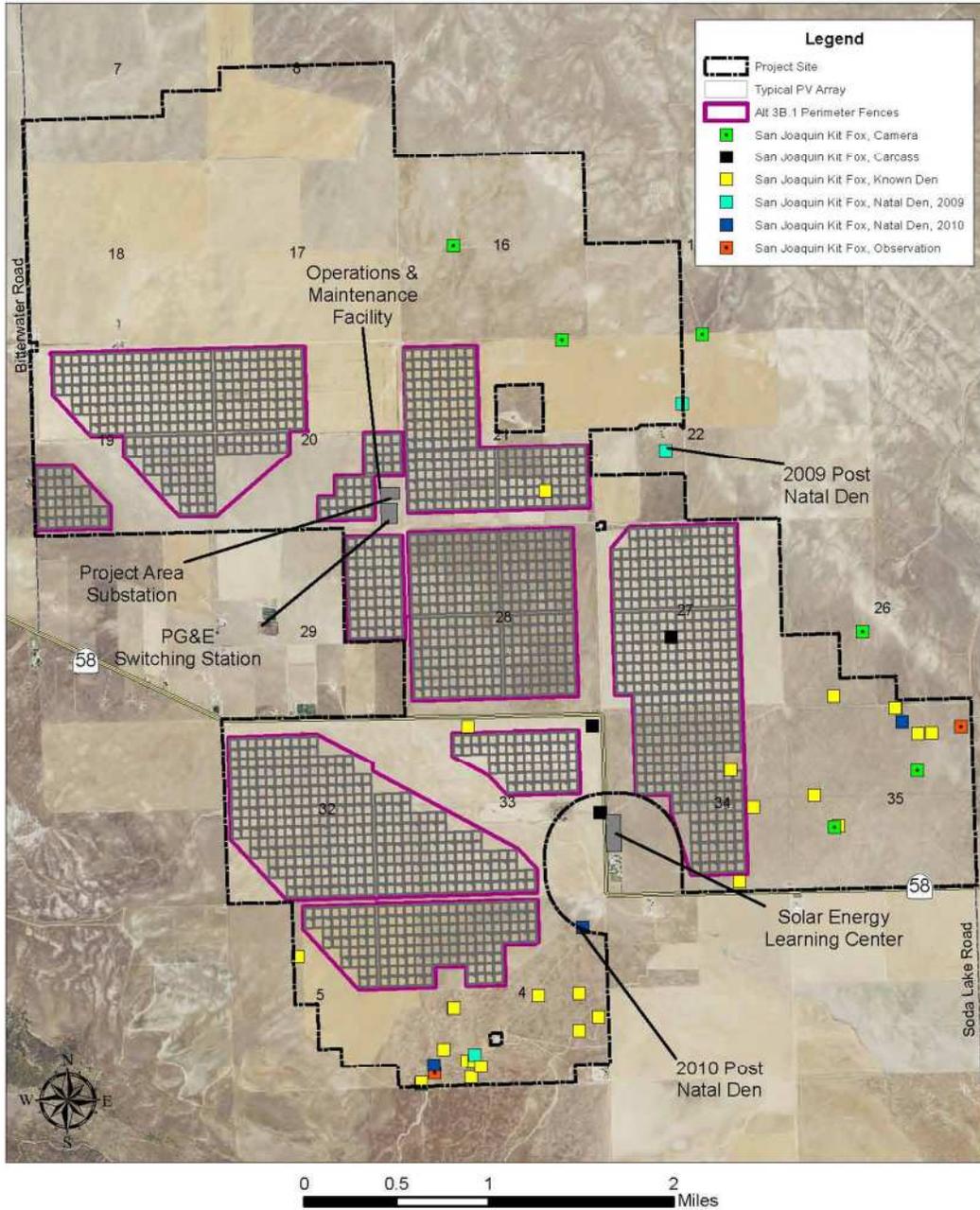
BR Map 2b. San Joaquin Kit Fox 2010 Genetic Results

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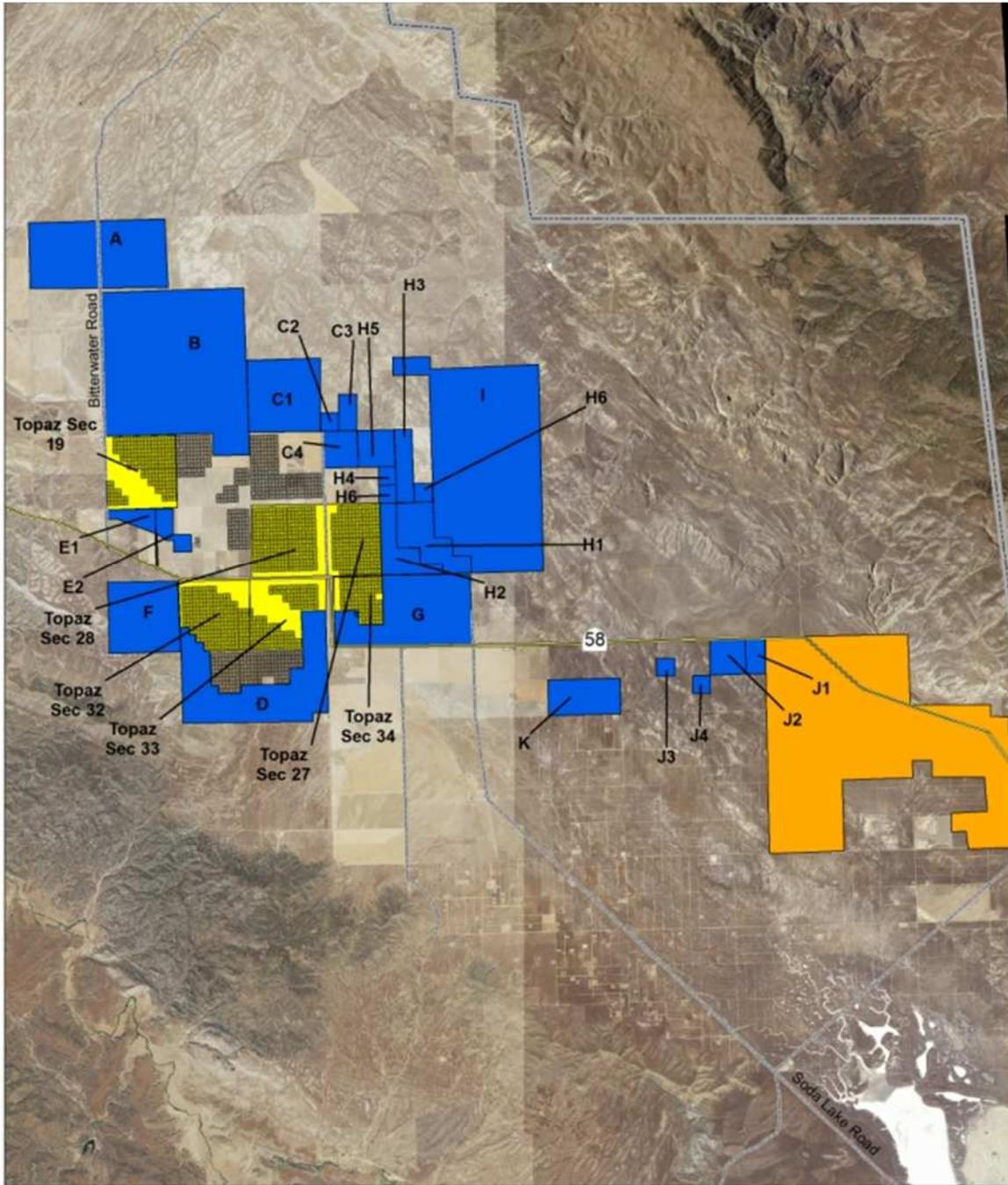
2009 San Luis Obispo County
NAIP Aerial Photography
Map Updated: March 14, 2011

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BR Map 3. Kit Fox Active Den Areas



Mitigation Parcels



Legend

- Typical PV Array
- County Boundary
- Mitigation Parcels
- Project Areas included in Table 3
- SunPower

