WRIGHT SOLAR PARK
HABITAT CONSERVATION PLAN

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Acronyms and Abbreviations

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AC	alternating current
APP	Avian Protection Plan
Applicant	Wright Solar, LLC
BESS	Battery Energy Storage System
BMPs	Best Management Practices
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO_2	carbon dioxide
CSU	California State University
DC	direct current
DPS	Distinct Population Segment
EA	environmental assessment
Eagle Act	Bald and Golden Eagle Protection Act
EIR	Environmental Impact Report
EIS	environmental impact statement
ESA	federal Endangered Species Act
ESRP	Endangered Species Recovery Program
gWh	gigawatt hours
HCP	Habitat Conservation Plan
HMP	Habitat Management Plan
I-	Interstate
km	kilometers
kV	kilovolt
LGIA	Large Generator Interconnection Agreement

m	meter
MBTA	Migratory Bird Treaty Act of 1918, as amended
mm	millimeters
mph	miles per hour
MVCS	Medium Voltage Collection System
MW	megawatt
NEPA	National Environmental Policy Act
NESC	National Electric Safety Code
NMFS	National Marine Fisheries Service
NPPA	Native Plant Protection Act
O&M	operations and maintenance
PG&E	Pacific Gas and Electric Company
project	Wright Solar Park project
PV	photovoltaic
RDM	residual dry matter
RPS	Renewables Portfolio Standard
SB	Senate Bill
SR	State Route
SSURGO	Soil survey geographic data
Upland Recovery Plan	*Recovery Plan for the Upland Species of the San Joaquin Valley, California*
USACE	U.S. Army Corps of Engineers
USC	U.S. Government Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WSP	Wright Solar Park and Wright Solar Park, LLC

Chapter 1
Introduction

1.1 Overview

Wright Solar Park, LLC (WSP or Applicant), is proposing the Wright Solar Park project (project). The applicant proposes to develop and operate a 200 megawatt (MW) ground-mounted solar photovoltaic (PV) power plant on private agricultural lands in western unincorporated Merced County, California (Figure 1-1). The proposed solar electrical generating facility would consist of a photovoltaic solar power system that would produce clean, renewable direct current (DC) electricity and convert it to alternating current (AC). The project would require a land footprint of approximately 1,400 contiguous acres to site the power plant.

The area surrounding the project is predominately grassland with low-density residential north of the project site. Land cover on the project site is discussed in Chapter 3. The applicant has prepared this Habitat Conservation Plan (HCP) to support an application to the U.S. Fish and Wildlife Service (USFWS) for permits under the federal endangered species act for three species, California tiger salamander (*Ambystoma californiense*) Central California Distinct Population Segment (DPS), blunt-nosed leopard lizard (*Gambelia sila*), and San Joaquin kit fox (*Vulpes macrotis mutica*).

1.1.1 Purpose

The purpose of this HCP is to provide incidental take authorization for species listed under the federal Endangered Species Act (ESA) during the construction and operation of the WSP, while protecting and enhancing ecological diversity and function in the region. To this end, the HCP describes how impacts on the federally listed endangered and state-listed threatened would be avoided, minimized, and mitigated, thereby addressing the permitting requirements.

If approved, incidental take[1] authorization (referred to as *take authorization* in this document) would be granted through permits issued by USFWS (also referred to as the *Wildlife Agencies*). The Applicant is asking USFWS to issue a Section 10(a)(1)(B) incidental take permit which provides take authorization of the California tiger salamander, blunt-nosed leopard lizard, and San Joaquin kit fox. The Applicant is also asking CDFW to issue an incidental take permit under Section 2081(b) of the California Endangered Species Act (CESA) that provides take authorization for the California tiger salamander and San Joaquin kit fox. The blunt-nosed leopard lizard is fully protected by the State of California and thus, take of individuals is prohibited. The conservation strategy described in Chapter 5 is designed to avoid impacts to individual blunt-nosed leopard lizards during operations and maintenance and decommissioning of the facility, should the species move onto the site following

[1] *Take* as defined by the ESA means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (50 CFR 222.307). *Incidental take* is take that is incidental to, and not intended as part of, an otherwise lawful activity.

construction. The HCP includes a conservation strategy to fully mitigate for impacts to the California tiger salamander and San Joaquin kit fox consistent with CESA.

1.2 Background

The purpose of the project is to provide renewable solar energy to be sold back to a utility provider through a power contract. Electrical power would be generated from a clean source that would supplement the energy capacity of the existing power grid of Northern California, thereby increasing the stability and operability of the transmission system, as well as offsetting supplies from fossil fuel generating sources. The energy generated by the project could be sold to public utilities, municipal utilities, or large private consumers of power. The power generated by the project would be interconnected to existing Pacific Gas and Electric Company (PG&E) power grid infrastructure for delivery to the purchaser of the power. The proposed project would have an operational lifespan of approximately 35 years.

In 2002, California established its Renewables Portfolio Standard (RPS) Program, with the goal of increasing the percentage of renewable energy in the state's electricity mix to 20% of retail sales by 2017. In 2006 under Senate Bill (SB) 107, California's 20% by 2010 RPS goal was codified. The legislation required retail sellers of electricity to increase renewable energy purchases by at least 1% per year with a target of 20% renewables by 2010. Publicly owned utilities set their own RPS goals recognizing the intent of the legislature to attain the 20% by 2010 target. On November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order S-14-08 requiring that "...[a]ll retail sellers of electricity shall serve 33 percent of their load with renewable energy by 2020."

In the ongoing effort to codify the ambitious 33% by 2020 goal, SB X1-2 was signed by Governor Edmund G. Brown, Jr. in April 2011. This new RPS applies to all electricity retailers in the state including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. All of these entities must adopt the new RPS goals of 20% of retails sales from renewables by the end of 2013, 25% by the end of 2016, and the 33% requirement being met by the end of 2020. The Wright Solar Park project would be important in helping the state meet the required 33% renewable energy load established under SB X1-2.

1.3 Scope of the Plan

This section introduces key elements of the scope of the HCP: covered activities, geographic scope (permit area), and the permit term, and covered species. Covered activities are discussed in more detail in Chapter 2.

1.3.1 Covered Activities (Project)

Covered activities involve the construction, operation, maintenance, and eventual decommissioning of the solar energy electrical generation facility to provide electricity for public consumption. The facility would consist of an array of solar PV panels, DC to AC power inverters, racking materials,

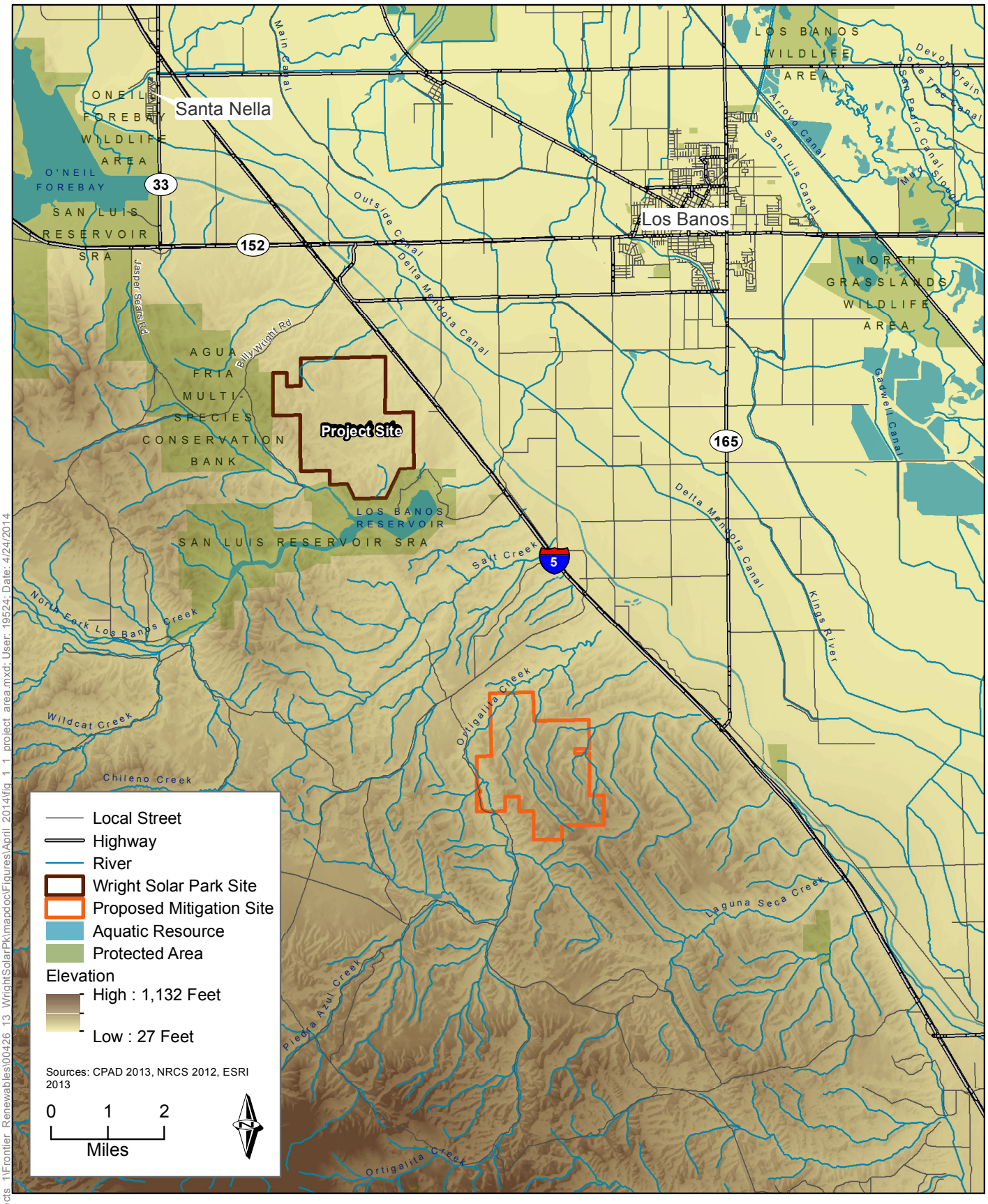

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Figure 1-1
Project Area

low-voltage transformer and power conditioning equipment, battery energy storage system, access roads, and an electrical interconnection. The PV panels would be installed on a single-axis tracking mounting system and would be dark blue or black in color with minimal light reflection. Construction is planned to begin in late 2014, after completing California Environmental Quality Act (CEQA) review, receiving all necessary construction and environmental permits, and meeting pre-construction CEQA conditions. Construction and testing of the project would take a total of 26 months to complete and is expected to be completed in October 2016, at which point the project would become operational. The project has a planned life of 35 years, so decommissioning is projected to occur in 2051. Decommissioning would involve removal of all structures, facilities, and access roads, and restoration of the site to the existing pre-project conditions. Covered activities are described in more detail in Chapter 2.

1.3.2 Permit Area

The project area is approximately 2.7 miles southeast of the community of Santa Nella and approximately 6 miles southwest of Los Banos. The project site can be accessed via Billy Wright Road off of State Route (SR) 33/152. O'Neill Forebay is approximately 3 miles northwest and the Los Banos Creek Reservoir is approximately 0.5 mile south (Figure 1-1).

The permit area includes both the project site (2,731 acres) and the proposed mitigation lands (2,450 acres). These noncontiguous areas total approximately 5,181 acres in which the Applicant is requesting take authorization from the Wildlife Agencies for activities covered by this HCP. Covered activities, including management and monitoring of mitigation sites, would only occur within the permit area (Figure 1-2).

1.3.3 Permit Term

The permit term is the time period in which all covered activities can receive take authorization under the incidental take permit, consistent with the requirements of the HCP. The permit term is also the time in which all mitigation actions must be successfully completed to offset the impacts of the covered activities. The proposed permit term for this HCP is 40 years. This proposed permit term encompasses all construction and testing activities, as well as the full operational life of the project and its decommissioning. This permit term would also be sufficient to allow for successful implementation of the conservation strategy to offset project impacts.

1.3.4 Covered Species

The permits issued by the Wildlife Agencies must name specific species in which take from the impacts of covered activities is authorized. These species, called *covered species*, are either currently listed as threatened or endangered or may become listed during the permit term. Although the primary intent of this HCP is to provide mitigation for effects on covered species, it would also contribute to the protection of native biological diversity, habitat for native species, natural communities, and local ecosystems. This broad scope would conserve a wide range of natural resources including native species that are common as well as those that are rare.

This HCP proposes coverage for three species, the California tiger salamander, blunt-nosed leopard lizard, and San Joaquin kit fox. In exchange for the incidental take authorization, the HCP would provide for long-term mitigation, monitoring, and management of the species at a level sufficient to offset any impacts from covered activities.

Covered Species Evaluation

To determine which species would be covered by the Plan, a comprehensive list of 53 special-status plant and animal species was developed by reviewing the sources below. Each species was then evaluated to determine their individual potential to occur in the permit area (Appendix A).

- California Natural Diversity Database (CNDDB) (California Department of Fish and Wildlife 2013).
- California Native Plant Society (CNPS) Online *Inventory of Rare and Endangered Vascular Plants of California* (California Native Plant Society 2013).
- A species list obtained from the USFWS website for the quads encompassing the project and the surrounding quads, as well as for Merced County (U.S. Fish and Wildlife Service 2013).
- Personal communication with local experts including Wildlife Agency staff.
- USFWS recovery plans.
- USFWS 5-year status reviews.
- California State University (CSU)–Stanislaus Endangered Species Recovery Program (ESRP) papers and reports.
- Draft Biological Resources Report for the Wright Solar Project (Ecology and Environment 2013).
- ICF file Information.

Species proposed for coverage in the HCP were limited to those species for which impacts from covered activities were likely. However, it is important to note that many other special-status species and common species are expected to benefit from the conservation strategy of this HCP.

Covered Species Criteria

For each special-status species with potential to occur in the study area (Appendix A), information was gathered on its status, population trends, distribution, threats, conservation, and management efforts in the region. The following criteria were then applied to each species to determine whether it would be proposed for coverage by the HCP. To be covered, a species had to meet all four of the following criteria: range, status, impact, and data.

- Range—The species is known to occur or is likely to occur within the permit area, based on credible evidence, or the species is not currently known in the permit area but is expected to occur during the permit term (e.g., through range expansion or reintroduction to historic range).
- Status—The species meets at least one of the following criteria for regulatory status.
    - Listed under the ESA as threatened or endangered, or proposed for listing.
    - Listed under CESA as threatened or endangered or a candidate for such listing.

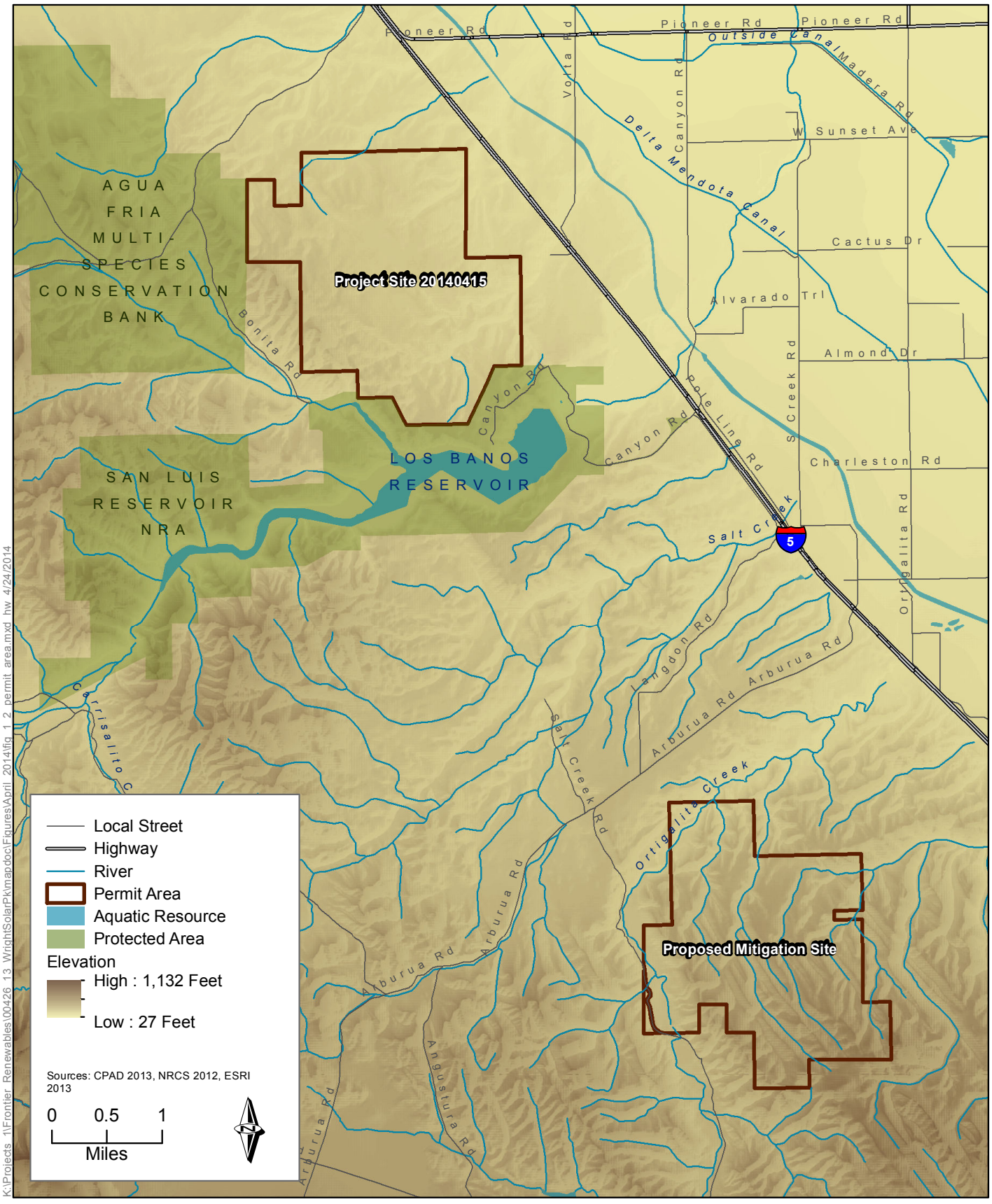

Figure 1-2
Permit Area

- Listed under the Native Plant Protection Act (NPPA) as rare.
- Expected to be listed under ESA or CESA within the permit term (assumed to be 40 years). Potential for listing during the permit term is based on the current listing status, discussion with Wildlife Agency staff and other experts, an evaluation of species population trends and threats, and best professional judgment of the biologists preparing the HCP.
- Habitat characteristics and ecology indicate species serves as a keystone species[2] for an important and rare natural community in the permit area (plants only).

- Impact—The species or its habitat would be adversely affected by covered activities or projects that may result in take of the species.
- Data—Sufficient data on the species' life history, habitat requirements, and occurrence in the permit area and surrounding region are available to adequately evaluate impacts on the species and to develop conservation measures to mitigate these impacts to levels specified by regulatory standards.

Through the selection process, it was determined that there was the potential for take of three species, California tiger salamander, blunt-nosed leopard lizard, and San Joaquin kit fox. All other special-status plant and wildlife species either do not have the potential to occur in the permit area, have no or low potential to be affected by the covered activities, are unlikely to become listed during the permit term, or a combination of these factors (Appendix A). These other species are not covered under this permit. If any listed species that is not covered under this permit is discovered on the project site during facility operation, the appropriate permits will need to be obtained.

1.4 Regulatory Setting

The HCP is designed primarily to comply with ESA and CESA. The HCP is also consistent with other federal and state wildlife and related laws and regulations, listed here and described in greater detail below.

- Migratory Bird Treaty Act.
- Bald and Golden Eagle Protection Act.
- California Fish and Game Code Sections 3511, 4700, 5050, 5515 (fully protected species).
- California Fish and Game Code Section 3503 (bird nests).
- California Fish and Game Code Section 3503.5 (birds of prey).
- National Environmental Policy Act of 1969.
- California Environmental Quality Act of 1970.

[2] A species whose presence and role within an ecosystem has a disproportionate effect on other organisms within the system.

1.4.1 Federal and State Endangered Species Laws

Federal Endangered Species Act

The ESA is administered by the USFWS for terrestrial and freshwater fish species and by the National Marine Fisheries Service (NMFS) for marine and anadromous species. ESA requires these federal agencies to maintain lists of threatened and endangered species.

USFWS or NMFS can list species as either endangered or threatened. An endangered species is at risk of extinction throughout all or a significant portion of its range (ESA Section 3[6]). A threatened species is likely to become endangered within the foreseeable future (ESA Section 3[19]). Section 9 of the ESA prohibits the take of any fish or wildlife species listed under ESA as endangered or threatened. Take, as defined by ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Harm is defined as "any act that kills or injures the species, including significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering" (50 CFR 17.3).

Section 9 prohibits the "removal or reduction to possession" of any listed plant species "under federal jurisdiction" (i.e., on federal land, where federal funding is provided, or where federal authorization is required). The ESA includes mechanisms that provide exceptions to the Section 9 take prohibitions. These are addressed in Section 7 for federal actions and Section 10 for nonfederal actions.

Section 7

Section 7 of the ESA requires all federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of habitat critical to such species' survival. To ensure that its actions do not result in jeopardy to listed species or in the adverse modification of critical habitat, each federal agency must consult with USFWS or NMFS regarding federal agency actions that may affect listed species. The issuance of permits for this HCP is a federal action that triggers a Section 7 consultation. Consultation begins when the federal agency submits a written request for initiation to USFWS or NMFS, along with the agency's biological assessment of its proposed action, and when USFWS or NMFS accepts that biological assessment as complete. If USFWS or NMFS concludes that the action is not likely to adversely affect a listed species, the action may be conducted without further review under ESA. Otherwise, USFWS or NMFS must prepare a written biological opinion describing how the agency's action will affect the listed species and its critical habitat. For this HCP, USFWS will consult internally (with itself) to comply with Section 7 of the ESA (because no marine or anadromous fish are covered, NMFS is not involved).

If the biological opinion concludes that the proposed action would jeopardize the continued existence of a listed species or adversely modify its critical habitat, the opinion will suggest "reasonable and prudent alternatives" that would avoid that result. If the biological opinion concludes that the proposed action would take a listed species but would not jeopardize its continued existence, the biological opinion will include an incidental take statement. Incidental take

is take that is "incidental to, and not intended as part of, an otherwise lawful activity" (64 CFR 60728). The incidental take statement specifies an amount of take that is allowed to occur as a result of the action and may require reasonable and prudent measures to minimize the impact of the take.

Section 10

Until 1982, state, local, and private entities had no means to acquire incidental take authorization as could federal agencies under Section 7. Private landowners and local and state agencies ran the risk of direct violation of the ESA no matter how carefully their projects were implemented. This statutory dilemma led Congress to amend Section 10 of the ESA in 1982 to authorize the issuance of an incidental take permit to nonfederal project proponents upon completion of an approved conservation plan. The term conservation plan has evolved into habitat conservation plan.

In cases where federal land, funding, or authorization is not required for an action by a nonfederal entity, the take of listed fish and wildlife species can be permitted by USFWS through the Section 10 process. Private landowners, corporations, state agencies, local agencies, and other nonfederal entities must obtain a Section 10(a)(1)(B) incidental take permit for take of federally listed fish and wildlife species "that is incidental to, but not the purpose of, otherwise lawful activities."

The take prohibition for listed plants is more limited than for listed fish and wildlife. Under Section 9(a)(2)(B) of the ESA, endangered plants are protected from "removal, reduction to possession, and malicious damage or destruction" in areas that are under federal jurisdiction. Section 9(a)(2)(B) of the ESA also provides protection to plants from removal, cutting, digging up, damage, or destruction where the action takes place in violation of any state law or regulation or in violation of a state criminal trespass law. Thus, the ESA does not prohibit the incidental take of federally listed plants on private or other nonfederal lands unless the action requires federal authorization or is in violation of state law. Thus, Section 10 incidental take permits are only required for wildlife and fish species. However, the Section 7(a)(2) prohibition against jeopardy applies to plants, and issuance of a Section 10(a)(1)(B) incidental take permit cannot result in jeopardy to a listed plant species.

To obtain a Section 10(a)(1)(B) permit, the HCP must specify the following mandatory elements.

- The impact that will likely result from the taking of covered species.
- The steps the permit applicants will take to monitor, minimize, and mitigate such impacts to the maximum extent practicable.
- The funding that will be available to implement such steps.
- The procedures to be used to deal with unforeseen circumstances.
- The alternative actions to such taking the permit applicants considered and the reasons why such alternatives are not proposed to be utilized.
- Such other measures that the Director [of the Department of Interior or Commerce] may require as being necessary or appropriate for purposes of the plan (50 CFR 17.22[b]).

This HCP is intended to satisfy these requirements.

To receive an incidental take permit, Section 10(a)(2)(B) of the ESA requires that the following criteria be met.

- The taking will be incidental to otherwise lawful activities.
- The Applicants will, to the maximum extent practicable, minimize and mitigate the impacts of such taking.
- The Applicants will ensure adequate funding for the HCP and procedures to deal with unforeseen circumstances[3].
- The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild.
- The Applicants will ensure that other measures that USFWS may require as being necessary or appropriate will be provided.
- USFWS have received such other assurances as may be required that the HCP will be implemented.

Prior to the approval of an HCP, USFWS is required to undertake an internal Section 7 consultation[4] because issuance of an incidental take permit is a federal action (see the discussion of ESA Section 7, above.) Elements specific to the Section 7 process that are not required under the Section 10 process (e.g., analysis of impacts on designated critical habitat, analysis of impacts on listed plant species, and analysis of indirect and cumulative impacts on listed species) are included in this HCP to help USFWS meet the requirements of Section 7.

California Endangered Species Act

CESA prohibits take of wildlife and plants listed as threatened or endangered by the California Fish and Wildlife Commission. Take is defined under the California Fish and Game Code (more narrowly than under ESA) as any action or attempt to "hunt, pursue, catch, capture, or kill." Therefore, take under CESA does not include "the taking of habitat alone or the impacts of the taking."[5] Rather, the courts have affirmed that under CESA, "taking involves mortality."

Like ESA, CESA allows exceptions to the prohibition for take that occurs during otherwise lawful activities. Incidental take of state-listed species may be authorized if the Applicants submit an approved plan that minimizes and "fully mitigates" the impacts of this take. The requirements for an application for an incidental take permit under the CESA are described in Section 2081 of the California Fish and Game Code and in final adopted regulations for implementing Sections 2080 and 2081. Sections 2081(b) and (c) of the CESA allow CDFW to issue an incidental take permit for a state-listed threatened and endangered species if specific criteria is met. These criteria are reiterated in Title 14 California Code of Regulations (CCR), Sections 783.4(a) and (b).

[3] *Unforeseen circumstances* are changes in circumstances affecting a covered species or geographic area covered by the HCP that could not reasonably have been anticipated by the plan developers, and that result in a substantial and adverse change in the status of a covered species.

[4] When USFWS issues a permit, they will consult with itself, if necessary.

[5] *Environmental Council of Sacramento v. City of Sacramento*, 142 Cal. App. 4th 1018 (2006).

- The authorized take is incidental to an otherwise lawful activity.
- The impacts of the authorized take are minimized and fully mitigated.
- The measures required to minimize and fully mitigate the impacts of the authorized take: (a) are roughly proportional in extent to the impact of the taking on the species, (b) maintain the applicant's objectives to the greatest extent possible, and (c) are capable of successful implementation.
- Adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with and the effectiveness of the measures.
- Issuance of the permit will not jeopardize the continued existence of a state-listed species.

The Applicant is applying for a Section 2081 permit for California tiger salamander and San Joaquin kit fox; the HCP describes and analyzes project effects as they pertain to such a permit. The application for a 2081 permit must include the following components.

- A complete description of the project or activity for which the permit is sought, including its location.
- An analysis of whether and to what extent the project or activity for which the permit is sought could result in the taking of species to be covered by the permit.
- An analysis of the impacts of the proposed taking on the species.
- An analysis of whether issuance of the incidental take permit would jeopardize the continued existence of a species.
- Proposed measures to minimize and fully mitigate the impacts of the proposed taking.
- A proposed plan to monitor compliance with the minimization and mitigation measures and the effectiveness of the measures.
- A description of the funding source and the level of funding available for implementation of the minimization and mitigation measures.

CDFW will review the application for consistency with the requirements of the CESA, including compliance with CEQA. There is no required public noticing associated with Section 2081 permits apart from CEQA review. CDFW will make a determination on the permit application, prepare a findings document and issue take authorization upon completion of CEQA review. The incidental take permit issued by CDFW shall be effective for the approved permit term unless earlier suspended, revoked, or relinquished.

1.4.2 Other Federal and State Wildlife Laws and Regulations

Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918, as amended (MBTA), implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds is

unlawful, as is taking of any parts, nests, or eggs of such birds (16 U.S. Government Code [USC] 703). *Take* is defined more narrowly under the MBTA than under ESA and includes only the death or injury of individuals of a migratory bird species or their eggs. As such, *take* under the MBTA does not include the concepts of harm and harassment as defined under ESA. No federally listed migratory birds are covered by this HCP because none occur in the project area or are expected to be taken by covered activities. However, the Applicant would comply with the MBTA for non-listed migratory birds as part of their project construction and operation. The Applicant has prepared an Avian Protection Plan (APP) as part of the environmental review process for Merced County. The APP is Appendix I of the Environmental Impact Report (County of Merced 2014). The plan includes monitoring avian species during construction and for two years following construction to document avian use of the project site and any mortality that occurs as a result. Monitoring will occur at an increased frequency during periods of migration. All mortality events will be reported to the USFWS and CDFW.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (Eagle Act) prohibits the taking or possession of and commerce in bald and golden eagles with limited exceptions. Under the Eagle Act, it is a violation to "take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or in any manner, any bald eagle commonly known as the American eagle, or golden eagle, alive or dead, or any part, nest, or egg, thereof." *Take* is defined to include pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, and disturb. *Disturb* is further defined in 50 CFR Part 22.3 as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

Recent revisions to the Eagle Act authorize take of bald eagles and golden eagles under the following conditions: (1) where the take is compatible with the preservation of the bald eagle and golden eagle, (2) is necessary to protect an interest in a particular locality, (3) is associated with but not the purpose of an otherwise lawful activity, and (4) for individual instances of take the take cannot be avoided, or (5) for programmatic take the take is unavoidable even though advanced conservation practices are being implemented (50 CFR 22.26). Permits issued under this regulation usually authorize disturbance only; however, in limited cases a permit may authorize lethal take that results from but is not the purpose of an otherwise lawful activity.

Bald and golden eagles are not covered species in this HCP because they are not expected to be affected by the covered activities in ways that may result in take as defined by the Eagle Act. This HCP also does not seek a permit under the Eagle Act and therefore does not permit direct injury or death of the species or its eggs or disturbance to nests.

California Fully Protected Species

In the 1960s, before CESA was enacted, the California legislature identified specific species for protection under the California Fish and Game Code. These *fully protected* species may not be taken or possessed at any time, and no licenses or permits may be issued for their take except for

collecting these species for necessary scientific research and relocation of bird species for the protection of livestock, or as part of an approved Natural Community Conservation Plan. Fully protected species are described in Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the California Fish and Game Code. These protections state that "…no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected [bird], [mammal], [reptile or amphibian], [fish]."

White-tailed kite (*Elanus leucurus*), is the only fully protected species with potential to occur on the site. However, this species is not expected to be directly taken by the project as defined by the Fish and Game Code. All direct take of these fully protected species would be avoided by project activities.

California Fish and Game Code 3503 (Bird Nests)

Section 3503 of the California Fish and Game Code makes it "unlawful to take, possess, or needlessly destroy the nests or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." Therefore, CDFW may issue permits authorizing take. The HCP contains conservation measures to avoid and minimize such take to the maximum extent practicable in order to comply with Section 3503.

California Fish and Game Code 3503.5 (Birds of Prey)

Section 3503.5 of the California Fish and Game Code prohibits the take, possession, or destruction of any birds of prey or their nests or eggs "except as otherwise provided by this code or any regulation adopted pursuant thereto." The HCP contains conservation measures to avoid and minimize such take to the maximum extent practicable in order to comply with Section 3503.5.

1.4.3 National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires federal agencies to include in their decision-making process appropriate and careful consideration of all environmental effects of a proposed action and of possible alternatives. Documentation of the environmental impact analysis and efforts to avoid or minimize the adverse effects of proposed actions must be made available for public notice and review. This analysis is documented in either an environmental assessment (EA) or an environmental impact statement (EIS). Project proponents must disclose in these documents whether their proposed action would adversely affect the human or natural environment. NEPA's requirements are primarily procedural rather than substantive in that NEPA requires disclosure of environmental effects and mitigation possibilities but includes no requirement to mitigate.

The issuance by USFWS of an incidental take permit under Section 10 of the ESA constitutes a federal action. Therefore, USFWS must comply with NEPA. To satisfy NEPA requirements, USFWS released a draft EA that accompanies this draft HCP.

1.4.4 California Environmental Quality Act

CEQA is similar to but more extensive than NEPA in that it requires that significant environmental impacts of proposed projects be reduced to a less-than-significant level through adoption of feasible avoidance, minimization, or mitigation measures unless overriding considerations are identified and documented that make the mitigation measures or alternatives infeasible. CEQA applies to certain activities in California undertaken by either a public agency or a private entity that must receive discretionary approval from a California government agency. In issuing the CESA permit, CDFW must comply with CEQA. Similarly, the action of the County of Merced is the approval of a Conditional Use Permit, which is subject to CEQA compliance. The County has prepared a separate Environmental Impact Report (EIR) to satisfy CEQA. This EIR also provides the CEQA compliance necessary for CDFW to issue a CESA permit.

1.5 Document Organization

This HCP and supporting information are presented in the chapters and appendices listed below.

- Chapter 1, *Introduction*, discusses the background, purpose, and objectives of the HCP; reviews the regulatory setting; and summarizes the planning process.
- Chapter 2, *Covered Activities*, describes the activities covered under the HCP.
- Chapter 3, *Physical and Biological Resources*, presents an overview of the physical and biological setting of the area encompassing the WSP site and the proposed mitigation site and describes the baseline physical and biological conditions.
- Chapter 4, *Impact Assessment and Level of Take*, presents the impacts of the covered activities.
- Chapter 5, *Conservation Strategy*, summarizes the conservation strategy and describes the specific conservation actions to be implemented to mitigate the impacts of the covered activities.
- Chapter 6, *Implementation and Funding*, details the administrative requirements associated with HCP implementation and the roles and responsibilities of the Applicants and Wildlife Agencies.
- Chapter 7, *Alternatives to Take*, presents the required analysis of alternatives to take of covered species.
- Chapter 8, *Literature Cited*, is a comprehensive bibliography of references cited in the text.
- Appendix A, *Species Considered for Coverage*, lists the special-status species that were considered for coverage under this Plan, their legal status, and the rationale for coverage or not.

Chapter 2
Covered Activities

2.1 Introduction

This chapter describes the activities covered by the Wright Solar HCP. The impacts from these activities are described and quantified in Chapter 4, *Impact Assessment and Level of Take*. These activities are necessary for the Applicant to meet the project purposes described in Chapter 1.

2.2 Covered Activities

The Applicant is constructing and operating a 200-megawatt (MW) alternating current (AC) ground-mounted solar photovoltaic (PV) power plant located on private agricultural lands in western unincorporated Merced County, California (Figure 1-1). The facility would consist of the following project components; an array of solar PV panels, tracker components, direct current (DC) to AC power inverters, tracking materials, low/medium voltage transformer and power conditioning equipment, a medium voltage collection system, a project substation, a battery energy storage system, access roads, and an electrical interconnection switching station (Figure 2-1). Covered activities are described in detail according to each of the three phases of the project: construction, operation and maintenance, and decommissioning. The final section of the chapter describes the covered activities that would occur on the mitigation sites associated with HCP implementation.

2.2.1 Construction Activities

Phased construction is planned to begin in August 2014. Construction must begin before the end of 2014 in order to take advantage of critical federal tax credits that make the project financially feasible. The Applicant anticipates that construction and testing of the project would take a total of 26 months to complete. Therefore, project construction is expected to be completed in October 2016. The project elements would be completed either in phases or concurrently. Construction activities would include the installation of civil infrastructure (e.g., roads, utilities, fencing), mechanical infrastructure (e.g., tracking components, PV panels), and electrical infrastructure, as listed below.

Civil Infrastructure Activities

- Survey and project layout, including road, panel, switching station, and support buildings.
- Road construction, including placement of aggregate on all-weather roads.
- Establishment of temporary facilities, parking, and staging areas (these are all inclusive of the project site unless otherwise shown on Figure 2-1).
- Installation of a chain-link fence and gates.
- Watering for dust control and soil compaction.

- Construction of switching station, skid/inverter, and control room pads.

Mechanical and Electrical Infrastructure Activities

- Installation of I-beam foundations and placement of a racking system on top of I-beam/tubular steel foundations.
- Placement of PV solar modules and DC collection system.
- Installation of a wire harness, fuses, and wire grounding.
- Trenching for buried wires.
- Installation of buried wiring.
- Installation of inverter/transformer structures.
- Installation of wiring and interconnection.
- Installation of AC collection system.
- Trenching and overhead installation of Medium Voltage Collection System (MVCS) from inverters/transformers to the project switching station.
- Construction of the project substation.
- Construction of the project switching station.
- Construction of the interconnection to the Pacific Gas and Electric Company (PG&E) transmission/distribution system.
- Installation of telecommunications equipment.
- Installation of meteorological equipment.
- Construction of operations and maintenance facility.
- Installation of battery energy storage system.
- Development of well for operations water.

Site Access and Construction Staging

The maximum project footprint would be approximately 1,893 acres, including staging areas and access roads. Access and interior roads would be surfaced with aggregate, be dust free, and would be maintained to facilitate onsite circulation for emergency vehicles during all weather conditions. The internal road network and project site access are illustrated on Figures 2-1 and 2-2, respectively.

Construction staging involves development of specific areas for parking and other temporary construction-related facilities. Approximately 10.5 acres of all-weather parking spaces would be constructed to provide temporary onsite parking for construction staff. This area could be expanded to accommodate increased worker needs. This area and the gravel placed on it would be reclaimed at the end of the construction period. Figure 2-1 shows the location of the temporary construction facilities where the construction crew parking and trailers would be located. This area would also include temporary work facilities and office space for use during construction. Temporary

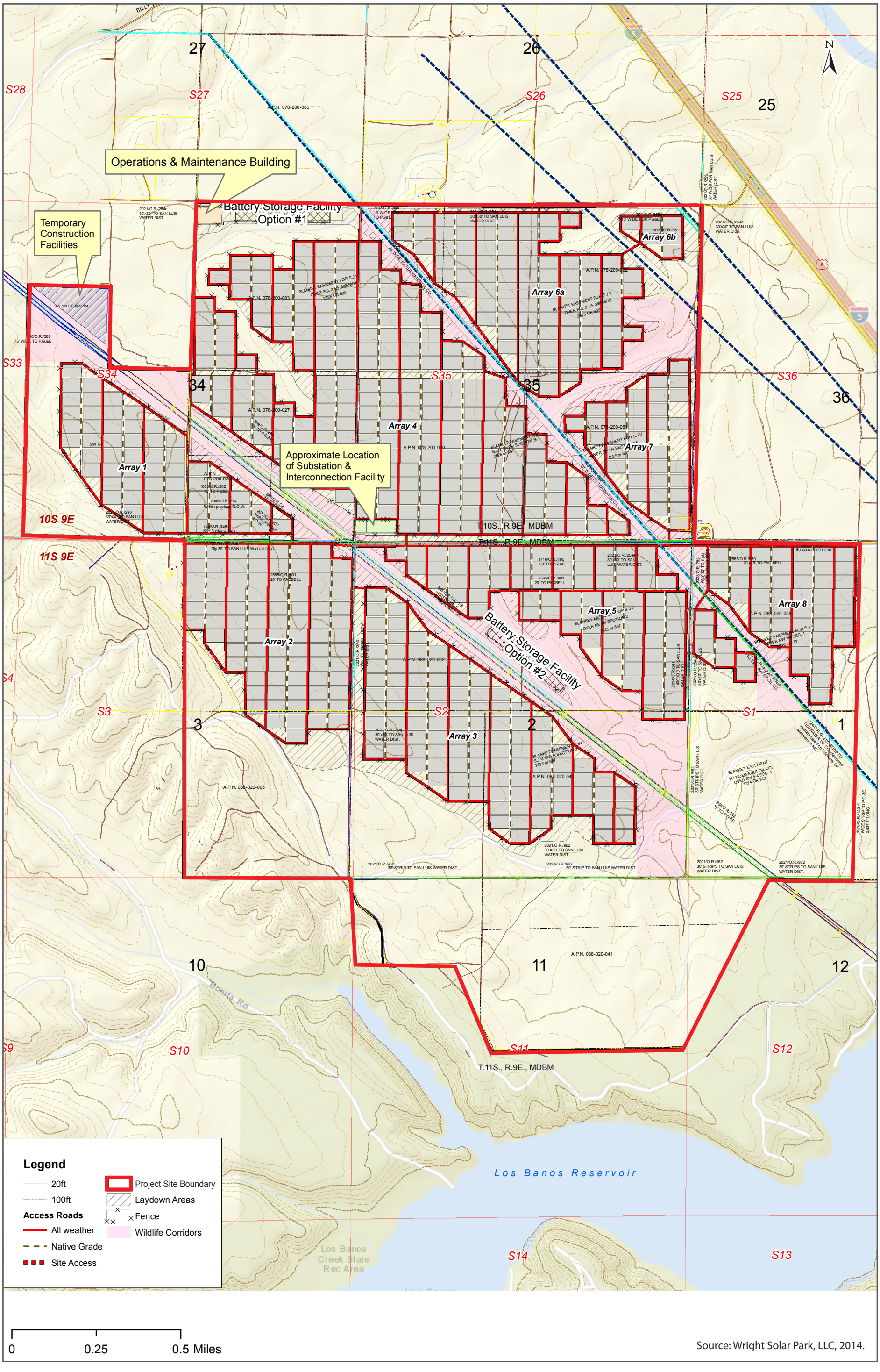

Figure 2-1
Site Plan

Source: Wright Solar Park, LLC, 2013.

Graphics ... 0055213 (3-17-2014)

Figure 2-2
Construction Access and Haul Routes

construction and support facilities include: construction trailers and storage sheds, sanitary facilities, including drinking water, and waste disposal services. Two offsite rural road intersections would need to be improved to allow temporary access by large equipment and tractor-trailer delivery vehicle. As shown in Figure 2-2, there are two options for access off of Billy Wright Road, one close to Interstate (I-) 5 and one closer to the project site.

All temporary facilities will be removed once construction is complete.

Site Disturbance, Grading, and Compaction

The intent of the grading for the solar development is to adhere to the pre-existing contours of the terrain as much as possible. However, grading is needed in some areas to achieve the solar panel design standard of 15% maximum slope for north and south aspects. Earthwork would focus on cut and engineered fill as necessary to create finished grade slopes suitable for panel installation.

Site grading for inverter pads, the switching station, roads, arrays, battery storage, and other improvements would generate in Approximately 3,111,000 cubic yards of grading soil or other materials are assumed for inverter pads, the switching station, roads, arrays, battery storage, and other improvements. Approximately 82,000 cubic yards of material (mostly gravel for all weather roads) would be imported to the site. Soil compaction, soil strengthening agents, or geo fabric may be used to allow safe access within the internal and circulation roads. Compaction may also be required for the construction of inverter pads, the switching station, and control rooms. Road construction would require soil conditioning to achieve proper compaction. Roads and other work areas would be periodically sprayed with water to reduce dust.

Fire protection improvements would consist of perimeter and evenly dispersed interior access roads with a 20-foot minimum width to be constructed of all-weather aggregate base.

Equipment Installation

To support the PV panels, the project would utilize a fixed-tilt mounting system or a single-axis tracking system designed to optimize power production of the panels by ensuring proper orientation to the sun throughout the day and seasons. Should new technology, which makes the collection of solar energy more efficient, become available during the permit term, installation of those components to existing infrastructure would occur. Installation would occur within the current footprint of the facility and no increase in the overall footprint of the solar facility would occur. Figure 2-3 shows a typical installation of a single-axis tracking system. The fixed-tilt mounting and single-axis tracking systems are supported by metal piers driven or screwed into the ground. The machines required for pile driving are similar to those found on highway construction jobs used for driving guard rail piers. Pier placement begins with a precise surveyed layout, ensuring proper positioning of remaining tracker assembly parts. Affixed to the top of each pier is a pier cap and bearing assembly that supports and allows proper movement of the torque tube assembly. The torque tube assembly serves two purposes: to provide an attachment point for the panels, and to move through the range of positions needed to optimize panel production. Single-axis tracking systems require a drive system that provides directional force to the torque tube. This can be accomplished with either a mechanical or hydraulic drive arm and tube assembly that “pushes and

pulls" the torque arm through its range of motion or by a geared assembly that redirects rotational force to the tubes. Both approaches require a small geared motor or hydraulic system mounted on a pile support or pad strong enough to move the system through its daily range of motions. When final, installations will be approximately eight feet tall.

Shielded cables would be used throughout the solar field. All shielded electrical cables would be directly buried to a depth of between 42 inches and 48 inches. Conduit would not be installed around buried electrical wiring as conduit would not allow for proper heat dissipation. Any cables or wiring that runs between the ground and the panels will be appropriately protected to avoid gnawing by fossorial mammals.

Figure 2-3. Typical Installation of a Single-Axis Tracking System

Tracking System

To facilitate wildlife movement through the area, the project design incorporates multiple wildlife-friendly pathways through the project site, as illustrated on Figure 2-1. The incorporation of the wildlife corridors into the project design is intended to allow for the use of portions of the site and prevent a complete barrier to movement due to the project. The preliminary design specifies that the distance between rows of the trackers would be between 6.5 feet and 8.5 feet, and row length would be no longer that 150 feet on each side of the drive arm assembly.

Project Substation

The substation is the portion of the system where project power is transformed to match the specification of the interconnection into the electrical grid. The project substation is characterized as having a low side and a high side, as defined by the point of power transformation from 34.5 kilovolts (kV) (low side) stepped up in voltage to match the grid specifications in the transmission system (high side). In the case of the project, the power would be stepped up to 230 kV at the project substation. The footprint of the substation would be approximately 2.1 acres.

Project Transmission Line

The project includes an electrical transmission line ("gen-tie line") to connect the project to generation facilities owned and operated by PG&E. The gen-tie line would be composed of a span of three conductors between the project substation dead end structures and the adjacent switching station dead end structures. The line would be less than 500 feet in length, and sizing of the

conductor would be relative to the exact length of the span necessary for the project and the avoidance of calculated line losses. The dead end structures on both sides of the facilities would also carry a fiber communications system between the control rooms of the facilities.

Switching Station and Point of Interconnection

A project switching station would be located within approximately 200–500 feet of tower #92 of the Los Banos-Panoche 230-kV line. The switching station would include breakers, switches, meters, and related equipment, as required by the interconnection provider. The switching station would provide a point of isolation for the solar generation facility and for the two circuits of the transmission line. After the switching station is built and tested, PG&E would have the ability to isolate circuits of the Los Banos-Panoche 230-kV line.

The switching station facility would have its own perimeter fencing that would be independent from the project fence line and would be directly accessible by the facility operator. At the conclusion of construction, the switching station would be owned and operated by PG&E, per the Large Generator Interconnection Agreement (LGIA). PG&E would control all access to inside the perimeter of the switching station.

Battery Storage Facility

As part of the project, a Battery Energy Storage System (BESS) would be constructed within the solar facility to provide dispatchable energy under various operating conditions. The ability to store energy would improve the project's operability and enhance the integration of as-available solar-generated energy resources into the transmission network by offering additional ramp rate control and more consistent energy flows. The BESS would be constructed as a single building facility, the footprint of which would be up to 4 acres.

Perimeter Fencing Design and Lighting

To maintain the security of the facility, a perimeter fence would be constructed around each of the eight solar arrays shown in Figure 2-1 (Arrays 6a and 6b are discontinuous and would be fenced separately). Exclusionary fencing, installed around the solar arrays, would preclude the use of the solar array areas by large ungulates, such as elk; however, this fencing is designed to allow virtually unimpeded movement within the project site by small animals, including all three of the covered species. Fence design, such as leaving a 4-inch clearing from bottom of the fence, is intended to allow San Joaquin kit fox to move freely into and out of the project site, while disallowing predators (e.g., coyotes) from entering the site. A more in depth discussion of how these features have been used to successfully avoid impacts to San Joaquin kit fox on similar project in California is provided in Chapter 5, *Conservation Strategy*.

There would be no lights on the perimeter of the solar arrays. Lights would be installed at the switch yard and at the substation for ongoing maintenance and security purposes. Low-level lighting would be installed at entry and egress gates at strategic locations around the facility. Security lighting would be set up to use infrared or FLIR technology. All project lighting would be shielded and directed downward to minimize the potential for glare or spillover onto adjacent ownerships. Lights

will use amber colored lenses when possible and be shaded from producing upward escaping light. Lighting would be used from dusk to dawn and switched lights, only activated when workers are present, can be installed and left in the off position until needed or as code requires. Project lighting would conform to National Electric Safety Code (NESC) requirements and all applicable Merced County outdoor lighting codes.

2.2.2 Operations and Maintenance Activities

Operation and Maintenance Facility

The proposed project includes an Operations and Maintenance (O&M) facility that would consist of a pre-engineered 35-foot by 100-foot metal building that would rest on a 10-inch concrete slab.

Septic

The O&M facility would need a potable water supply to provide minor anticipated needs of the staff. Within the O&M facility would be restroom facilities. Standard break room plumbing would also be needed. An engineered and approved septic system would be installed, and would be gravity fed from the facilities' plumbing. Septic system permits would be obtained and strictly adhered to in the installation.

Water

For operations, an onsite groundwater well would be drilled during construction, and would be primarily utilized for the O&M building's water system, for panel washing, and for maintenance. Water would be supplied from the well to up to a 50,000-gallon water tank, or several smaller tanks totaling 50,000 gallons, would be installed near the O&M facilities. Irrigation water would be obtained through water allocation from existing landowners' approved rights to irrigation water from the San Luis Water District.

Facility Maintenance

Facility O&M would include the periodic maintenance of buildings, solar panels, and solar components, as well as the internal road network. The level of vehicle activity entering and leaving the site during operation would be limited to scheduled and emergency maintenance visits and monthly delivery vehicles. Scheduled solar park maintenance would occur in the early evening or early morning hours to avoid interference with the project's peak hours of generation, no later than 10:00 p.m. and no earlier than 4:00 a.m. However, if possible, all operations and maintenance activities will occur during daylight hours. Maintenance activities that require taking the facility out of service are typically conducted at night, when the facility is not generating power. If operations and maintenance activities are required when it is dark, they would be conducted under the supervision of a qualified biologist. Unscheduled emergency maintenance would occur at any time; however daylight maintenance and emergency service would be strongly encouraged to maximize worker safety.

Panel Washing

Project maintenance would require water for washing dust from the solar panels; this task would take place up to four times per year. Approximately 500,000 gallons of water would be used to clean the panels per year. Panel washing would take place during daylight hours. It is anticipated that the O&M well would be sufficient to provide this quantity, as panel washing extends over several days, thereby giving water supplies time to recharge the 50,000-gallon water tank during nighttime hours.

Vegetation Maintenance

Vegetation maintenance would be required on the project site to reduce the risk of fire. Mowing would be utilized to keep vegetation down along the base of the solar panels and manage the open areas of grassland. Mowing would occur two to four times per year.

In lieu of mowing a grazing program to control vegetation and manage the grasslands within the project site may be utilized. Sheep grazing provides a cost effective and efficient alternative to mowing. Grazing, which occur April through June, would keep residual dry matter down and reduce the risk of fire. Shepherds would be present the entire time the sheep are present at the project site and will typically be finished within two weeks.

2.2.3 Site Decommissioning

Site decommissioning may occur at the end of the permit term. However, if it is in the operators financial and economic interest, it is preferred that the facility be repowered using the existing infrastructure within the current footprint. The applicant will secure a new incidental take permit prior to the continuation of the existing facility or construction of any new facility that would replace this facility. If the operator decides that the facility is no longer a viable option, decommissioning would occur at the end of the life of the project, expected in 2051.

While most structures would be removed during decommissioning, some improvements may be left to enhance agricultural operations following removal of the solar generating facility. A detailed Decommissioning and Site Reclamation Plan consistent with the HCP and the terms of the incidental take permit would be reviewed and approved by the County and the USFWS. The final permitted decommissioning plan would explain how some roads and other features may be left in place to accommodate more efficient farming practices. The decommissioning and restoration process would involve the removal of all aboveground structures except for the switching station, restoration of topsoil, revegetation, and seeding. Temporary erosion and sedimentation control Best Management Practices (BMPs) (see Chapter 5, *Conservation Strategy*) would be used during the decommissioning phase of the project. Equipment that would be removed includes electrical wiring, equipment on the inverter pads, the BESS, and the interconnection transformer pad and associated equipment.

Removal of the solar modules would involve removing the tracks to which the solar panels are attached and placing them in secure transport crates, and then into a trailer for storage and ultimate transport to another facility. The bolts and reusable fasteners that attached each solar module to the tracks would be removed and saved for reuse. Once the solar modules were

removed, the tracks would be disassembled and the structures supporting the tracks would be removed.

The substation will be lowered and removed from the site. All oils used for cooling of the step up transformer and any breakers will be pumped out and removed from site and recycled. Any gas used in breaker assembly will be "de-gassed" through appropriate protocols removed from the site safely. All concrete foundations for the steel structures will be broken up, reinforcement bar removed, and the clean concrete removed from site to be used as clean fill. All structures greater than 4 feet in buried depth will be left in place. The switching station, which will be deeded to PG&E at the end of construction per the LGIA, will exist on the site in perpetuity

All other aboveground site infrastructure, including fences, awnings, and the concrete pads that supported the inverters, transformers, and related equipment, would be removed. The fences and gates would be removed, and all materials would be recycled to the greatest extent possible. All debris would be removed from the area. The battery storage and operations and maintenance buildings will be retained to facilitate agricultural practices on the restored site. All native grade roads will be reclaimed as part of the overall site grading and soil restoration. Graveled all weather roads will not be reclaimed as they can now be incorporated into best management practices of future agricultural activities.

2.2.4 Activities Associated with HCP Implementation

Activities associated with HCP implementation include all management, avoidance and minimization, and monitoring actions required by the HCP that have the potential to take the covered species, or other actions that might be necessary to achieve HCP biological goals and objectives. Management actions that would be used onsite and offsite are described in detail in Chapter 5, *Conservation Strategy*.

The primary focus of the avoidance and minimization measures is to avoid or minimize take of individuals of covered species (i.e., death or injury to species) and impacts to high-quality habitat, such as grassland areas that may be affected by covered activities. Others forms of take (e.g., harm or harassment of covered species) may still occur.

Habitat Management on Mitigation Lands

Habitat management on the mitigation property will be governed by a Habitat Management Plan (HMP) that is approved by the USFWS. Grassland areas onsite but outside the project area would be set aside as onsite mitigation. These grassland areas would be managed for the covered species (continued to be grazed or mowed, no rodenticide usage, remain permeable for kit fox movement). Livestock grazing would be conducted under a grazing management plan with specific guidance on grass height and residual dry matter on the site to protect the grasslands and allow them to continue to function as kit fox habitat. During years of extreme weather such as drought or above average rainfall, the grazing intensity will be adjusted to properly meet the grass height and RDM criteria. Ponds would be managed as part of grazing operations but also to enhance breeding opportunities for California tiger salamander. All mitigation lands would adhere to County ordinances regarding fire protection, fire breaks, and fire management. Roadways would be

maintained to allow access by the grazing tenant and those monitoring the conservation easement. Fencing would be maintained around the perimeter of all mitigation sites to reduce vandalism and theft. New fencing would be installed where necessary to appropriately manage livestock in a way that maximizes the habitat value for San Joaquin kit fox and other native species. Targeted invasive plant management activities may be necessary to prevent invasion by pest plant species.

Monitoring

The type and level of monitoring was designed to ensure that the biological objectives of this HCP are achieved and are commensurate with the level of impact on the covered species described in Chapter 4. The mitigation lands would be monitored following the completion of construction of the project. The primary goal of effectiveness monitoring is to ensure habitat on mitigation areas remains suitable for the covered species. Effectiveness monitoring is habitat-based because monitoring the number of individuals or population on a particular mitigation area could prove inconclusive due to the rarity of the species and the fact that kit foxes frequently move.

Chapter 3
Physical and Biological Resources

3.1 Introduction

This chapter presents an overview of the physical and biological setting of the area encompassing the WSP site and the proposed mitigation site. It describes the baseline physical and biological conditions upon which the impact analysis (Chapter 4) and conservation strategy (Chapter 5) are based. The chapter also describes how existing data were used and new data collected to create the baseline inventory.

In addition, this chapter explains how the land cover types, natural communities, natural disturbances, and current management of the land are interrelated to provide a context for the management of physical and biological resources. The land cover types section identifies the methods used to classify, review data, and map the land cover of the permit area. The biological setting is described in terms of the covered species ecology and distribution of natural communities.

3.2 Physical Setting

This section describes the physical setting of the permit area including location, topography, geology, soils, climate, and hydrology. Data sources used to map and describe the physical setting of the study area are listed below.

- U.S. Geological Survey and California Geological Survey data on topography and hydrology.
- True-color aerial imagery.
- Soil survey information (Nazar 1990).
- Soil survey geographic data (SSURGO) from Natural Resources Conservation Service (Natural Resource Conservation Service 2013).
- Draft Biological Resources Report for Wright Solar Project (Ecology and Environment 2013).

3.2.1 Location

The project site is located in western Merced County, California, approximately 2.7 miles southeast of Santa Nella, and approximately 6 miles southwest of Los Banos. The project site is accessed via Billy Wright Road off of State Route (SR) 33/152. Interstate (I-) 5 passes the project site 0.21 mile to the east in a north western direction. O'Neill Forebay is approximately 3 miles to the northwest and the Los Baños Reservoir is approximately 0.5 mile south (Figure 1-1).

3.2.2 Topography

The project site is situated in the San Joaquin Valley, at a transition zone from the flat lowlands of the Central Valley to the rugged terrain of the Inner Coast Ranges. The site is characterized by a mostly flat topography with gently rolling hills in the southern and western portions, where the project site meets the edge of the eastern foothills of the Southern Coast Ranges. Elevation within the site ranges from 281 feet above sea level at the lowest point to 715 feet at the highest point.

The lands directly to the north and east of the project site are characterized by low, even, flat topography. Some areas have experienced a large amount of subsidence since the agricultural development of San Joaquin Valley in the mid-1900s. Much of the subsidence in this area was due to over pumping of artesian basins. In one area near the San Joaquin River near Los Banos, the ground was subsiding at a rate of 1.8 feet per year. However, this rate has slowed with the introduction of imported water from the north (Norris and Webb 1990).

The lands directly to the south and west of the project site are characterized by low rolling foothills of the Diablo Range. Within Merced County, the Diablo Range reaches a height of 3,804 feet at Laveaga Peak, 13 miles southwest of the project site, on the border between Merced County and San Benito County.

3.2.3 Geology

The project site is located in the Great Valley Physiographic Province, which extends through the central portion of the state, spanning the lowlands between the Coast Ranges and the Sierra Nevada Range (Norris and Webb 1990).

Most of the project site is underlain by the Panoche Formation of the Upper Cretaceous period, consisting of predominantly shale in the lower part becoming predominantly indurated arkosic sandstone with minor conglomerate in the upper part. The area is interspersed with beds of Los Banos Alluvium of the Middle-Late Pleistocene, consisting of silt, sand, and gravel derived from the Coast Range (Wagner et al. 1991).

The project site is located within the Ortigalita fault zone and is bisected by the O'Neill fault, extending southeast from the O'Neill Forebay damface (Wagner et al. 1991). The Ortigalita fault zone is a major Holocene dextral strike-slip fault that comprises the eastern portion of the larger San Andreas Fault system (Bryant and Cluett 2000). According to the U.S. Geological Survey (USGS), no historic earthquakes are registered for the Ortigalita fault zone, but it has been reported that a portion of the fault last ruptured at some point between 10,000 years ago and 35,000 years ago, during the latest Pleistocene time (Bryant and Cluett 2000).

3.2.4 Soils

The soils of the project site occupy the Coast Range foothills, low terraces, and alluvial fans of the San Joaquin Valley (Nazar 1990). Below is a description of the soil map units present on the project site, which are illustrated in Figure 3-1.

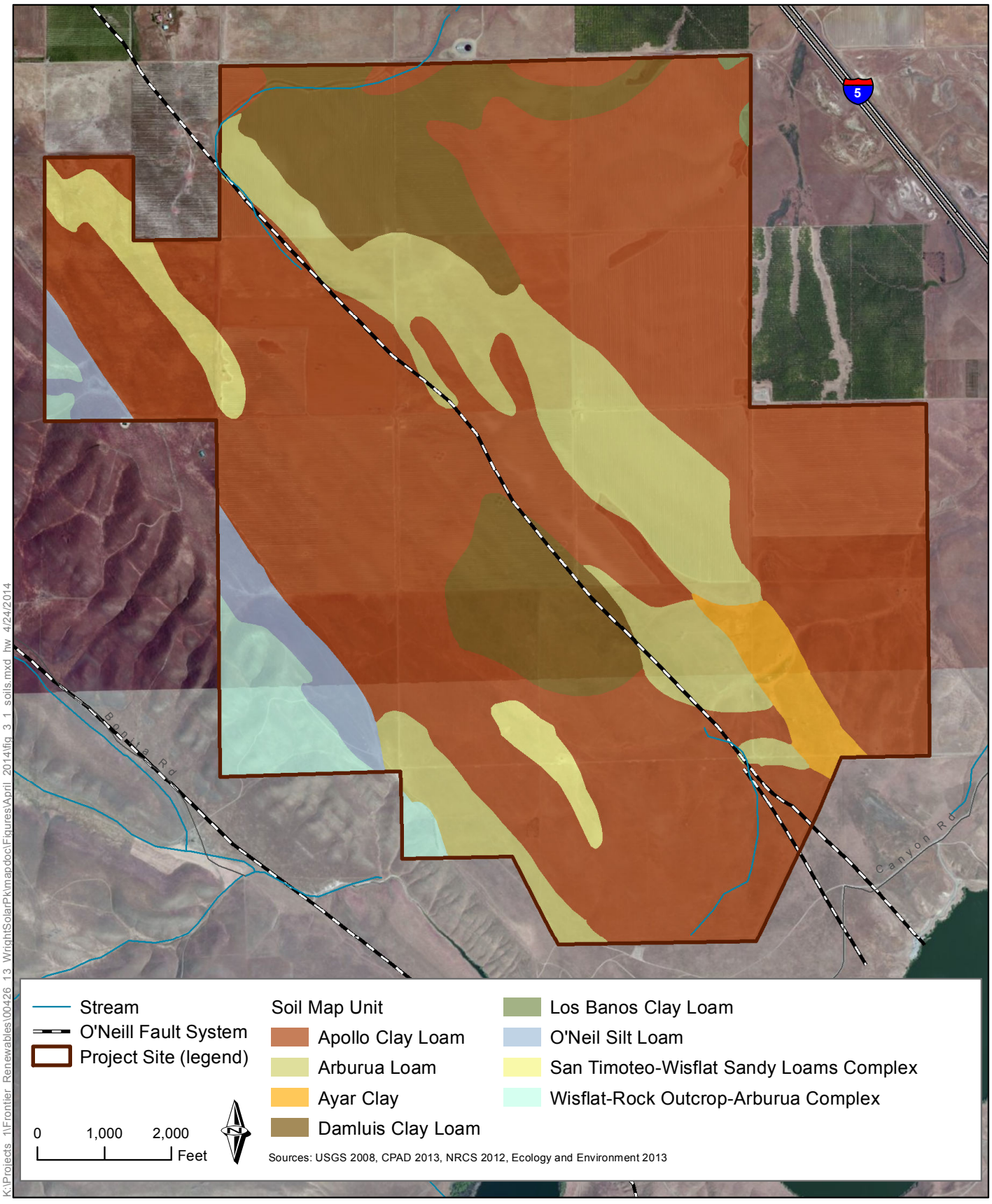

Figure 3-1
Soils in Project Area

Apollo clay loam is a deep, well-drained soil found on low foothills. It formed in material derived dominantly from soft, calcareous shale and sandstone. Most areas of this soil unit are used for irrigated crops, mainly cotton, sugar beets, barley, grain sorghum, and beans.

Arburua loam is a moderately deep, well-drained soil found on foothills. It formed in material derived dominantly from calcareous shale and sandstone. The characteristic plant community is mainly soft chess (*Bromus hordeaceus*) and foxtail fescue (*Vulpia myuros* var*. hirsuta*). This soil unit is used mainly as rangeland or as wildlife habitat.

Ayar clay is a deep, well-drained soil found on foothills. It formed in material derived dominantly from calcareous shale and sandstone. The characteristic plant community is mainly wild oat (*Avena fatua*) and red brome (*Bromus madritensis* subsp. *rubens*). Most areas of this unit are used as rangeland and wildlife habitat.

Damluis clay loam is a very deep, well-drained soil found on low terraces. It formed in alluvium derived from various kinds of rock. The characteristic plant community in areas not cultivated is mainly soft chess and filaree (*Erodium* sp.). Most areas of this unit are used for irrigated crops, mainly alfalfa, walnuts, beans, sugar beets, and cotton.

Los Banos clay loam is a very deep, well-drained soil found on leveled terraces. It formed in calcaereous gravelly alluvium derived from various kinds of rock. Most areas of this unit are used for irrigated crops, mainly walnuts, beans, tomatoes, alfalfa, and cherries. A few areas are used for homesite development.

O' Neill silt loam is a moderately deep, well-drained soil found on foothills. It formed in material derived dominantly from calcareous shale and sandstone. The characteristic plant community is mainly soft chess and wild oat. This unit is used mainly as rangeland; it is also used as wildlife habitat.

San Timoteo-Wisflat sandy loams complex is found on low foothills. The characteristic plant community on the San Timoteo soil is mainly soft chess wild oat, and filaree, and on the Wisflat soil it is mainly red brome and soft chess. The unit is 50% San Timoteo sandy loam and 40% Wisflat sandy loam. This unit is used mainly as rangeland; it is also used as wildlife habitat.

Wisflat-rock outcrop-Arburua complex is found on foothills. The characteristic plant community on the Wisflat soil is mainly red brome and soft chess, and on the Arburua soil it is mainly soft chess and foxtail fescue. This unit is 35% Wisflat sandy loam, 30% rock outcrop, and 20% Arburua loam. This unit is used mainly as rangeland; it is also used as wildlife habitat.

Wisflat-Rock outcrop-O' Neill complex is on foothills. The characteristic plant community on the Wisflat soil is mainly red brome and soft chess, and on the Wisflat soil is mainly red brome and soft chess, and on the O' Neill soil it is mainly soft chess and wild oat. This unit is used mainly as rangeland; it is also used as wildlife habitat.

3.2.5 Climate and Hydrology

Climate

The Mediterranean type climate of Merced County is typical of the San Joaquin Valley, characterized by extended periods of precipitation during the winter months and virtually no precipitation from spring through autumn. Summers are hot and dry and winters are mild with infrequent cold spells. The wet season generally extends from November through April, while rainfall from May through October tends to be minimal. The permit area is on the western side of the Merced County and the San Joaquin Valley, which has a hot, dry climate. Wind in the region has a strong influence on climate, with prevailing winds generally coming from the west. The strongest winds in the region occur from April through August, and velocities can reach 30 to 40 miles per hour. Low rainfall in the permit area is caused by the *rain shadow* of the Diablo Range—an area of reduced precipitation on the sheltered side of a mountain that results from the warming and drying of air. Rainfall occurs mostly in the winter, and averages only 10.36 inches per year (U.S. Bureau of Reclamation 2013).

Hydrology

Merced County is located in the center of the San Joaquin River drainage basin. Surface water is governed by the climate of the region and by watersheds producing streamflow that enter the area. Streamflow is produced by local and basinwide rainfall in addition to snowmelt from the Sierra Nevada. Dams and reservoirs regulate all the major streams and rivers contributing flow into Merced County. Water diversions for agricultural, municipal, habitat restoration, and industrial uses occur upstream of and within the County.

The hydrology of the entire project area has been modified over the past 15 years, as assessed from the historic aerial photography record dating back to 1998 (Ecology and Environment 2013). Consistent agricultural use and the placement of numerous soil berms, artificial impoundments (i.e., ponds and ditches likely created for irrigation and drainage purposes), and bermed access roads have physically altered the natural hydrology and aquatic habitats within and surrounding the area. The water patterns across the site are highly fragmented, and in conjunction with frequent soil disturbance and compaction, most water onsite is directed to flow quickly off the site. Thus, these modifications have resulted in aquatic systems that under normal conditions held water occasionally as driven by seasonal precipitation and now have become increasingly erratic with diminished water-holding capacity. Further, as the site is dry-farmed and no longer irrigated for crops (likely since 1998), the aquatic habitats are currently highly ephemeral and generally dry throughout the year. None of the features held surface water during all site visits in 2011–2013.

Eight ephemeral swales, one emergent wetland, one vernal pool wetland, thirteen ponds, and four drainage ditches were identified in or directly abutting the project area. None of these delineated features have an associated riparian zone or the potential to support such a community due to the current hydrological environment and as sited within the agricultural landscape (Ecology and Environment 2013).

3.3 Land Use

3.3.1 Agriculture

Agriculture is the prominent land use in the County, accounting for more than 90% of all land area. Merced County is ranked fifth among all counties in California and sixth in the nation in the annual market value of farm products. Rich soils, accessible irrigation water, favorable climate, a large labor force, and reliable access to local, national, and global markets make Merced County a thriving agricultural community.

The Merced County zoning designation for the WSP project site, which is dry-land farmed due to the lack of available surface or groundwater, is Exclusive Agriculture (A-2). More than 70% of the site is currently and consistently planted in dry-farmed hay crops such as winter wheat (*Triticum sp*.). In a typical year, this means that from late fall through early spring these crops densely cover the cultivated parcels at heights of 2–4 feet, depending on various factors.

Lands designated Agricultural are generally located on the valley floor or margins of the valley floor and are intended to be used for cultivated agricultural uses that rely on good soil and water quality, adequate water availability, and minimal slopes. Many noncultivated agricultural uses may also occur in these areas. Some locations within areas designated Agricultural have high open space value for recreation or wildlife. Other land use activities include livestock facilities and agricultural commercial facilities. Certain nonagricultural uses are allowed, including mineral resource extraction and processing, outdoor public and private recreational facilities, and accessory uses.

3.3.2 Existing Open Space

In 2002, the Agua Fria Conservation Bank was established in western Merced County immediately adjacent to the northwest of the project area to provide credits for the preservation of San Joaquin kit fox (*Vulpes macrotis mutica*) and burrowing owl (*Athene cunicularia*) habitat. This conservation bank preserves 136.7 acres of suitable habitat. Additionally, immediately to the south of the project site is the Los Banos Creek Reservoir which is part of the San Luis Reservoir State Recreation Area. Though not established to specifically protect San Joaquin kit foxes, the area within the State Recreation Area surrounding Los Banos Creek Reservoir does protect suitable habitat for the species and provides protected areas to serve as movement corridors.

3.4 Biological Resources

3.4.1 Land Cover

A *land cover type* is defined as the dominant character of the land surface discernible from aerial photographs, as determined by vegetation, water, or human uses. Land cover types are the most widely used units in analyzing ecosystem function, habitat diversity, natural communities, wetlands and streams, and covered species habitat. The land cover of the project site and proposed mitigation area is shown in Figures 3-2a and 3-2b. The source of the land cover data is from site

visits conducted in February and May 2013 (Ecology and Environment 2013). Each land cover type found on the site is described below.

California Annual Grassland

California annual grassland or nonnative grassland is an herbaceous plant community dominated by nonnative annual grasses found throughout most of California primarily below 3,000 feet in elevation. The annual grasses make a dense to sparse groundcover and are often associated with numerous species of showy, native annual wildflowers, especially in years of ample rainfall. The grasses and flowers germinate with the onset of the late fall rains. Growth, flowering, and seed-set occur winter through spring. With few exceptions, the plants die by the summer, yet these species persist as seeds until the winter rains.

Grasses are less than 1 meter (m) in height and the canopy is continuous to open. Characteristic nonnative species in this plant community are red brome, soft chess, ripgut brome (*Bromus diandrus*), hare barley (*Hordeum murinum* ssp*. leporinum*), slender oats (*Avena barbata*), wild oats Italian ryegrass (*Lolium multiflorum*), foxtail fescue, broadleaf filaree (*Erodium botrys*), other filaree species, and bur-clover (*Medicago polymorpha*). The dominant grass species within the survey area were ripgut brome and red brome (Ecology and Environment 2013).

Native plant species typically found in California annual grassland include few-flowered fescue (*Vulpia microstachys*), fiddleneck species (*Amsinckia* sp.), California poppy (*Eschscholzia californica*), California goldfields (*Lasthenia californica*), other goldfield species (*Lasthenia* sp.), peppergrass species, tarweed species (*Centromadia* sp.), lupine species (*Lupinus* sp.), gilia species (*Gilia* sp.), purple owls-clover (*Castilleja exserta*) and other owls clover species (*Orthocarpus* sp. and *Castilleja* sp.). Dominant nonnative forbs observed on the WSP included summer mustard (*Hirschfeldia incana*), London rocket (*Sisymbrium irio*), perennial pepperweed (*Lepidium latifolium*), wild lettuce (*Lactuca serriola*), horehound (*Marrubium vulgare*), and filaree species. The only relatively numerous native forb found on the site is Menzie's fiddleneck (*Amsinckia menziesii*) (Ecology and Environment 2013).

Grasslands are important for burrowing rodents such as ground squirrels and gophers, which in turn, provide prey for a variety of other species, including the San Joaquin kit fox. The low vegetation associated with California annual grassland is thought to provide clear views of potential predators of the San Joaquin kit fox. Presence of burrowing species provides burrows for refugia and a substantial prey base. The key characteristics of grassland habitat that contribute to these functions are a high cover of herbaceous vegetation and a low to absent cover of woody vegetation. California annual grassland occupies an estimated 3,101 acres in the permit area, of which 655 acres are on the project site and the remaining 2,446 are on the proposed offsite mitigation area (Table 3.4-1 and Figures 3-2a and 3-2b).

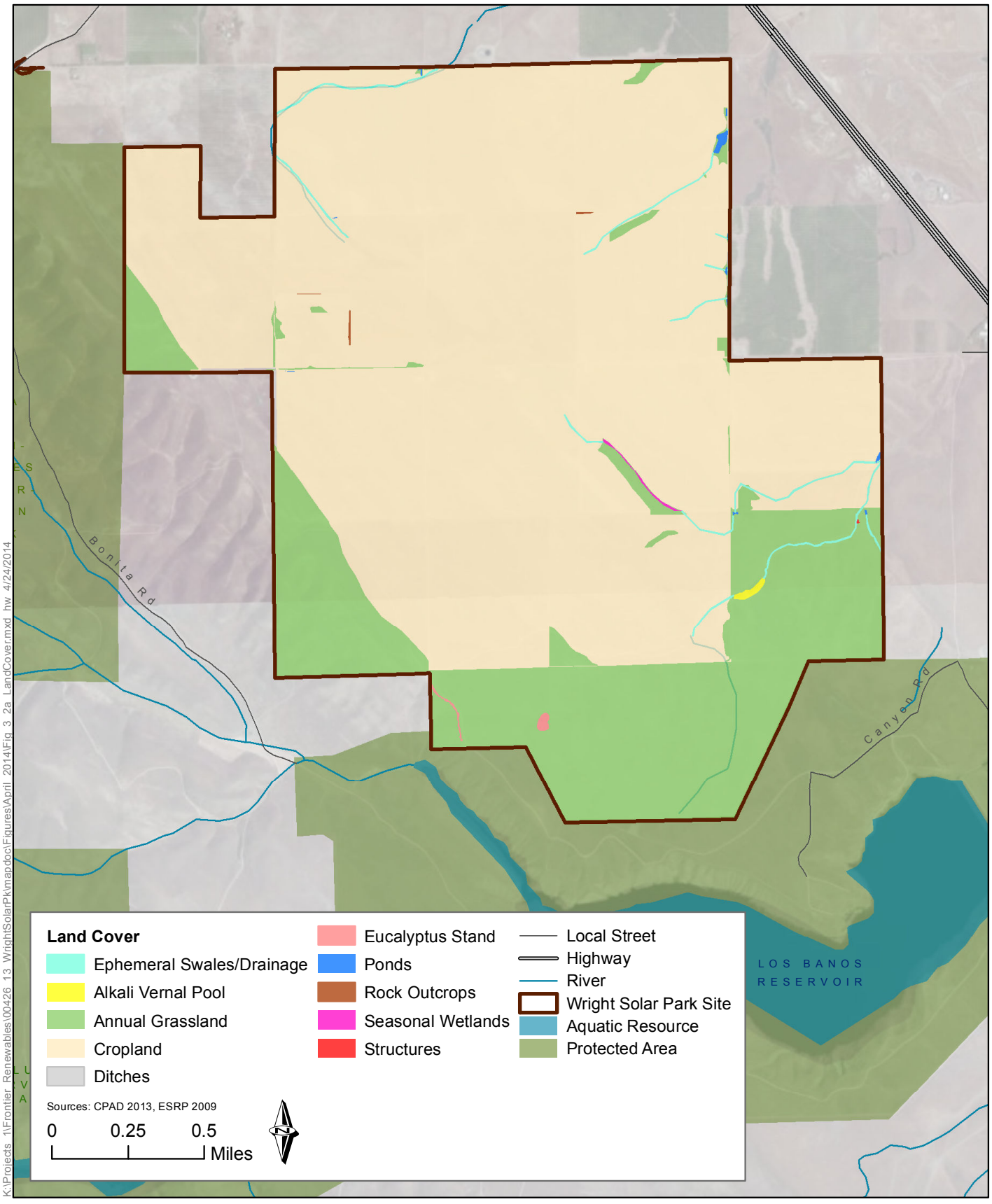

Figure 3-2a
Land Cover in Permit Area

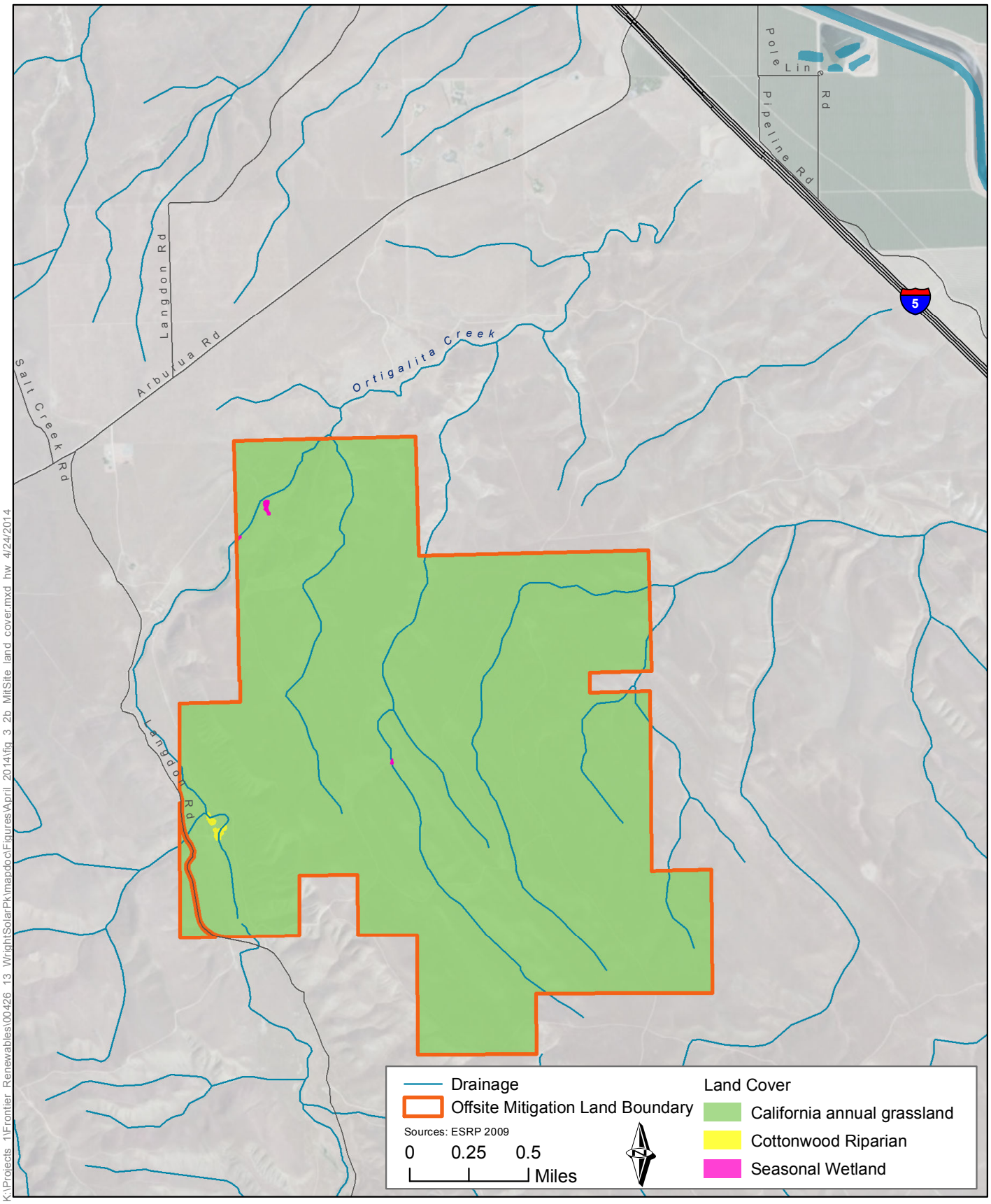

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Figure 3-2b
Land Cover in Permit Area

Table 3.4-1. Land Cover on the Project and Mitigation Sites (acres)

Land Cover Type	Project Site	Offsite Mitigation Lands	Total Study Area
Terrestrial Land Cover			
California Annual Grassland	655	2,446	3,101
Cropland	2,065	–	2,065
Rock Outcrop	0.8	–	0.8
Tree Stands	2.1		2.1
Cottonwood Riparian	–	2	2
Subtotal Terrestrial	2,722.9	2,448	5,170.9
Aquatic Land Cover			
Seasonal Wetland	1.1	1	2.1
Ponds	2.3	–	2.3
Ephemeral Swales	2.3	–	2.3
Ditches	0.2	–	0.2
Alkali Vernal Pool	1.7	–	1.7
Subtotal Aquatic	7.6	1	8.6
Total	2,730.5	2,449	5,179.5

[a] The acreage in the table includes the haul road widening areas but excludes 0.066 acre of existing structures. Land cover types represented in this section are slightly less than the acreages provided for the project site and total study area in other sections of the EA due to rounding.

Cropland (Dry-farmed Agriculture)

Dry-farming is the production of crops, without irrigation, on lands that receive annual rainfall of 20 inches or less. In districts of torrential rains, high winds, unfavorable distribution of the rainfall, or other water-dissipating factors, the term *dry-farming* is also properly applied to farming without irrigation under an annual precipitation of 25 or even 30 inches. In a typical year, this means that from late fall through early spring these crops densely cover the cultivated parcels at heights of 2–4 feet, depending on various factors. The crops are usually harvested in spring, after which the fields are tilled and disced for fire and weed control, and again readied for replanting in early fall. Opportunistic patches of weeds can colonize after the hay fields are mowed and include common ruderal species such as black mustard (*Brassica nigra*), pepperweed species (*Lepidium* sp.), barley (*Hordeum marinum*), hare barley, filarees, ripgut brome, and soft chess (Ecology and Environment 2013). Dry-farmed agriculture occupies an estimated 2,065 acres of the permit area all of which is on the project site (Table 3.4-1 and Figures 3-2a and 3-2b).

Rock Outcrop

Approximately 0.8 acre of rock outcrop is present in the study area in the grasslands along the western edge of the project site. (Table 3.4-1; Figures 3-2a and 3-2b). These outcrops are exposures of bedrock that typically lack soil and have sparse vegetation. Within the project site, rock outcrops are composed of sedimentary rock, primarily sandstone or shale (National Resources Conservation Service 2013).

Tree Stands

No forest or woodland habitats occur at the project site. However, small stands of trees (totaling 2.1 acres) are present at the south end of the project site. A small number of individual trees are also present at scattered locations within the project site. These individual trees are included in and discussed as a component of the tree stand habitat.

An approximately 1.1-acre stand of blue gum (*Eucalyptus globulus*) trees is located at the south end of the project site. Another stand of blue gum trees is located in a line along a dirt road, presumably for a windbreak. Other individual trees within the project site include blue gum, Peruvian pepper (*Schinus molle*), mimosa (*Acacia dealbata*), white mulberry (*Morus alba*), several olive trees (*Olea europaea*), corkscrew willow (*Salix matsudana*), black willow (*Salix gooddingii*), and blue elderberry (*Sambucus mexicana*).

Cottonwood Riparian

Cottonwood is a deciduous tree that thrives on wet sites, especially on floodplains. They are found in and along the margins of the active channel on intermittent and perennial streams. Generally, no single species dominates the canopy, and composition varies with elevation, aspect, hydrology, and channel type. In these areas, cottonwoods can form extensive stands and can grow to up to 120 feet in height. Cottonwood grows rapidly when young and forms dense stands on newly disturbed areas (Ecology and Environment 2013a). Cottonwood riparian occupies an estimated 2 acres of the study area, all of which is on the mitigation site (Table 3.4-1; Figures 3-2a and 3-2b).

Seasonal Wetland

Seasonal wetlands are freshwater wetlands that support ponded or saturated soil conditions during winter and spring and are dry through the summer and fall until the first substantial rainfall. The vegetation is composed of wetland generalists, such as hyssop loosestrife (*Lythrum hyssopifolia*), cocklebur (*Xanthium* spp.), and Italian ryegrass that typically occur in frequently disturbed sites, such as along streams. San Joaquin kit fox may use seasonal wetlands as movement habitat.

The seasonal wetland is located between two gently sloping hillsides, does not have defined banks, and is a seasonal feature with nonpersistent emergent vegetation patches. The wetland likely receives significant water only during high precipitation events. As indicated by the small amount (less than 100 square feet) of emergent vegetation (i.e., bulrush [*Scirpus sp*.]) near the northern berm, this is the only area where persistent ponding has occurred. Wetland vegetation observed onsite included bulrush, toad rush, ripgut brome, barnyard grass *(Echinochloa crus-galli),* and barley. The bulrush and rush plants were last year's emergence, indicating no recent ponding in the 2012/2013 wet season (Ecology and Environment 2013). Seasonal wetland occupies an estimated 2.1 acres in the permit area, of which 1.1 acres are on the project site and the remaining 1 is on the mitigation site (Table 3.4-1 and Figures 3-2a and 3-2b).

Ponds

Thirteen ponds, totaling 2.3 acres, are present at the project site. All of the ponds are anthropogenic features constructed within ephemeral swales/drainages (described below). None of the ponds held

water during the February 2013 wetland delineation and no other evidence of hydrology was reported (Ecology and Environment 2013b). These ponds may hold water seasonally; however based on a review of aerial photographs taken between 1998 and 2013, including the 2005/2006 wet season (an above-average precipitation year for areas north of Los Angeles, California [California Department of Water Resources 2006]), the features do not show any signs of ponding (Google 2013). These ponds may have been constructed to either capture and hold water for livestock or capture and detain water during large storm events to minimize downstream flooding.

Ephemeral Swale

Three ephemeral swale/drainages, totaling 2.3 acres, are present at the project site. The swale/drainages are inundated seasonally during years with normal or above-normal rainfall, primarily during or immediately following rainfall events (Ecology and Environment 2013b). These features consist mostly of swales (areas without a defined channel).

Ditches

Four ditches, totaling 0.2 acre, are present at the project site. All of the ditches are anthropogenic features that are inundated seasonally during years with normal or above-normal rainfall (Ecology and Environment 2013b).

Alkali Vernal Pool

Vernal pools are seasonal wetlands that pond water on the surface for extended durations during winter and spring and dry completely during late spring and summer. They support a typical flora largely composed of native wetland plant species. Vernal pools occur in distinctive topography with low depressions mixed with hummocks or mounds.

The vernal pool located in the permit area is a highly disturbed alkaline vernal pool with little diversity of vegetation species on its edges and completely devoid of vegetation in the center. Plants ringing the border of the wetland were facultative ruderal grasses and forbs, and dominant species were Italian ryegrass, broadleaf filaree, and London rocket. Grazing occurs within and around this wetland, and the shallowness and low density of the hoof prints indicated that the system did not hold significant water for long periods during the winter prior. The alkali vernal pool represents potential breeding habitat for California tiger salamander during a normal wet year, though California tiger salamander breeding in this wetland may be limited by its high salinity and alkalinity. The vernal pool occupies an estimated 1.7 acres on the project site (Table 3.4-1 and Figures 3-2a and 3-2b).

3.4.2 Covered Species

San Joaquin Kit Fox

Legal Status

The San Joaquin kit fox is listed under the state and federal endangered species acts. This species is listed by the U.S. Fish and Wildlife Service (USFWS) as an endangered species under the federal Endangered Species Act (ESA) and as a threatened species under the California Endangered Species Act (CESA). No critical habitat rules have been published for the San Joaquin kit fox. The USFWS (1983) *San Joaquin Kit Fox Recovery Plan* was the initial recovery plan for the species. Subsequently, a recovery strategy for San Joaquin kit fox was included in the *Recovery Plan for the Upland Species of the San Joaquin Valley, California* (Upland Recovery Plan) (U.S. Fish and Wildlife Service 1998). More recently, USFWS completed a 5-year review for the San Joaquin kit fox, and determined that the kit fox continues to meet the definition as endangered (U.S. Fish and Wildlife Service 2010a).

Taxonomy

The San Joaquin kit fox is a subspecies of the kit fox (*Vulpes macrotis*), the smallest member of the dog family in North America. Though there has been some debate as to the taxonomic relationship among North American arid land foxes, the San Joaquin kit fox remains a distinct subspecies due to its limited range in California. The details of this debate are outlined in Dragoo et al. (1990) and Schwartz et al. (2005). Descriptions of the species' physical characteristics can be found in USFWS (1998).

Distribution

Currently, kit foxes occur in some areas of suitable habitat on the floor of the San Joaquin Valley and in the surrounding foothills of the Coast Ranges, Sierra Nevada, and Tehachapi Mountains from Kern County north to Contra Costa, Alameda, and San Joaquin Counties (U.S. Fish and Wildlife Service 1998). There are known occurrences in Alameda, Contra Costa, Fresno, Kern, Kings, Madera, Merced, Monterey, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Santa Clara, Stanislaus, and Tulare Counties. The largest extant populations of kit fox are in Kern County (Elk Hills and Buena Vista Valley) and San Luis Obispo County in the Carrizo Plain Natural Area (U.S. Fish and Wildlife Service 1998).

Occurrences within the Plan Area

Historical

Although the precise historical range of San Joaquin kit fox is unknown, it is believed to have extended from Contra Costa and San Joaquin Counties in the north to Kern County in the south. By the 1930s the range had been reduced to the southern and western portions of the Central Valley (Grinnell et al. 1937). Surveys conducted between 1969 and 1975 extended the known range of the kit fox back into portions of its historical range in the northern San Joaquin Valley, including Contra Costa, Alameda, and San Joaquin Counties (U.S. Fish and Wildlife Service 1998).

Recent

There are several San Joaquin kit fox California Natural Diversity Database (CNDDB) occurrences within 10 miles of the study area (California Department of Fish and Wildlife 2013). In recent years, several studies and projects have occurred in western Merced County which documented the presence of San Joaquin kit foxes in western Merced County. In 2004, ICF, formerly Jones & Stokes, biologists recorded two San Joaquin kit fox occurrences in western Merced County while monitoring for Western Area Power Administration's Path 15 Transmission Line project. One was an adult kit fox observed approximately 12 miles south of the project and the other was a natal den located approximately 2 miles west of the project near the intersection of Billy Wright Road and Jasper Sears Road with one adult and two pups observed (Figure 3-3). On October 7, 2013, ICF biologists conducted a site visit of the project site as well as the proposed mitigation site. During the site visit, the biologists observed San Joaquin kit fox scat at the entrance of a suitable burrow on the proposed mitigation site. On October 29 and 30, 2013, two ICF biologists conducted nighttime spotlight surveys of the proposed mitigation site. The biologists spent approximately 4 hours each night driving existing access roads throughout the proposed mitigation site. The biologists observed one San Joaquin kit fox on each of the evenings surveyed (Figure 3-3).

From 2005 to 2007, biologists from California State University–Stanislaus' Endangered Species Recovery Program (ESRP) conducted extensive San Joaquin kit fox surveys in western Merced County to determine abundance and distribution. Survey methods included remote camera stations, track stations, spotlight surveys, and opportunistic observations. The ESRP also assessed the habitat suitability of accessible areas in western Merced County and conducted a least-cost path modeling exercise to identify potential movement corridors in western Merced County (Constable et al. 2009). The ESRP observed kit foxes on two occasions along Billy Wright Road north of the project site (Figure 3-3). Based on the results of their surveys, the ESRP concluded that kit fox populations are not homogeneously distributed throughout western Merced County. Consistent detections in southern western Merced County (south of SR 152) suggest a resident population may be present whereas the infrequent detections in the north (north of SR 152) suggest that kit foxes may be transient in this area (Constable et al. 2009).

Additionally, the ESRP assessed the distribution of suitable habitat for San Joaquin kit fox in the areas that were identified as the species' range in the 1998 Upland Recovery Plan (Cypher et al. 2013). The areas in western Merced County with natural vegetation near the project site have been ranked as medium to high suitability for San Joaquin kit fox. The areas on the project site itself, which have been, and still are dryland farmed, were ranked as low suitability for San Joaquin kit fox.

Natural History

Habitat Requirements

San Joaquin kit fox inhabits a variety of habitats, including grasslands; scrublands; vernal pool areas; alkali meadows and playas; and agricultural irrigated pastures, orchards, vineyards. They prefer habitats with loose-textured soils and are primarily found in arid grasslands and open scrublands that are suitable for digging. The southern portion of their range is predominately shrubland while the northern and western portion of their range is predominately grassland. Historically and

currently, kit fox abundance is greater in southern shrublands than in northern grasslands (U.S. Fish and Wildlife Service 1998).

Dens generally are located in open areas with grass and scattered brush, and seldom occur in areas with thick brush. Preferred sites are relatively flat, well-drained terrain. They are seldom found in areas with shallow soils resulting from high water tables or impenetrable bedrock or hardpan layers. However, kit fox may occupy soils with high clay content where they can modify burrows dug by other animals, such as ground squirrels (U.S. Fish and Wildlife Service 1998). Land use, terrain ruggedness, and vegetation density are habitat components that are most important to San Joaquin kit foxes. San Joaquin kit foxes prefer habitats dominated by saltbush (*Atriplex polycarpa* and *A. spinifera*) and grassland communities dominated by red brome. They also occur in alkali sink scrubland and grasslands dominated by wild oat, and to a lesser degree in areas that have been highly disturbed, such as agricultural lands and urban areas (Cypher et al. 2013). Kit foxes will den within small parcels of native habitat that are surrounded by intensively maintained agricultural lands and adjacent to dryland farms (U.S. Fish and Wildlife Service 1998). Highly suitable areas are also characterized by flat to gently rolling terrain (<5% slope), with suitability declining as the average slope increases. Additionally, kit foxes prefer arid environments with sparse vegetation and a high proportion of bare ground. Habitat suitability decreases as vegetation density increases (Cypher et al. 2013). Habitat type that occur in the project area are shown in Table 3.4-2.

Table 3.4-2. Habitat Associations for San Joaquin Kit Fox in WSP Permit Area

Land Cover Type	Land Cover Use	Habitat Designation	Habitat Parameters	Rationale
Annual Grassland	Breeding, foraging, movement	Primary	Requires suitable burrows for denning, primarily provided by ground squirrels in the northern portion of the kit fox geographic range. Must be managed to maintain low vegetation height.	Low vegetation is thought to provide clear view of potential predators. Presence of burrowing species provides burrows for refugia and a substantial prey base.
Seasonal Wetland	Same as annual grassland	Same as annual grassland	Same as annual grassland.	Same as annual grassland.
Agricultural	Foraging and movement	Secondary, movement	Improves with the presence of suitable prey.	Periodic discing renders this type of habitat unsuitable for denning and for some prey species.

Source: U.S. Fish and Wildlife Service 1998.

Reproduction

Kit foxes can, but do not necessarily, breed their first year. Sometime between February and late March, two to six pups are born per litter (Cypher et al. 2000). The annual reproductive success for adults ranges between 20 and 100% (mean: 61%) and 0 and 100% for juveniles (mean: 18%) (Cypher

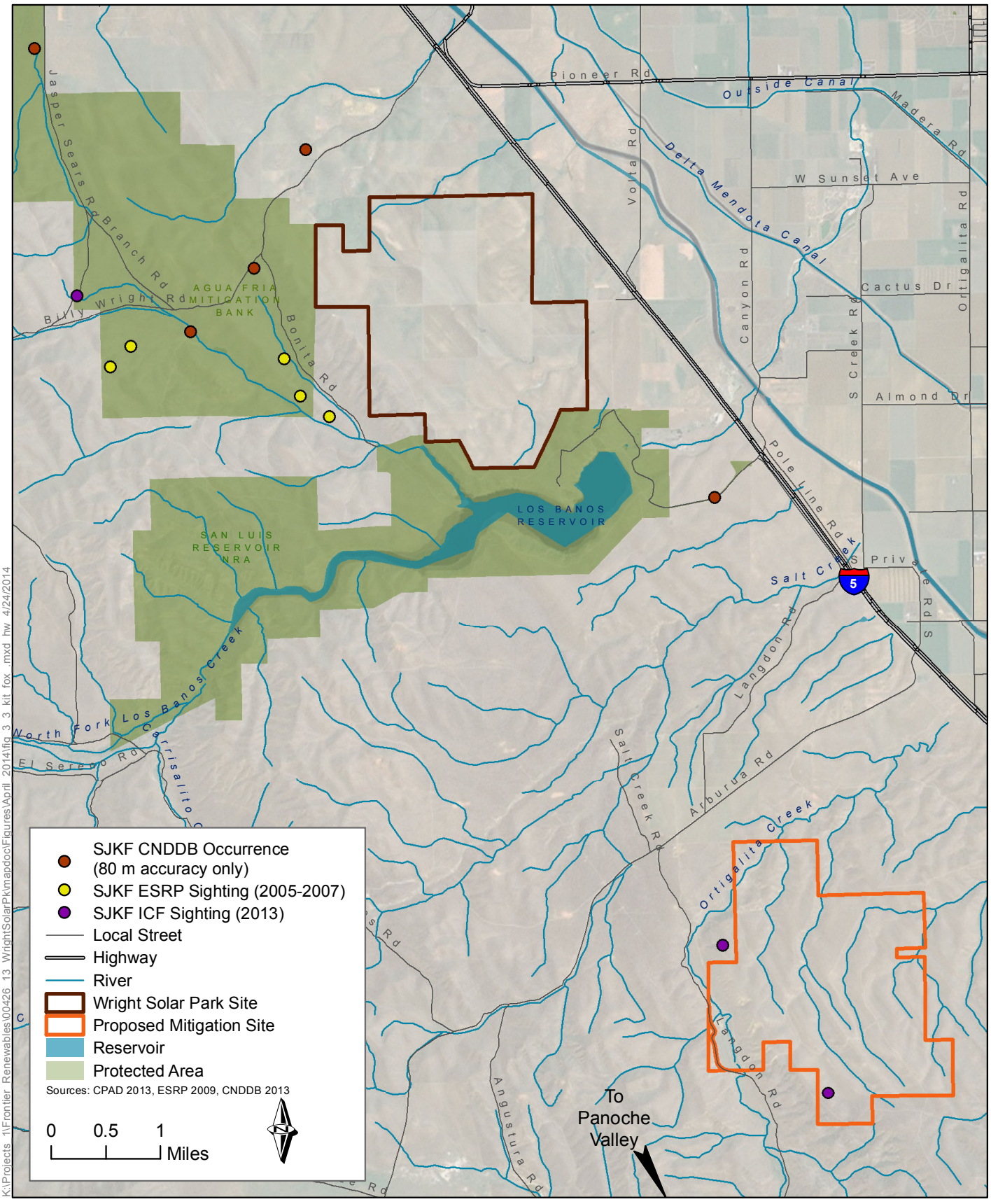

Figure 3-3
San Joaquin Kit Fox Sightings

et al. 2000). Population growth rates generally vary positively with reproductive success and kit fox density is often positively related to both the current and the previous year's prey availability, especially kangaroo rats (Cypher et al. 2000).

Ecological Relationships

San Joaquin kit foxes prey upon a variety of small mammals, especially kangaroo rats, ground-nesting birds, and insects. In many areas of their range, San Joaquin kit fox population and density is correlated to the population and density of kangaroo rats (Cypher et al. 2013). The diet of kit foxes varies with season and geographic locality based on local availability of potential prey. In the northern portion of their range, kit foxes most commonly prey on California ground squirrels, cottontails (*Sylvilagus audubonii*), black-tail jackrabbits (*Lepus californicus*), pocket mice (*Perognathus* spp.), and kangaroo rats, as well as reptiles and insects (U.S. Fish and Wildlife Service 1998, 2010a).

They are in turn subject to predation by coyote (*Canis latrans*), nonnative red foxes (*Vulpes vulpes*), domestic dog, golden eagles (*Aquila chrysaetos*), and large hawks (*Buteo sp.*) (U.S. Fish and Wildlife Service 1998). The main source of kit fox mortality in the natural environment is predation from coyotes (Harrison and Cypher 2011). White et al. (2000) determined that coyotes were responsible for 59% of kit fox deaths during a 4-year telemetry study at Camp Roberts in southern Monterey County.

Movement

The home range of kit foxes can vary greatly and is thought to be related to prey abundance (U.S. Fish and Wildlife Service 2010a). The species can readily navigate a matrix of land use types and may range up to 20 miles at night during the breeding season and somewhat less (6 miles) during the pup-rearing season (Girard 2001). Home ranges in western Merced County average 1,169 acres (1.8 square miles) (U.S. Fish and Wildlife 2010a). The home ranges of pairs or family groups of kit foxes generally do not overlap (White and Ralls 1993). This behavior may be an adaptation to periodic drought-induced scarcity in prey abundance.

Due to the relatively homogenous land cover throughout western Merced County, it is assumed that most of the area west of I-5 and south of Highway 152 could be used by local resident San Joaquin kit fox as movement and foraging habitat. The ESRP assessed the habitat suitability of accessible areas in western Merced County and conducted a least-cost path modeling exercise to identify potential movement corridors within this area (Constable et al. 2009). The ESRP concluded that in order to enhance the long-term viability of populations present in western Merced County, movement corridors connecting this population and the core population in Panoche Valley, to the south, should be maintained.

Threats

Compared with populations in the southern San Joaquin Valley, little is known about the ecology and habitat needs of kit foxes in the northern part of their range. Researchers have consistently indicated that the behavioral ecology of kit foxes in this region is poorly known and may be different from the ecology of foxes in the southern part of their range (U.S. Fish and Wildlife Service 1998).

The northern populations of kit foxes appear to use different prey (ground squirrels instead of kangaroo rats), and their denning habitat appears different (Orloff et al. 1986). In addition, habitat features such as ground cover, dominant vegetation, land use practices, rainfall, and in some areas slope is substantially different in the north than in the south, where kit foxes are more abundant and well-studied. Because of these differences, geographic differences may exist in the demographic characteristics of these populations. However, the threats to the species are likely to be comparable in both regions of their range.

Continued fragmentation of habitat is a serious threat to this species. Increasing isolation of populations through habitat degradation and barriers to movement, such as aqueducts and busy highways, can limit dispersal to and occupancy of existing and former habitat. The threat of being struck by vehicles is high, particularly for dispersing individuals. Habitat alteration also represents a threat to this species. This is known to result from oil extraction and mining activities, changes in wildlife prevalence, and changes in vegetation structure due to nonnative species and altered grazing regimes (U.S. Fish and Wildlife Service 2010a). Livestock grazing is not thought to be detrimental to the kit fox, but it may affect the number of prey species available, depending on the intensity of grazing (U.S. Fish and Wildlife Service 1998). Moderate grazing is thought to benefit the species because it can potentially enhance the prey base and reduce vegetation to allow kit fox to more easily detect and avoid predators. The use of pesticides to control rodents and other pests also threatens kit fox in some areas, either directly through poisoning or indirectly through reduction of prey abundance.

Blunt-Nosed Leopard Lizard

Legal Status

The blunt-nosed leopard lizard is listed by USFWS as an endangered species under the federal Endangered Species Act (ESA) and by CDFW as an endangered species under the California Endangered Species Act (CESA). It is also a fully protected species under California Fish and Game Code. No critical habitat rules have been published for the blunt-nosed leopard lizard. A recovery strategy for blunt-nosed leopard lizard was included in the *Recovery Plan for the Upland Species of the San Joaquin Valley, California* (U.S. Fish and Wildlife Service 1998). More recently, USFWS completed a 5-year review for the blunt-nosed leopard lizard and determined that the blunt-nosed leopard lizard continues to meet the definition as endangered (U.S. Fish and Wildlife Service 2010b).

Taxonomy

The blunt-nosed leopard lizard is relatively large with a long tail and powerful hind limbs. Its size and body proportions are similar to those of the related long-nosed leopard lizard (*Gambilia wislinzenii*), except for the blunt snout (Stebbins 2003). Adult males range in size from 87–120 millimeters (mm) snout-vent length. Females are smaller, averaging 86–111 mm snout-vent length. Adult males weigh between 31.8 and 37.4 grams; adult females weigh between 20.6 and 29.3 grams (U.S. Fish and Wildlife Service 1998).

Males are distinguished from females by a larger head due to larger temporal and mandibular muscles and a larger tail base (U.S. Fish and Wildlife Service 1998). During breeding, females have

bright red-orange markings on the sides of the head and body and the undersides of the thighs and tail. Breeding males develop a salmon or pink skin hue that covers most of the body (Stebbins 2003).

Distribution

The blunt-nosed leopard lizard is endemic to the San Joaquin Valley and surrounding foothills. Historically, this species occurred from Stanislaus County in the north to the Tehachapi Mountains in Kern County in the south. The foothills of the Sierra Nevada and the Coast Ranges roughly define the eastern and western boundaries of its distribution, except for populations on the Carrizo Plain and in the Cuyama Valley west of the San Joaquin Valley. The blunt-nosed leopard lizard is not found above 800 meters (2,624 feet) in elevation (U.S. Fish and Wildlife Service 1998). Blunt-nosed leopard lizards are known to hybridize with long-nosed leopard lizards where their ranges overlap in the Cuyama River watershed in Santa Barbara and Ventura Counties (U.S. Fish and Wildlife Service 1998).

Occurrences within the Plan Area

No comprehensive survey has been conducted of the entire range of the blunt-nosed leopard lizard. The current known distribution includes scattered units of undeveloped land on the valley floor and in the foothills of the Coast Ranges. In the northern part of its range, the blunt-nosed leopard lizard is known to occur in the Firebaugh and Madera Essential Habitat Areas (U.S. Fish and Wildlife Service 1998). Long-term population studies for blunt-nosed leopard lizards have not been conducted in Merced County. The status of blunt-nosed leopard lizard populations in western Merced County is not known (U.S. Fish and Wildlife Service 2010b).

There are five extant California Natural Diversity Database (CNDDB) records for blunt-nosed leopard lizards in western Merced County (California Department of Fish and Wildlife 2013) (Figure 3-4). One of these records is between 0.5 to 3 miles west of the project site (according to the CNDDB GIS polygon data). This record is from a 1979 report describing the distribution of blunt-nosed leopard lizard (California Department of Fish and Wildlife 2013). The more heavily grazed annual grasslands in the study area represent potential habitat for blunt-nosed leopard lizard. The steeper areas, the croplands, and patches of annual grasslands within the croplands represent low quality habitat for blunt-nosed leopard lizard. These conclusions are based the knowledge that the species typically occurs in areas of low relief, that farming activities would likely preclude the species from occupying these areas, and because the patches of grassland within the cropland have dense vegetation, which is generally not occupied by this species.

Natural History

Habitat Requirements

Blunt-nosed leopard lizards are found in areas of sparsely vegetated grasslands, valley sink scrub, and saltbush scrub habitats, canyon floors, and large washes at elevations below 2,600 feet. They inhabit areas with sandy soils and scattered vegetation and are usually absent from thickly vegetated habitats. Typical suitable habitats on the San Joaquin Valley floor include nonnative grassland and valley sink scrub habitats. The soils there are usually saline and alkaline playa clays

with a white salty crust and are occasionally covered by introduced annual grasses. The cultivation of crops preclude the use the use by blunt-nosed leopard lizards. However, areas with light to moderate grazing may be beneficial for blunt-nosed leopard lizards (U.S. Fish and Wildlife Service 1998). Habitat types that occur at the project site are shown in Table 3.4-3.

Blunt-nosed leopard lizards use small rodent burrows for shelter, predator avoidance, and behavioral thermoregulation. These burrows may be either abandoned ground squirrel tunnels or occupied or abandoned kangaroo rat tunnels. Blunt-nosed leopard lizards also utilize small mammal burrows to avoid predation primarily by quick escape movements or by seeking refuge in small rodent burrows in their territory or under shrubs and rocks. When burrow densities are low, some individuals may construct shallow tunnels in earth berms or under rocks (U.S. Fish and Wildlife Service 2010b).

Table 3.4-3. Habitat Associations for Blunt-Nosed Leopard Lizard

Land Cover Type	Land Cover Use	Habitat Designation	Habitat Parameters	Rationale
Grasslands with burrows	Breeding, foraging, aestivation and hibernation	Primary	Requires suitable burrows for predator avoidance, aestivation, and hibernation. Grasslands must be managed to maintain low vegetation height. Light to moderate grazing beneficial.	Presence of burrowing species provides burrows for refugia. Low vegetation is thought to provide clear view of potential predators and prey. Also allows for easier movement.

Sources: U.S. Fish and Wildlife Service 1998, 2010b.

Reproduction

The reproductive season of the blunt-nosed leopard lizard generally begins within a month after emergence from dormancy, usually the end of April continuing through the beginning of June and occasionally to the end of June. During this time, adults pair and frequently occupy the same burrow. Males aggressively defend territories using a repertoire of distinct behavioral displays and active aggression against intruders. Blunt-nosed leopard lizards communicate primarily through visual displays, including seasonal and permanent body coloration and ritualistic head and body movements (U.S. Fish and Wildlife Service 1998).

The female lizard lays 2–6 eggs in June and July, the number of eggs being positively correlated with the size of the female. During adverse conditions, reproduction may be delayed up to 2 months or even forgone for a season. Incubation lasts about 2 months, and young hatch from early July through early August. Hatchling size varies between 42 and 48 mm snout-vent length. Young may grow to 88 mm during their first season prior to hibernation (see Table 3.4-4 below). Sexual maturity occurs by 9–21 months. Females are able to breed after their second year of hibernation, (U.S. Fish and Wildlife Service 1998).

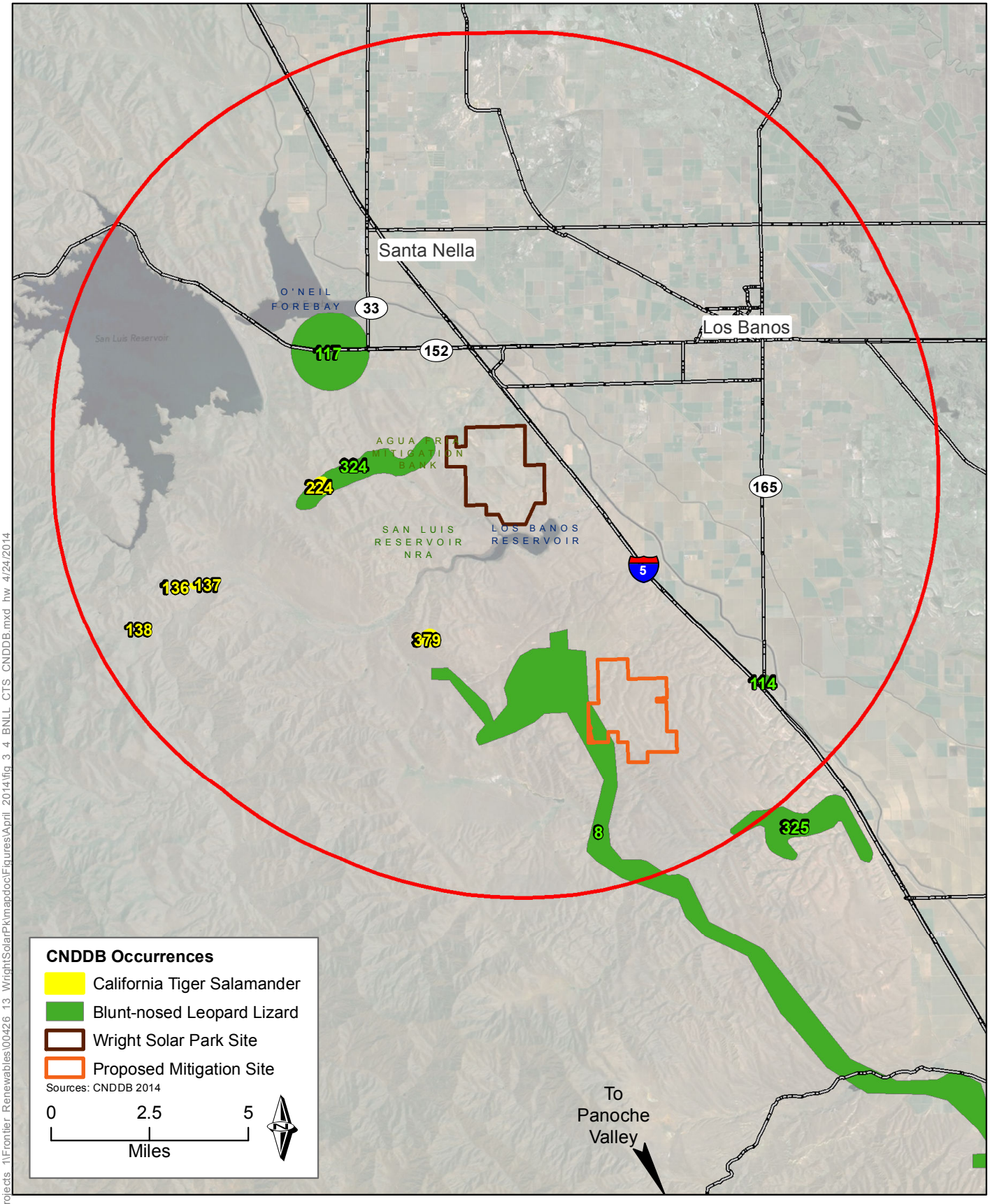

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Figure 3-4
CNDDB Records for Blunt-nosed Leopard Lizard and California Tiger Salamander

Table 3.4-4. Key Seasonal Periods for Blunt-Nosed Leopard Lizard

	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Aboveground activity			✓	✓	✓	✓	✓	✓	✓	✓		
Hibernation and aestivation	✓	✓	✓				✓	✓		✓	✓	✓

Sources: U.S. Fish and Wildlife Service 1998; California Department of Fish and Game 2004.

Ecological Relationships

Blunt-nosed leopard lizards are potential prey for San Joaquin whipsnakes (*Masticophis flagellum ruddocki*) and gopher snakes (*Pituophis catenifer*), loggerhead shrikes (*Lanius ludovicianus*), American kestrels (*Falco sparverius*) and other raptors, American badgers (*Taxidea taxis*), coyotes (*Canis latrans*), and San Joaquin kit foxes. Because of similar size and diet between blunt-nosed leopard lizards and California whiptail (*Aspidoscelis tigris munda*), interspecific competition probably occurs when the two species are sympatric (U.S. Fish and Wildlife Service 1998).

The seasonal and daily aboveground activity of blunt-nosed leopard lizards is strongly correlated with temperature. Optimal activity occurs when air temperatures are between 74°F and 104°F and ground temperatures are between 72°F and 97°F (U.S. Fish and Wildlife Service 2010b).

Home Range and Population Density

Male home ranges overlap and are generally larger than those of females, averaging 0.2–1.7 hectares (0.5–4.2 acres) compared with 0.1–1.1 hectares (0.3–2.7 acres) for females (U.S. Fish and Wildlife Service 1998). Blunt-nosed leopard lizard density can vary over time and can be affected by environmental factors such as drought.

Threats

Since the 1870s, more than 95% of the original natural communities in the San Joaquin Valley have been lost to agricultural, urban, and industrial development (U.S. Fish and Wildlife Service 1998). Cultivation, habitat modification for petroleum and mineral extraction, pesticide application, off-road vehicle use, and construction for transportation, communication, and irrigation infrastructure all have resulted in pervasive habitat loss throughout the San Joaquin Valley. These activities present ongoing threats to the survival of blunt-nosed leopard lizards (U.S. Fish and Wildlife Service 2010b).

California Tiger Salamander

Legal Status

The California tiger salamander (*Ambystoma californiense*) is listed under the state and federal endangered species acts. The Central California population is federally listed as threatened and the

Sonoma County and Santa Barbara County populations are federally listed as endangered.[6] The California tiger salamander is listed as threatened under CESA throughout its range. Critical habitat has been designated for the central California populations only. The Sonoma County population is included in the Santa Rosa Conservation Strategy. A Recovery Plan has not been developed for the central California or Santa Barbara County populations.

Taxonomy

The California tiger salamander was first described by Gray in 1853 based on specimens that had been collected in Monterey, California. The California tiger salamander was formerly regarded as a subspecies of *A. tigrinum*. However, based on recent studies of the genetics, geographic distribution, and ecological differences among the members of *A. tigrinum* complex, the California tiger salamander has been determined to represent a distinct species (U.S. Fish and Wildlife Service 2004).

The biogeographical and genetic information supporting the recognition of the Santa Barbara County and Sonoma County populations as distinct population segments under ESA are reviewed in those listing decisions (U.S. Fish and Wildlife Service 2000, 2003). More information on the taxonomic status and a description of the species' physical characteristics can be found in the listing decision for the central California population (U.S. Fish and Wildlife Service 2004).

Distribution

The California tiger salamander is endemic to California. Historically, the California tiger salamander probably occurred in grassland habitats throughout much of the state. Although this species still occurs within much of its range, it has been extirpated from many areas it once occupied (Stebbins 2003; Shaffer 1996).

California tiger salamander occurs in the Central Valley and the adjacent Sierra Nevada foothills up to 1,500 feet, generally from Yolo County south to Kern County (California Department of Fish and Game 2010).Most populations occur at elevations below 1,500 feet (457 meters), but California tiger salamanders have been recorded at elevations up to 3,660 feet (1,116 meters), just below Rose Peak in the Ohlone Regional Wilderness, Alameda County (California Department of Fish and Game 2010). Although populations have declined, the species continues to breed at a large number of locations within its current range (59 FR 18353–18354 [April 18, 1994]). At most historic breeding sites below 200 feet (61 meters) elevation, ponds remain present but no longer support California tiger salamanders. These sites are typically occupied by nonnative species (Fisher and Shaffer 1996).

[6] The 2004 listing of the central California population of the California tiger salamander (U.S. Fish and Wildlife Service 2004a) also downgraded the Sonoma County and Santa Barbara County populations of the species from endangered to threatened. However, an August 19, 2005 ruling from U.S. District Judge William Alsup vacated this downlisting, so these populations remain listed as endangered.

Occurrences within the Plan Area

There are nine records of California tiger salamander within approximately 10 miles (16 kilometers) of the project site, two of which are approximately 3 miles (3 kilometers) west of the project site (California Department of Fish and Wildlife 2013).

The ponds and the seasonal wetland that were identified during the Ecology & Environment 2013 wetland delineation do not represent suitable aquatic habitat (breeding) for California tiger salamander because there are no indications that these features pool long enough to support breeding habitat. The wetland delineation noted that these ponds do not support any wetland vegetation and no hydrologic indicators were noted in the delineation (Ecology and Environment 2013b). A review of historic aerial photographs between 1998 and 2013 do not show any of these mapped ponds holding water (Google 2013). Pooling water was observed within one pond that occurs within the project site on December 10, 2013. This pond appears to have been filled as a result of the purging of an agricultural irrigation filtration system. Because the purging of this system is likely to be periodic, it would not support extended periods of continuous inundation, and therefore would not provide suitable aquatic habitat. The seasonal wetland also does not pond to a sufficient depth or duration to support California tiger salamander breeding.

The alkali vernal pool represents potential breeding habitat for California tiger salamander during a normal wet year. This wetland appears to pool to a maximum depth of 12–18 inches and was observed to be saturated to the surface on December 10, 2013, which suggests that it could pool for an extended period of time, especially considering that very little rain had fallen up to that point in the year (just under an inch). While not specifically measured, the pool is suspected to have an elevated salt content when full due to the presence of extensive salt crusts left behind after water has evaporated from the pool. CDFW only considered freshwater habitats as suitable for the species in their 2010 status review for the species (California Department of Fish and Game 2010) and USFWS only considers fresh water habitat as part of the primary constituent elements in the listing of critical habitat for the central population (70 FR 49280–49458). However, a subspecies of tiger salamander, the blotched tiger salamander (*Ambystoma tigrinum melanostictum*), has been reported occurring in habitats with a high salinity and alkalinity (Gasser and Miller 1986), and there are records within the CNDDB that report of California tiger salamander occurring in alkali habitats (California Department of Fish and Wildlife 2013). It is therefore possible that California tiger salamander may use the alkali vernal pool at the project site as aquatic habitat.

USFWS considers upland habitat within 1.24 miles (2 kilometers [km]) of California tiger salamander breeding habitat to represent potential upland habitat for the species (U.S. Fish and Wildlife Service 2003). In addition to the alkali vernal pool there are other aquatic features outside of the project site that are within 1.24 miles (2 km) of the project site. These features include: the Los Banos Reservoir; an unnamed stream flowing into Los Banos Reservoir from the north, which is just southwest of the project site; a pond 0.8 mile (1.3 km) north of the project site and just south of Billy Wright Road; and several pools within and adjacent to Los Banos Creek below the reservoir. Los Banos Reservoir does not represent suitable habitat for California tiger salamander because it is a perennial water body that is stocked with sport fish. Portions of the unnamed stream that pool above its connection with the Los Banos Reservoir may support California tiger salamander

breeding. A review of historic aerial photographs (Google 2013) shows the pond off of Billy Wright Road inundates from winter into mid to late summer. There are several pools observable from aerial photographs that occur downstream of the reservoir that could support salamander breeding. A review of historic aerial photographs (Google 2013) show several of these pools dried down during the summer months with a few appearing to remain inundated into fall.

Grassland areas within the project site that contain mammal burrows could potentially be occupied by California tiger salamander if they breed within the aquatic habitats identified above.

Natural History

Habitat Requirements

California tiger salamanders require two major habitat components: aquatic breeding sites and terrestrial aestivation or refuge sites. California tiger salamanders inhabit valley and foothill grasslands and the grassy understory of open woodlands, usually within 1 mile (1.6 km) of water (Jennings and Hayes 1994). Following metamorphosis California tiger salamanders are terrestrial animals which spend most of their time underground in subterranean refuge sites, or *refugia*. Underground retreats are usually California ground squirrel (*Spermophilus beechyii*) or pocket gopher (*Thomomys bottae*) burrows and, occasionally, human-made structures. Adults emerge from underground to breed for only brief periods during the year. California tiger salamanders breed and lay their eggs primarily in vernal pools and other ephemeral ponds that fill in winter and often dry out by summer (Loredo et al. 1996); they sometimes use permanent human-made ponds (e.g., stock ponds) and reservoirs (see *Ecological Relationships* discussion below) (Zeiner et al. 1988; Stebbins 2003). Streams are rarely used for reproduction.

Adult salamanders migrate from upland habitats to aquatic breeding sites during the first major rainfall events of fall and early winter and return to upland habitats after breeding. This species uses small-mammal burrows, logs, piles of lumber, and shrink-swell cracks in the ground for cover for cover during migration to and from aquatic breeding sites (Zeiner et al. 1988). California tiger salamanders can overwinter in burrows up to 1 mile from their breeding sites (Jennings and Hayes 1994).

The California tiger salamander is particularly sensitive to the duration of ponding in aquatic breeding sites. Because tiger salamanders have a long developmental period, the largest and thus longest lasting seasonal ponds or vernal pools are the most suitable type of breeding habitat for this species (Jennings and Hayes 1994). Aquatic sites that are considered suitable for breeding should retain water for a minimum of 10 weeks (California Department of Fish and Game 2010). Moreover, large vernal pool complexes, rather than isolated pools, probably offer the best quality habitat as these areas can support a mixture of core breeding sites and nearby refugia (Jennings and Hayes 1994).

California tiger salamanders primarily use California ground squirrel and Botta's pocket gopher as burrows as upland refuge sites. Loredo et al. (1996) emphasized the importance of California ground squirrel burrows as refugia for California tiger salamanders, and suggested that a commensal relationship existed between the California tiger salamander and California ground squirrel, in which

tiger salamanders benefit from the burrowing activities of squirrels. In a study conducted near Concord, California, it was found that California ground squirrel burrows were used almost exclusively as refuge sites by California tiger salamanders. Also, tiger salamanders apparently do not avoid burrows occupied by ground squirrels (Loredo et al. 1996). Suitable habitat types that occur at the project site are shown in Table 3.4-5.

Table 3.4-5. Habitat Associations for California Tiger Salamander

Land Cover Type	Land Cover Use	Habitat Designation	Habitat Parameters	Rationale
Herbaceous-dominated	Dispersal, aestivation	Dispersal, aestivation	Tiger salamanders can be found up to 1.24 mile (2.0 km) from wetlands and aquatic habitats	California tiger salamanders spend majority of lives in burrows in upland habitats
Aquatic, including wetlands and vernal pools	Breeding, larval development	Breeding	All life stages may occur around breeding sites	Requires aquatic habitat with sufficient ponding duration to complete metamorphosis

Source: U.S. Fish and Wildlife Service 2004.

Reproduction

Adult California tiger salamanders migrate to and congregate at aquatic breeding sites during warm rains, primarily between November and February (Barry and Shaffer 1994). Tiger salamanders are rarely observed except during this period (Loredo et al. 1996). During the winter rains, tiger salamanders breed and lay eggs primarily in vernal pools and other shallow, ephemeral ponds that fill in winter and often dry by summer (Loredo et al. 1996). This species also uses permanent human-made ponds for reproduction. Spawning usually occurs within a few days after migration, and adults probably leave the breeding sites at night soon after spawning (Barry and Shaffer 1994).

Eggs are laid singly or in clumps on both submerged and emergent vegetation and on submerged debris in shallow water. In ponds without vegetation, females lay eggs on objects on the pond bottom (Barry and Shaffer 1994; Jennings and Hayes 1994). After breeding, adults leave the breeding ponds and return to their upland refugia sites.

Key seasonal periods for California tiger salamanders are presented in Table 3.4-6. After approximately 2 weeks, the salamander eggs begin to hatch into larvae which then metamorphose into terrestrial juvenile salamanders. The amount of time that salamanders spend in the larval stage and the size of individuals at the time of metamorphosis seems to be dependent on many factors. Larvae in small ponds develop faster, while larvae in larger ponds that retain water for a longer period are larger at time of metamorphosis. At a minimum, salamanders require 10 weeks living in ponded water to complete metamorphosis but in general development is completed in 3–6 months (Petranka 1998). If a pond dries prior to metamorphosis, the larvae will desiccate and die (U.S. Fish and Wildlife Service 2000). Juveniles disperse from aquatic breeding sites to upland habitats after metamorphosis (Jennings and Hayes 1994).

Table 3.4-6. Key Seasonal Periods for California Tiger Salamander

	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Breeding/Migration	✓	✓									✓	✓
Larval development			✓	✓	✓	✓	✓	✓				
Metamorphosis					✓	✓	✓	✓				
Juvenile Dispersal	✓	✓				✓	✓	✓	✓	✓	✓	✓

Source: Jennings and Hayes 1994.

Ecological Relationships

California tiger salamander larvae and embryos are susceptible to predation by fish (Zeiner et al. 1988; Shaffer et al. 1993), and tiger salamander larvae can be directly impacted in aquatic sites that support predatory fish (Shaffer et al. 1993). Aquatic larvae are taken by herons and egrets and possibly garter snakes (*Thamnophis* sp.) (Zeiner et al. 1988). Shaffer et al. (1993) also found a negative correlation between the occurrence of California tiger salamanders and the presence of bullfrogs; however, this relationship was detected only in unvegetated ponds, where the natural risk of depredation was higher. This suggests that vegetation structure in aquatic breeding sites may be important for survival. Because of their secretive behavior and limited periods aboveground, adult California tiger salamanders have few predators (U.S. Fish and Wildlife Service 2000).

Movement

The proximity of refuge sites to aquatic breeding sites also affects the suitability of salamander habitat. Adult tiger salamanders have been observed up to 1.3 miles (2.1 km) from breeding ponds (U.S. Fish and Wildlife Service 2004). A trapping effort in Contra Costa County captured California tiger salamanders at distances ranging from 2,641 to 3,960 feet (850 to 1,207 meters) from the nearest breeding, aquatic site (U.S. Fish and Wildlife Service 2004). In a study in winter 2002–2003. Trenham and Shaffer (2005) found that 95% of tiger salamanders resided within 2,040 feet (620 meters) of their breeding pond in Solano County.

Loredo et al. (1996) found that tiger salamanders may use burrows that are first encountered during movements from breeding to upland sites. In their study area, where the density of California ground squirrel burrows was high, the average migration distances between breeding and refuge sites for adults and juveniles was 118 feet (36 meters) and 85 feet (26 meters), respectively. Also, habitat complexes that include upland refugia relatively close to breeding sites are considered more suitable because predation risk and physiological stress in California tiger salamanders probably increases with migration distance.

Dispersal of juveniles from natal ponds to underground refugia could occur throughout the year. While juveniles will move short distances from breeding ponds once they start to dry up in the late spring and summer, longer distances from breeding ponds are attained during rainy periods. Juveniles disperse from breeding sites after spending a few hours or days near the pond margin (Jennings and Hayes 1994). Juveniles have been observed to migrate up to 1 mile (1.6 km) from

breeding pools to upland areas (U.S. Fish and Wildlife Service 2004). Dispersal distance is likely phased and may increase with an increase in precipitation (Trenham 2001).

Some genetic data suggest low rates of California tiger salamander migration between vernal pool complexes (Shaffer et al. 1993; Irschick and Shaffer 1997) or metapopulations; this suggests that natural colonization after a local extirpation event may be unlikely (Fisher and Shaffer 1996). Trenham et al. (2001) showed that pool complexes occupied by California tiger salamander fit a metapopulation model, and dispersal rates between ponds may be high for both first-time and experienced breeders. Dispersal rates are probably high enough to prevent local extirpations within a pool complex.

Threats

California tiger salamander populations have experienced dramatic declines throughout the historical range of the species, particularly in the Central Valley. California tiger salamander populations have declined as a result of two primary factors: widespread habitat loss and habitat fragmentation. These factors have both been caused by conversion of valley and foothill grassland and oak woodland habitats to agricultural and urban development (Stebbins 2003). For example, residential development and land use changes in the range of California tiger salamanders have removed or fragmented vernal pool complexes, eliminated refuge sites adjacent to breeding areas, and reduced habitat suitability for the species over much of the Central Valley (Barry and Shaffer 1994; Jennings and Hayes 1994). Grading activities have probably also eliminated large numbers of salamanders directly (Barry and Shaffer 1994). Overall, approximately 75% of habitat for California tiger salamander within its historic range has been lost (Fisher and Shaffer 1996).

The introduction of bullfrogs, Louisiana red swamp crayfish (*Procambarus clarkii*), and nonnative fishes (mosquitofish) [*Gambusia affinis*], bass, and sunfish) into aquatic habitats has also contributed to declines in tiger salamander populations (Jennings and Hayes 1994; U.S. Fish and Wildlife Service 2000). These nonnative species prey on tiger salamander larvae and may eliminate larval populations from breeding sites (Jennings and Hayes 1994). At sites where aquatic vegetation is present, predation by exotic fish appears more likely to result in California tiger salamander extirpation than bullfrogs (Fisher and Shaffer 1996). At most historic breeding sites below 200 feet elevation, ponds remain present but no longer support California tiger salamanders. Instead, these sites are typically occupied by nonnative species (Fisher and Shaffer 1996).

Burrowing-mammal control programs are considered a threat to California tiger salamander populations. Rodent control through destruction of burrows and release of toxic chemicals into burrows can cause direct mortality to individual salamanders and may result in a decrease of available suitable habitat (U.S. Fish and Wildlife Service 2000).

Vehicular-related mortality is an important threat to California tiger salamander populations (Barry and Shaffer 1994; Jennings and Hayes 1994). California tiger salamanders readily attempt to cross roads during migration, and roads that sustain heavy vehicle traffic or barriers that impede seasonal migrations may have affected tiger salamander populations in some areas (Shaffer and Fisher 1991; Shaffer and Stanley 1992; Barry and Shaffer 1994). Therefore, establishing artificial barriers to movement or maintaining roads that support a considerable amount of vehicle traffic in areas that

support California tiger salamander populations could severely degrade salamander habitat (Jennings and Hayes 1994).

Hybridization between California tiger salamander and an introduced congener, *A. tigrinum*, has been documented and may be extensive (Riley et al. 2003). *A. tigrinum* was introduced to California for use as fishing bait; and both taxa co-occur in ponds and vernal pools. Hybridization between native and exotic taxa, due to lack of reproductive isolation, can threaten native taxa by causing genetic swamping and reduced genetic diversity of native populations. In rare species such as California tiger salamander, hybridization can also lead to population extirpation. In a study of tiger salamander hybridization conducted in the Salinas Valley, Riley et al. (2003) found that the degree of genetic mixing between California tiger salamander and *A. tigrinum* depended on breeding habitat type. In artificial ponds, there appeared to be no barriers to gene exchange between California tiger salamander and *A. tigrinum*. However, in vernal pools, significantly fewer hybrid genotypes and more pure parental genotypes were found. These results suggest that the potential for reproductive isolation between the two taxa may be higher in native habitats.

Chapter 4
Impact Assessment and Level of Take

4.1 Introduction and Approach

This chapter evaluates the potential effects of the covered activities on covered species. The impact analysis is based on the activities described in Chapter 2, *Covered Activities*, and the ecological information of covered species, summarized in Chapter 3, *Physical and Biological Resources*. Direct, indirect, and cumulative effects on the covered species and estimated levels of take are described below.

The information in this chapter is intended to meet the requirements of Section 7 of the Endangered Species Act (ESA) in order to assist the U.S. Fish and Wildlife Service (USFWS) with its internal consultation. Under Section 7, federal agencies must ensure that their actions, including issuing Section 10(a)(1)(B) permits, do not jeopardize the continued existence of listed species or destroy or adversely modify listed species' critical habitat. Proposed actions must be evaluated in terms of their direct and indirect effects on listed species, as defined below.

4.2 Definitions

The following terms used this chapter are defined for the purposes of this HCP.

Impacts are those actions affecting biological resources, specifically covered species and their habitats, in the Permit Area. Impacts can be direct or indirect; they can also be cumulative.

Direct impacts are defined as activities that remove or alter any covered species or their habitat (e.g., construction, operation, maintenance and decommissioning). Direct impacts can be either permanent or temporary (see definitions of permanent and temporary impacts immediately below).

Incidental take is any take otherwise prohibited, if such take is incidental to and not the purpose of the carrying out of an otherwise lawful activity (50 Code of Federal Regulations 17.3).

Permanent impacts are direct impacts that permanently remove or significantly alter habitat for any covered species.

Temporary impacts are direct impacts that alter covered species habitat during the construction and testing period as well as ground-disturbing activities from ongoing maintenance, but will allow the disturbed area to recover to pre-project or ecologically improved conditions within one year (e.g. construction staging areas).

Indirect impacts are defined by USFWS as "those that are caused by the proposed action and are later in time, but are still reasonably certain to occur" (50 CFR 402.02). While more difficult to detect and track, indirect impacts can undermine species viability or habitat quality, especially if multiple indirect or direct impacts work cumulatively to impair the species or to degrade the habitat.

Cumulative impacts result from the proposed actions' incremental impact when viewed together with past, present, and reasonably foreseeable future actions. Cumulative impacts are defined under both ESA and the National Environmental Policy Act (NEPA). Habitat conservation plans (HCPs) are not required to evaluate cumulative effects. However, as stated in the HCP Handbook, "the applicant should help ensure that those considerations required of the Services by Section 7 have been addressed in the HCP" (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1996:3–15). Accordingly, this HCP addresses the cumulative effects of the covered activities over the permit term in relation to past, present, and reasonably foreseeable future projects in western Merced County.

4.3 Impact Assessment Methods

To meet regulatory requirements and to properly mitigate effects, the amount of take must be discussed and, if possible, quantified. The allowable amount of take is quantified by estimating permanent and temporary direct impacts on land cover (methods for impact estimation are described below).

To estimate impacts resulting from implementation of covered activities over the course of the permit term, it was first necessary to identify the baseline conditions on which the impacts are assumed to occur. This baseline condition is defined as the composition and distribution of land cover and covered species habitat at the time the land cover was mapped in October 2013. The impact analysis was conducted by intersecting in GIS a footprint of the Wright Solar Park (WSP) project with the baseline GIS data of suitable habitat for each covered species using the following steps.

- **Step 1:** Land cover characterized and created in GIS using a combination of desktop digitizing and ground truthing (see Section 3.4.1).
- **Step 2:** The construction plans were overlaid with the land cover data (Figure 3-2a) to quantify the amount of each land cover type that will be affected following construction of the solar field. Land cover types within the Permit Area that will not be affected by construction of the solar field were also quantified.
- **Step 3:** Land cover types which provide habitat for the covered species and are also affected by the project were quantified.

4.4 Effects on San Joaquin Kit Fox

There are no known occurrences of San Joaquin kit fox within the project site. A detailed discussion of San Joaquin kit fox use of the surrounding area is in Chapter 3. Biologists conducted field surveys at the project site in 2011, 2012, and 2013 and evaluated habitats on the project site for special-status species (Ecology & Environment 2013). Biologists did not find any evidence of San Joaquin kit fox (tracks, scat, bones or other remains from potential kit fox prey species) within the project site during their surveys. In 2005, the ESRP observed kit foxes off of Billy Wright Road near the Permit

Area during spotlighting surveys (Figure 3-3). In 2013 ICF biologists recorded small mammal communities and mammal dens in the patches of grassland that have not been cultivated during agricultural operations. It has not been established whether these dens are active or if San Joaquin kit fox use them. Based on the existing habitat conditions in the project site and the disparate prey base it is highly unlikely that kit fox would persist on the site. Aside from the potential to support denning kit fox, the project site has been considered as part of a broader potential north–south movement corridor for San Joaquin kit foxes (Figure 4-1), so there is potential for San Joaquin kit fox to move through the project site. This condition can be considered the baseline for the project site. The following discussion addresses the permanent and temporary direct and indirect effects, as well as cumulative effects to kit fox and their habitat resulting from the project.

4.4.1 Direct Effects on Individuals and Habitat

Approximately 70% of the project site (approximately 1,400 acres) is currently planted in dry-farm crops such as winter wheat; the remaining areas are either annual grasslands or isolated wetland features (Figure 3-2a). All solar panels, associated buildings, and access roads will be constructed on portions of the site that are currently under cultivation. Therefore, there will be no loss of annual grasslands or wetlands as a result of the project.

Four types of direct effects are possible on San Joaquin kit fox at the project site. First, take of individuals may occur as a result of project construction. Second, San Joaquin kit fox movement habitat will be affected or degraded as a result of the project. Third, the operation, maintenance, and occupancy of the new development may have adverse effects on the species. And fourth, decommissioning activities may result in take of individuals. Each of these direct effects is discussed below.

Construction-Related Take

While incidental take could result from construction of the project, it is expected that the effect of the project would have a minimal impact on the kit fox population in western Merced County. The number of individuals that could be affected as the result of covered activities (discussed below) is expected to be very low and would not result in a major decrease in the regional population. This is because the project will be constructed on lands that have been and are currently dry-farmed and are areas which are not likely to be used by kit foxes, except for movement and/or foraging. Any effects will be minimized with the avoidance and minimization measures described in Chapter 5, *Conservation Strategy*.

The project would be constructed over 26 months during which time kit foxes could traverse through the project site and could be harassed[7], injured, or killed by construction vehicles, personnel, or equipment. Because kit foxes are largely nocturnal and because construction activities generally occur during the day, kit foxes are unlikely to move through the area while construction activities are actively occurring. However, human-made structures such as culverts or pipes that are

[7] "Harassment" is defined by Federal regulation as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering."

stored or built on-site may be used as dens (U.S. Fish and Wildlife Service 1998). Therefore, if kit foxes are in the area they may be present at the start-up of daily construction activities.

Although the chances are low due to the presumed infrequent use of the site, injury or death of San Joaquin kit foxes could occur during construction as a result of the following.

- Increased vehicular traffic along Billy Wright Road, in the project vicinity, and at the project site by construction vehicles which would increase the chance of vehicle strikes.
- Operation of construction equipment.
- Collapse of burrows from vehicular traffic or excavation of burrows with kit fox inside.
- Entrapment within trenches or holes dug during construction and that are left accessible overnight.
- Increased use of the site by predators (coyotes, red foxes, or domestic dogs) attracted to the project site by trash discarded by construction personnel.
- Accidental spills of fuels, lubricants, and industrial chemicals which could directly poison kit foxes or their prey, resulting in indirect poisoning.

Additionally, sound from construction could cause kit foxes to change their movement habits and avoid the area. Application of the construction avoidance measures described in Chapter 5 will greatly reduce the potential impact on kit foxes and the potential for take.

Removal or Degradation of San Joaquin Kit Fox Habitat

The areas that will be directly affected by the project, where the solar panels, associated buildings, and access roads will be sited, will occur on those areas that are currently under cultivation. There will be no loss of annual grasslands or wetlands as a result of the project, with the minor exception of some roadside grassland/ruderal vegetation that could be removed through road widening. All of the project-related impacts will occur on the approximately 1,400 acres that are currently planted in dry-farm crops such as winter wheat (Figure 3-2a).

It is estimated that of the 1,400 acres where the project is planned, approximately 1,200 acres[8] will be permanently lost and will therefore provide limited or no habitat value for San Joaquin kit fox even after revegetation following construction. Permanent loss is assumed to result from new buildings, the tracks that the solar arrays are attached to, and new/widened roadways, and the areas beneath the solar panels. The remaining 200 acres will be temporarily disturbed during construction and will be reseeded with a native grassland mix following construction and will be managed by grazing or mowing. Temporary habitat loss will occur during the 26-month construction period associated with ground disturbance and other activity throughout the site, as the panels are installed.

The historic and current use of the project site for cultivated agriculture has provided suitable movement and foraging habitat for San Joaquin kit fox, but the level and long-term nature of the

[8] Actual permanent and temporary impact acreages are currently being refined as the site plan is finalized. These estimates will be revised once that process is complete.

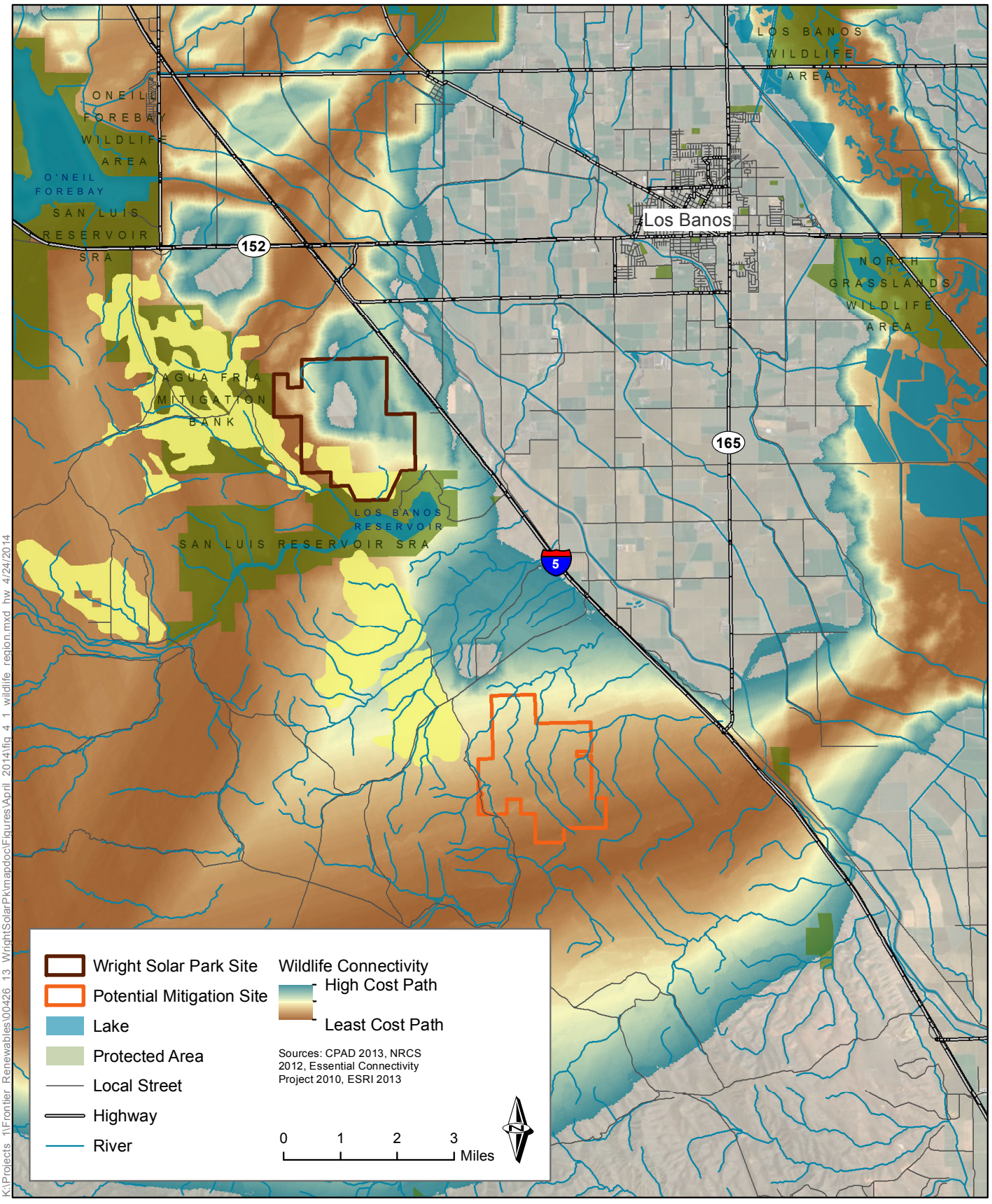

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Figure 4-1
Wildlife Connectivity in Region

disturbance prevented the project site from providing suitable denning habitat. Surrounding grasslands and patches of grass along road edges that have ground squirrel activity could provide denning opportunities for San Joaquin kit fox. The project has been designed to allow for the local population of kit foxes to move through the project site. The project site will remain suitable as movement and foraging habitat. Therefore, the change in land use is not viewed as a complete loss of habitat value. San Joaquin kit fox will still be able to forage and move through the site (see below for specifics on design features that facilitate their movement), and there will likely be more denning opportunities inside the project site, since the area under the solar panels will likely be occupied by ground squirrels and will no longer face frequent disturbance from agricultural activities.

Take Resulting from Operations and Maintenance

Operation and maintenance (O&M) activities are the day-to-day function and upkeep of facilities at the project site. Operation activities include inspecting, monitoring, and/or testing the solar panels and associated facilities within the project site. These activities would involve personnel and appropriate staff working at facilities and using existing access roads. Maintenance activities could include repairing and/or replacing facilities, structures, and access roads. They may also include emergency repair and replacement of facilities or vegetation management, such as mowing vegetation around the bases of the solar panels.

Operation and maintenance activities have the potential to cause take of individual San Joaquin kit fox. Kit foxes could be struck by vehicles or equipment if they are moving through or foraging on the project site. If any excavation needs to occur to repair or replace underground infrastructure the removal or collapse of burrows could occur. If kit fox are inside then mortality could result. They could also be attracted to prey displaced from O&M sites or to garbage left behind, and thus be exposed to an elevated potential for injury or mortality. The risk will be greatest when it is dark, when their movements are most likely to occur. However, project-related vehicular traffic is expected to be minimal during this time.

Kit foxes migrating or foraging near work areas during O&M activities could also be affected by noise, lighting, and vibration from these activities; such disturbance could disrupt kit fox movement and the overall quality of linkages through the project site.

Decommissioning Related Take

The decommissioning and restoration process would involve the removal of aboveground structures, restoration of topsoil, revegetation, and seeding. When determining what structures will be removed the applicant will consider surface impacts that would be caused by infrastructure removal and the future use of the site. For example, if the site reverts back to farming, all underground infrastructure will likely be removed so as not to impede farming activities. The level of disturbance, equipment necessary and potential for take during decommissioning will be equivalent to impacts caused during site construction. The primary risk to kit fox during decommissioning will be vehicles accessing the site and potentially collapsing burrows, though excavation could result in take as well, if burrows are excavated when kit fox are inside. Some excavation will occur to remove shallow facilities and excavation of burrows will reduce the prey base for kit fox and potentially

result in mortality if kit fox are not properly excluded from the site. The construction avoidance measures described in Chapter 5 will greatly reduce the potential impact on kit foxes and the potential for take.

4.4.2 Indirect Effects on Habitat

The O&M of the facilities associated with the project may also have indirect effects on the species. Increased risk of fire associated with roads (e.g., accidents and tossed lighted cigarette butts) may also harm or kill kit foxes and temporarily remove habitat. Finally, indirect effects could result from conservation actions, such as vegetation management or survey work in mitigation areas. These activities could harass kit fox through noise or other disturbance. Indirect effects of conservation actions are discussed in more detail below.

Because kit foxes are not known to use the project site, the overall chance of road kill of kit fox on new or widened roads is considered very low. Kit foxes have been observed off of Billy Wright Road during spotlighting surveys conducted by the CSU-Stanislaus Endangered Species Recovery Program in 2005. There is risk to kit foxes along Billy Wright Road and other roads in the project area. The risk will be greatest after dark, when kit fox movements are most likely to occur and when visibility is low. However, project-related vehicular traffic is expected to be minimal during this time.

4.4.3 Effects of Conservation Actions

Effects on kit fox on conservation lands are expected to be very low. Conservation actions implemented on mitigation lands, such as cattle grazing or seeding of native grasses, would have minimal effect. However, any activities that would result in the collapse or removal of burrows could affect kit fox. Impacts would be direct, if they crushed or injured individuals, or indirect if they reduced the prey base. Any time equipment is used on a mitigation site there is the potential that individual kit foxes could be struck or that their behavior could be altered such that they are forced into less-than-suitable habitat. Because these visits would primarily occur as the result of monitoring events or would be associated with grassland enhancement projects, the duration is expected to be short and the effect on kit foxes would be minimal. Surveys in the conservation easement areas may result in harassment of kit fox, which would qualify as indirect take. The implementation of avoidance and minimization measures described in Chapter 5 will greatly reduce or eliminate the potential for these effects.

4.5 Effects on Blunt-Nosed Leopard Lizards

There are no known occurrences of blunt-nosed leopard lizards within the Permit Area or within 0.5 mile of the Permit Area (Figure 3-4). Based on the existing habitat conditions in the Permit Area, it is highly unlikely that blunt-nosed leopard lizards would occur on the site. However, once the project is built, and areas of temporary disturbance are restored, there is potential for blunt-nosed leopard lizards to move into the Permit Area. The following discussion addresses the permanent and temporary direct and indirect effects, as well as cumulative effects on blunt-nosed leopard lizards and their habitat resulting from the project.

4.5.1 Direct Effects on Individuals and Habitat

There are small patches of suitable grassland habitat along the existing roads and grasslands to the west and south of the project site. Direct mortality is expected to be highly unlikely from construction of the project because of the lack of suitable habitat on site and the avoidance measures that will be used to prevent impacts to individuals. The avoidance and minimization measures described in Chapter 5 will be applied to ensure this avoidance during construction and operations.

Removal or Degradation of Habitat

The project will result in the permanent conversion of 1.2 acres of annual grassland and temporary impacts on another 1.9 acres of annual grassland habitat of blunt-nosed leopard lizard. All of these areas are small isolated patches of grasslands within the cropland areas of the project site. Because the cultivated agricultural onsite provides limited habitat value for blunt-nosed leopard lizards, the change in land use alone is not considered to be take of the species because of its very small amount and low habitat value.

Take Resulting from Operations and Maintenance

Blunt-nosed leopard lizards may colonize the areas of the project site following completion of the project and after reseeding of the areas under the solar arrays. O&M activities have a potential to affect blunt-nosed leopard lizards if they were to move into the project site following construction. Maintenance vehicles have a potential to run over blunt-nosed leopard lizards if they are driving through the site during periods when the lizards are active on the surface, which would generally be during spring through fall. If vehicles need to drive off of established roads they could result in the removal or collapse of small mammal burrows and have potential to entomb blunt-nosed leopard lizards. If any excavation needs to occur to repair or replace underground infrastructure the removal or collapse of burrows could occur. Avoidance measures described in Chapter 5 will reduce these threats and reduce the likelihood of mortality of blunt-nosed leopard lizards inside burrows that are impacted by project activities.

Decommissioning Related Take

The decommissioning and restoration process would involve the removal of aboveground structures, restoration of topsoil, revegetation, and seeding. The level of disturbance, equipment necessary and potential for take during decommissioning will be equivalent to impacts caused during site construction except the project site is expected to be more inhabitable by blunt-nosed leopard lizards following construction because it will no longer be farmed. The primary risk to lizards during decommissioning will be vehicles accessing the site and potentially collapsing burrows and entombing them. Some excavation will occur to remove shallow facilities and excavation could result in mortality if lizards are in burrows during excavation. Avoidance measures described in Chapter 5 will reduce these threats and reduce the likelihood of mortality.

4.5.2 Indirect Effects on Habitat

Indirect effects on blunt-nosed leopard lizards may result from increased vehicular traffic along new and existing roads. This additional traffic increases the probability of road kill when blunt-nosed leopard lizards are active above ground. The O&M of the WSP may also have indirect effects on the species. Increased risk of fire associated with roads (e.g., accidents and tossed lighted cigarette butts) may also harm or kill blunt-nosed leopard lizards and temporarily remove habitat. Finally, indirect effects could result from conservation actions, such as vegetation management or survey work in mitigation areas. Indirect effects are discussed in more detail below.

Because of existing habitat use and conditions within the project site, the overall chance of road kill of blunt-nosed leopard lizards on new or widened roads in the project site is considered very low Suitable habitat occurs to the west of the project site and there is risk to blunt-nosed leopard lizards crossing Billy Wright Road and other roads in the project area. Avoidance measures described in Chapter 5 will would reduce these threats and ensure that mortality does not occur.

4.5.3 Effects of Conservation Actions

Adverse effects on blunt-nosed leopard lizards on conservation lands are expected to be very low. Conservation actions implemented on mitigation lands, such as cattle grazing or seeding of native grasses, would have minimal effect. However, any activities that would result in the collapse or removal of burrows could affect blunt-nosed leopard lizards. Impacts would be direct if they crushed or injured individuals. Any time equipment is used on a mitigation site there is the potential that individual blunt-nosed leopard lizards could be crushed in burrows or run over. Because these visits would primarily occur as the result of monitoring events or would be associated with grassland enhancement projects, the duration is expected to be short and the effect on blunt-nosed leopard lizards would be minimal.

4.6 Effects on California Tiger Salamander

There are no known occurrences of California tiger salamander within 2.5 miles of the Permit Area (Figure 3-4). Based on the existing habitat conditions in the Permit Area, it is highly unlikely that California tiger salamanders would occur at the project site. However, the project site is within 1.24 miles of potential breeding habitat and there is some grassland habitat with small mammal burrows within the project site. Once the project is built, and areas of temporary disturbance restored, there is potential for California tiger salamanders to occur in upland areas within the Permit Area during the dry season. The following discussion addresses the permanent and temporary direct and indirect effects, as well as cumulative effects to California tiger salamanders and their habitat resulting from the project.

4.6.1 Direct Effects on Individuals and Habitat

The alkali vernal pool located in the Permit Area and other ponds located within 1.24 miles of the Permit Area represent potential breeding habitat for California tiger salamanders. Though aquatic

habitat will not be affected and most of the project site is not suitable upland habitat for California tiger salamanders, there are small patches of suitable grassland habitat along the existing roads.

While incidental take could result from construction of the project, it is expected that the collective effect of the project would have a minimal impact on the California tiger salamander population in the region. Any effects will be minimized with the avoidance and minimization measures described in Chapter 5. The number of individuals that could be affected as a result of covered activities would likely not result in a major decrease in the regional population. This is due to the fact that the project will be constructed predominately on lands that have been and are currently dry-farmed and are areas which are not likely to be used by tiger salamanders. The greatest risk to tiger salamanders will occur during decommissioning as the habitat quality on the project site is expected to be better for tiger salamanders once the project is built. All aquatic features in the Permit Area will be avoided.

Construction-Related Take

Construction activities may also affect California tiger salamanders if they are occupying or dispersing through the project site during construction. Although the chances are low due to existing habitat conditions of the site, injury or death of California tiger salamanders could occur during construction as a result of the following.

- Increased vehicular traffic along Billy Wright Road, in the project vicinity, and at the project site by construction vehicles which would increase the chance of vehicle strikes.
- Operation of construction equipment which could crush salamander above ground or in shallow burrows.
- Entrapment within trenches or holes dug during construction.
- Accidental spills of fuels, lubricants, and industrial chemicals which could directly poison tiger salamanders.

Application of the construction avoidance measures described in Chapter 5 will greatly reduce the impact on tiger salamanders and the potential for take.

Removal or Degradation of California Tiger Salamander Upland Habitat

The project will result in the permanent conversion of 1.2 acres of annual grassland and temporary impacts on another 1.9 acres of annual grassland that are within approximately 1.24 miles of the potential California tiger salamander breeding habitat. All of these areas are small isolated patches of grasslands within the cropland areas of the site. Therefore, the adverse effects on California tiger salamander habitat are considered minimal.

Take Resulting from Operations and Maintenance

O&M activities have a potential to affect California tiger salamanders if they occupy the project site after temporarily affected areas are restored. Maintenance vehicles have a potential to run over California tiger salamanders if they are driving through the site during periods when the salamanders are active on the surface, which would generally be during fall/winter and spring nights

when there are rain events or the humidity is relatively high. Other maintenance activities that result in the removal or collapse of small mammal burrows through excavation have potential to kill or injure California tiger salamanders.

Decommissioning Related Take

The decommissioning and restoration process would involve the removal of aboveground structures, restoration of topsoil, revegetation, and seeding. When determining what structures will be removed the applicant will consider surface impacts that would be caused by infrastructure removal and the future use of the site. For example, if the site reverts back to farming, all underground infrastructure will likely be removed so as not to impede farming activities. The level of disturbance, equipment necessary and potential for take during decommissioning will be equivalent to impacts caused during site construction except the project site is expected to be more inhabitable by tiger salamanders following construction because it will no longer be farmed. The primary risk to salamanders during decommissions will be vehicles accessing the site and potentially collapsing burrows and entombing them. Some excavation will occur to remove shallow facilities and excavation could result in mortality if salamanders are in burrows during excavation. The O&M avoidance measures described in Chapter 5 will be applied to all decommissioning activities. As a result incidental take is not expected to result from decommissioning of the project because these measures will avoid effects on California tiger salamanders.

4.6.2 Indirect Effects on Habitat

Indirect effects on California tiger salamanders may result from increased vehicular traffic along new and existing roads. This additional traffic increases the probability of road kill when tiger salamanders are migrating from upland habitat to breeding habitat. The O&M of the facilities associated with the project may also have indirect effects on the species. Increased risk of fire associated with roads (e.g., accidents and tossed lighted cigarette butts) may also harm or kill tiger salamander and temporarily remove habitat. Indirect effects could result from conservation actions, such as vegetation management or survey work in mitigation areas. Indirect effects are discussed in more detail below.

Because of the low quality (dry farmed) of existing habitat within the project site, the overall chance of road kill of California tiger salamanders on new or widened roads in the project site is expected to be low. Suitable habitat occurs to the west of the project site and there is risk to tiger salamanders crossing Billy Wright Road and other roads in the project area to breed in the alkali wetland within the project site. The risk will be greatest after/during rainy weather and when it is dark, when their movements are most likely to occur and when visibility is low. However, project-related vehicular traffic is expected to be minimal during this time.

4.6.3 Effects of Conservation Actions

Effects to California tiger salamanders on conservation lands are expected to be very low. Conservation actions implemented on mitigation lands, such as cattle grazing or seeding of native grasses, would have minimal effect. However, any activities that would result in the collapse or

removal of burrows could affect tiger salamanders. Impacts would be direct if they crushed or injured individuals, or indirect if they impede movement to and from aquatic habitat to upland habitat. Site visits would primarily occur as the result of monitoring events or would be associated with grassland enhancement projects, the duration of these visits is expected to be short and the effect on tiger salamanders would be minimal. As described in the avoidance measures equipment use will be restricted during or immediately after heavy rain events (i.e., when tiger salamanders are most likely to be moving overland) to avoid take and because the dirt roads would become unusable. California tiger salamanders may experience harassment or harm when being moved from within a construction zone to an area outside of the construction zone during implementation of the avoidance measures.

4.7 Cumulative Effects

Implementation of the project may incrementally contribute to cumulative loss or degradation of habitat for San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamanders. In this HCP, the cumulative effects of the plan on these species are assessed relative to past, present, and reasonably foreseeable projects in western Merced County.

The area around the junction of I-5 and SR 152 has over the years become a pinch point for the north–south movement of wildlife along the western side of the San Joaquin Valley. The past development of the San Luis Reservoir, O'Neill Forebay, the California Aqueduct, Delta-Mendota Canal, Outside Canal, Los Banos Reservoir, the commercial and residential development around Santa Nella, agricultural development east of I-5, and the presence of I-5 and SR 152 themselves have made it increasingly difficult for north–south movement of wildlife in the region. In addition, several planned developments are contemplated in the vicinity of the project site, including Villages of Laguna San Luis (north and northwest of the site) and continued development under the Santa Nella Community Plan (north of the site). Due to these existing constraints on movement the remaining highest priority for San Joaquin kit fox conservation in the region is to protect the local, Santa Nella satellite population and retain a connection between that population, south to the Panoche Valley.

The Wright Solar Park will be located southwest of the I-5/SR 152 junction, and the pinch point identified there, within the Santa Nella satellite population of the San Joaquin kit fox. It is possible that the Wright Solar project will contribute to cumulative effects on wildlife movement within the local region, or habitat degradation and loss when considered in combination with some of these projects, and in particular the planned development of the Villages of Laguna San Luis; however, an additive effect to the constraints on movement around the I-5/SR 152 pinch point is not anticipated to result from project construction or operation. Effects on the San Joaquin kit fox will be confined to a reduction in available dispersal, foraging, and low quality denning habitat within the Santa Nella satellite population.

The 6,200 acre Villages of Laguna San Luis mixed-use development would adjoin the northern boundary of the project site and extend north of SR 152, effectively blocking movement in the vicinity outside of the open space areas planned around the periphery of the development and in

the movement corridors provided through and adjacent to the project site under the HCP. However, although the community plan for the Villages of Laguna San Luis has been approved by the County, site-specific permits from the regulatory and resource agencies have not been obtained, including permits from the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) for incidental take of listed species under the federal and state Endangered Species Acts (ESA), and the U.S. Army Corps of Engineers (USACE) for permits to discharge fill material into waters of the United States. Without these permits the project is not reasonably foreseeable as currently proposed. Given the potential effects on the kit fox from this proposed development, and its status as a state and federally-listed species, it is likely that refinements in the configuration or extent of this planned development, or additional mitigation or minimization measures to reduce effects on movement, may occur during the permitting process. Compliance with the state and federal ESA would likely reduce the cumulative contribution of the Villages of Laguna San Luis to effects on wildlife movement corridors, although it is unknown to what degree.

The urban community of Santa Nella is located north of SR 152. Although continued build-out of this community would likely result in a loss of kit fox habitat, it would not appreciably impede kit foxes from moving north and south across SR 152. As stated above, the highest priority for San Joaquin kit fox conservation in the region is to protect the local, Santa Nella satellite population and retain a connection between that population and the Panoche Valley satellite population. None of the planned developments described above would result in the loss of the connection between the Santa Nella satellite population and Panoche Valley. Design of the Wright Solar Project will allow for local kit foxes to be able to move through the project site as well as move between the project site and other protected open spaces in western Merced County, including the Agua Fria Conservation Bank, Los Banos Creek Reservoir, the proposed mitigation site, and the core population to the south in Panoche Valley. This will enable the Santa Nella satellite population of kit foxes to persist, and thus will not result is cumulative impact on the species.

The project would contribute to the permanent loss of movement and foraging habitat for San Joaquin kit fox and minimally contribute to the permanent loss of upland California tiger salamander habitat, it would not contribute to the permanent loss of suitable San Joaquin kit fox denning habitat because the site is currently not suitable for denning, nor will it contribute to the permanent loss of suitable blunt-nosed leopard lizard habitat because the site is currently not suitable for that species. Construction of the project is not expected to facilitate or contribute to further development in western Merced County during the life of the project (or permit term). Additional rural residential development in the region, and associated land uses such as agriculture, will occur regardless of the construction and operation of the project.

4.8 Estimated Level of Take

HCPs are required to determine the amount of incidental take that may occur as a result of covered activities and that will be authorized during the take permit term (50 CFR 17.22[b]) (see Section 4.2 for a definition of incidental take). The following estimate of take considers the avoidance and minimization measures described in Chapter 5.

Incidental take of kit foxes, California tiger salamanders, and blunt-nosed leopard lizard in the form of harassment, injury, or death may occur as a result of construction activities or from on-going use of the Permit Area. Loss of habitat that may result in take (in the form of harm) is permitted for all three covered species. In the event that San Joaquin kit fox or California tiger salamanders move through the Permit Area, they may be accidentally harassed by construction or O&M activities, by implementation of avoidance measures, or harmed when injured or killed by vehicles. Table 4-1 summarizes the Applicant's take request, in the form of harm due to mortality or injury, for San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamanders.

Table 4-1. Mortality and Injury Expected by Species for 40-Year Permit Term

Species	Number of Individuals	Permanent Habitat Loss (acres)	Temporary Habitat Loss (acres)
San Joaquin kit fox	1	1,200	200
Blunt-nosed leopard lizard	1	1.2	1.9[a]
California tiger salamander	1	1.2[a]	1.9[a]

[a] The project site does not contain suitable habitat currently, therefore loss of habitat is not projected from construction. This species is included because it could move into the project site following construction and there could be temporary impacts from decommissioning activities.

The relative numbers of individuals that may be taken over the permit term is not possible to predict. There is relatively little data on the population dynamics and density of any of the covered species in the vicinity of the action area. It is known that San Joaquin kit foxes utilize habitat in the general vicinity of the action area, but population densities are not known. Abundance, or even presence or absence of California tiger salamanders and blunt-nosed leopard lizards is even less well known. The potential for those species to occur in the action area is inferred from historic occurrence data that was obtained from the CNDDB, and from the presence, or predicted future presence, of potential habitat both within and surrounding the action area.

The effects of the various covered activities on covered species are likewise difficult to predict. It is currently not well understood how active solar fields may affect the covered species. A lack of data in this regard makes it difficult to predict whether or not covered species will experience certain forms of take, such as mortality or injury. Nonetheless, certain activities may result in take of covered species should they occur on site. While burrows will be hand excavated to minimize the chances that covered species will be entombed within burrows, it is possible that species may be injured or killed during these excavations by shovels or other excavation equipment. Mortality or injury may occur from vehicle strikes, or through other means that we lack sufficient knowledge to predict.

Because of the many unknowns regarding the effects of the project on covered species, incidental take in the form of mortality or injury for the 40-year permit term is estimated to be one (1) of each covered species. The number for the maximum level of direct take for San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander was determined because the level of mortality and injury cannot currently be reasonably estimated over a 40-year permit term, and if any mortality or injury occurs, it will be necessary to analyze the project's effects on covered species to determine whether or not such mortality or injury can be avoided in the future, and how many animals would be expected to experience that mortality or injury for the remainder of the duration of the permit. Each time documented mortality or injury of any covered species occurs, the applicants will meet and confer with the Wildlife Agencies to evaluate the cause of the take and ways in which it could have been avoided. This estimation does not include any harm or harassment that might result from monitoring activities on mitigation lands. Those activities are considered to have a negligible chance of causing take on the mitigation lands.

In addition to the number of individuals that may experience mortality or injury within the solar site, all individuals within the 5,181 permit area will experience incidental take in the form of harassment from construction of the project, operations and maintenance, decommissioning within the solar site, and management activities on the mitigation site.

Take in the form of harm resulting from habitat loss is also expected to occur as a result of covered activities. Currently, the project site could function as movement and foraging habitat for kit fox, and potentially California tiger salamander and blunt-nosed leopard lizard later in the permit term.

The Applicant expects take in the forms of harassment and harm over the 5,181-acre permit area, and injury or death of up to 1 kit fox, 1 blunt-nosed leopard lizard, and 1 California tiger salamander during the permit term. The Applicant also requests take authorization for the loss of up to 1,400 acres of kit fox movement and foraging habitat that may also serve as habitat for blunt-nosed leopard lizard and California tiger salamander after the project is constructed.

Chapter 5
Conservation Strategy

5.1 Overview and Purpose

The conservation strategy is designed to mitigate the effects of the covered activities on the covered species-- San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander--and achieve the biological goals and objectives of the habitat conservation plan (HCP). The conservation strategy outlines a series of avoidance, minimization, and conservation measures to achieve these goals and objectives. The conservation strategy also includes a monitoring and adaptive management program to ensure compliance and track progress towards meeting the goals and objectives. The conservation strategy is based on the following.

- The need to meet the Endangered Species Act (ESA) standard of minimizing and mitigating impacts of the covered activities to the maximum extent practicable and the California Endangered Species Act (CESA) standard of fully mitigating impacts.
- The projected level of impact on San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander as a result of the covered activities.
- The ecological requirements of the covered species.
- The conservation needs of the covered species in the permit area and in the region.
- Discussions with species experts, including U.S. Fish and Wildlife Service (USFWS) and California Department of Wildlife (CDFW) (Wildlife Agencies) staff.

The conservation strategy includes three types of conservation measures, each of which is described below.

- Project design features that minimize effects.
- General avoidance and minimization measures.
- Species-specific avoidance and minimization measures.
- Habitat preservation, habitat enhancement, and long-term habitat management.

5.2 Biological Goals and Objectives

This HCP establishes biological goals and objectives for each of the covered species. *Biological goals* are broad, guiding principles based on the conservation needs of the species. *Biological objectives* are expressed as conservation targets or desired future conditions. Objectives are measurable and quantitative when possible; they clearly state a desired result and will collectively achieve the biological goals. Biological goals and objectives for covered species are required by USFWS's 5-Point Policy to be included in HCPs (65 FR 35242 [June 1, 2000]).

The biological goals and objectives described below are designed to at least maintain current populations of the covered species and other native species in the permit area. The biological goals and objectives provide the framework for the conservation strategy presented in this chapter. The chief biological goal of this project will be to contribute to and support the recovery strategy for blunt-nosed leopard lizard and San Joaquin kit fox identified in the *Recovery Plan for Upland Species in the San Joaquin Valley, California* (U.S. Fish and Wildlife Service 1998) and contribute to and support the management and recovery measures identified in the *Report to the Fish and Game Commission - A Status Review of the California Tiger Salamander* (Ambystoma californiense*)* (California Department of Fish and Game 2010).

5.2.1 Covered Species

At a regional level, the permit area and the lands immediately adjacent have been identified as an important movement corridor for the San Joaquin kit fox. The movement corridor in this region of the kit fox range is part of a pinch point between the northern and southern kit fox populations and is considered critical to the continued existence and genetic diversity of the northern population. All associated land acquisition and habitat enhancement will focus on protecting and managing suitable habitat for the covered species. In addition, an intent of these activities will be to build connections between kit fox populations to contribute to "the establishment of a viable complex of kit fox populations (i.e., a viable metapopulation) on private and public lands throughout its geographic range," as identified in *Recovery Plan for Upland Species of the San Joaquin Valley* (U.S. Fish and Wildlife Service 1998).

Additionally, blunt-nosed leopard lizards and California tiger salamanders are known to occur to the west and south of the project site (Figure 3-4). Through the project design features and application of the general and species-specific avoidance and minimization measures outlined below, Wright Solar, LLC (the Applicant) will maintain permeability of the site and improve on site conditions for San Joaquin kit fox, as well as blunt-nosed leopard lizards and California tiger salamanders.

Goal 1. Minimize adverse effects on covered species during all project activities: construction, operation and maintenance (O&M), and decommissioning.

Objective 1.1. Avoid injury or death of covered species during project construction and decommissioning by implementing project-level avoidance and minimization measures for all covered activities that occur in suitable habitat. Implement species-specific avoidance measures to protect covered species during O&M activities.

Objective 1.2. Retain movement through the project site by protecting grassland habitat around the edges of the project site and by allowing movement within the project site. Ensure that fences that surround the project site are permeable to San Joaquin kit fox.

Objective 1.3. Minimize impacts on San Joaquin kit fox during project occupancy by incorporating project design elements into the project design that reduce disturbance from noise, light, human activity, pets, or other competing species.

Objective 1.4. Avoid impacts to alkali vernal pool.

Goal 2. Increase the quantity and quality of covered species habitat that is under permanent protection in western Merced County.

Objective 2.1. Preserve and manage 2,450 acres of San Joaquin kit fox foraging and movement habitat offsite in western Merced County, and place those lands under permanent conservation easements.

Objective 2.2. Preserve and manage blunt-nosed leopard lizard habitat off-site in western Merced County, and place those lands under permanent conservation easements.

Objective 2.3. Preserve and manage California tiger salamander upland habitat within at least 1.24 miles of known or potential aquatic habitat offsite in western Merced County, and place those lands under permanent conservation easements.

5.3 Avoidance and Minimization Measures

As required by ESA, the HCP includes measures to avoid or minimize the taking of covered species. The primary focus of these measures is to avoid or minimize take of individuals of covered species (i.e., death or injury to species) and impacts on high-quality habitat, such as grassland areas that may be affected by covered activities. Even with these avoidance and minimization measures, other forms of take (e.g., harm or harassment of covered species) may still occur.

5.3.1 Project Design Features

The following measures have been incorporated into the design of the project to avoid and minimize impacts on San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander.

- To lessen the potential direct effects on covered species, the project has been designed so that the areas that will be directly affected by the proposed project (on which the solar arrays and roads will be constructed) will occur almost entirely in areas that are currently cultivated and therefore least suitable habitat for the covered species.
- Security fences installed on the perimeter of the project site will be designed to enable passage of kit foxes and their prey, while impeding the passage of larger predators of kit foxes, such as coyotes and larger domestic dogs. All fencing will leave a 4- to 8-inch opening between the fence mesh and the ground. The bottom of the fence fabric shall be knuckled (wrapped back to form a smooth edge) to protect wildlife that pass under the fence. Fences will be monitored regularly to ensure that any damage or vandalism is quickly repaired.
- Areas of the project site between the solar arrays will be left fallow and managed (e.g., grazed or mowed) to allow annual grassland species and prey species to recolonize the project site and to maintain two wildlife corridors through the entire project site in a generally north-south direction.
- Exterior lighting installed in common areas will be low-intensity, focused, directional lights to reduce light spillage into adjacent open space. This approach will minimize disturbances to San Joaquin kit fox.

- The grassland areas within the project site will not be affected by construction activities and will be left in their existing condition. These areas will continue to be grazed to keep grass height and density low.
- Wetland areas within the project site will not be affected by construction activities and will be left in their existing condition.

5.3.2 General Avoidance and Minimization Measures

The following avoidance and minimization measures will be implemented whenever covered activities occur.

- All employees and contractors will receive environmental training prior to the commencement of construction activities. The avoidance and minimization measures will be outlined in the training. All personnel on the construction site will follow these measures to avoid or reduce effects on covered species. The training will include a printed handout (printed in both English and Spanish) that will be handed to all personnel. All employees and contractors will be required to sign a sign-in sheet indicating that they attended the training and understand the material presented. The handout will contain the following information.
    - Descriptions of the covered species (including photographs) and their habitat needs.
    - A current report of the occurrences of the covered species in the Permit Area.
    - An explanation of the protected status of each covered species under the federal and state endangered species acts and legal obligations.
    - Avoidance and minimization measures that will be followed to reduce impacts on the covered species during all project activities: construction, O&M, and decommissioning, and the penalties for not following the avoidance and mitigation measures.
    - Instructions on the procedures that will be implemented if a covered species is found onsite, including contact information of a biological monitor, USFWS, and CDFW personnel.
- At least 30 days prior to the onset of ground-disturbing activities, the name(s) and credentials of a supervisory project biologist responsible for approving and overseeing all project biological monitors and other biologists performing biological work, would be submitted to the Service for approval.
- Approved biological monitor(s) will be required onsite as long as construction crews and vehicles are accessing the site. Monitoring will cease once construction traffic and activity has ceased and the site is operable.
- Biological monitors will have the authority to order a halt to construction activities, and will order halts to construction activities in the following instances: 1) the monitor observes activities that may result in mortality or harm to covered or listed species; 2) the monitor observes any of the avoidance and minimization measures described in this HCP are not being implemented; or 3) if at any time a covered or federally-listed species is in danger of experiencing mortality or harm. Work shall not resume until the situation has been rectified to the satisfaction of the supervisory project biologist. If a biological monitor orders a halt to

construction activities, he or she shall immediately contact the supervisory project biologist for further instructions.

- All construction-related activities will occur within designated work areas.
- All construction activities will terminate 30 minutes before sunset and will not resume until 30 minutes after sunrise, except as described below. Sunrise and sunset times are established by the U.S. Naval Observatory Astronomical Applications Department for the geographic area where the project is located. Some discrete maintenance activities must occur when the facility is not generating power, at night. Those activities will be conducted under the supervision of a qualified biologist. Some O&M activities must occur when the solar site is powered down, which occurs at night. Those activities which must occur at night are authorized.
- To prevent inadvertent entrapment of San Joaquin kit foxes or other animals during the construction phase of the project, all excavated, steep-walled holes or trenches more than five feet deep shall be covered at the close of each working day by plywood or similar materials. Any covers that are installed will be able to be removed quickly by construction staff should the need arise. If covers require heavy equipment to lift them, some means of inspecting the inside of the hole will be installed (e.g., Plexiglas windows) so that biological monitors can ensure no animals are trapped inside. Holes and trenches less than five feet deep may either be covered or be provided with escape ramps at a rate of one ramp every 100 feet. Escape ramps may be constructed of earth fill or wooden planks with a slope no steeper than 45 degrees. If wooden planks are used, perpendicular groves or rungs shall be provided to aid in traction. All holes and trenches, whether covered or uncovered, more than 2 feet deep shall be inspected daily for trapped animals regardless of whether or not work is occurring in that area. Before holes or trenches are filled, they shall be thoroughly inspected for trapped animals. Work will not continue until trapped animals have moved out of or are removed from the open trench and relocated to a location approved by the Wildlife Agencies.
- Speed limits within the project site will be limited to 15 miles per hour (mph) during the day and 10 mph at night. All project-related vehicles and equipment will be restricted to established roads, construction areas, and designated staging areas.
- Food-related trash will be disposed of in closed containers and removed from the project site at least once daily.
- No pets or firearms will be permitted on the project site.
- Within 1 working day of finding a dead, sick, or injured covered species on the project site, the biologist will notify the Wildlife Agencies orally and within 3 working days in writing. Notification in writing will include the date, time, and location where the specimen was found and information about the conditions under which it was found.
- A map of the location of all observation of covered species observed during preconstruction surveys and during monitoring will be prepared and submitted to the Wildlife Agencies. This information will be presented to the California Natural Diversity Database (CNDDB).
- A Revegetation Plan will be prepared for the project. Upon completion of the project, all areas temporarily subject to ground disturbance, including staging areas, will be revegated according

to the project Revegetation Plan. The plan will be submitted prior to its implementation, which will be immediately following construction.

5.3.3 Species-Specific Avoidance and Minimization Measures

San Joaquin Kit Fox

The following measures will be incorporated during construction, O&M, and decommissioning of the solar park to avoid and minimize effects on San Joaquin kit fox.

- The guidelines described in U.S. Fish and Wildlife Service 2011, or the most recent version of these guidelines will be implemented, except as modified by other measures below. The applicant will inquire with the Service yearly to obtain the most recent guidelines.
- As described in U.S. Fish and Wildlife Service (2011), the preconstruction survey will be conducted no less than 14 days and no more than 30 days before the beginning of ground disturbance, or any activity likely to affect San Joaquin kit fox. The biologists will conduct den searches by systematically walking transects through the project site and a buffer area to be determined in coordination with the Wildlife Agencies. Transect distance will be based on the height of vegetation such that 100% visual coverage of the project site is achieved. If a potential or known den is found during the survey, the biologist will measure the size of the den, evaluate the shape of the den entrances, and note tracks, scat, prey remains, and recent excavations at the den site. Dens will be classified into the den status categories defined by USFWS (U.S. Fish and Wildlife Service 2011).
- A report of the preconstruction survey will be submitted to the Wildlife Agencies for review and approval.
- If potential den sites are located they will be monitored by a biologist approved by the Wildlife Agencies. The biologist will use an infrared beam camera and track plates or powder, to determine if the den is currently being used. The camera and track plates will be placed at the burrow for a minimum of 5 consecutive days. Other signs of occupancy (e.g., scat, fur) will be searched for in and around the burrow and, if found, documented with photographs.
- San Joaquin kit fox are attracted to den-like structures such as stored pipes. All construction pipes, culverts, or similar structures with a 4-inch or greater diameter that are stored at the construction site for one or more overnight periods shall be closed off at both ends and thoroughly inspected before they are buried, capped, or otherwise used or moved in any way. If a kit fox is discovered in a pipe, that section of pipe shall not be moved until the kit fox is allowed to leave unimpeded or the Wildlife Agencies have been consulted.
- All materials staged on the project site, and especially in staging areas, shall be spaced so as to not provide areas suitable for Covered Species to seek shelter. At no time shall materials be haphazardly piled on the project sites. All materials shall be inspected thoroughly by the biological monitor prior to being moved.
- Construction activities will be prohibited within exclusion zones around suitable burrows, based on their type. If any San Joaquin kit fox dens or potential dens are found during preconstruction

surveys, the status of the dens shall be evaluated prior to project ground disturbance. The configuration of exclusion zones around San Joaquin kit fox dens should have the radius measured outward from the entrance or cluster of entrances, as follows.

  - *Potential den*: a 50-foot avoidance buffer will be used when kit fox occupation is expected but not confirmed.
  - *Known den*: a 100-foot avoidance buffer will be used if kit fox activity is observed.
  - *Natal/pupping den*: the Wildlife Agencies must be contacted.

- The Applicant will install artificial escape tunnels along the outside edge of the solar arrays (outside of the fencing) and facing the 300-foot wide 230-kilovolt (kV) transmission corridor. The escape tunnels will be placed at a minimum every 1/8-mile along the transmission corridors length adjacent to the solar arrays. The escape tunnels should be of similar design as those presented in Harrison et al. (2011).
- Rodenticide and pesticide use is prohibited. Herbicide application will be limited to areas where mowing is not possible (e.g., around buildings and against poles and other infrastructure).

Blunt-Nosed Leopard Lizards

The following measures will be incorporated during O&M and decommissioning of the solar park to avoid effects on blunt-nosed leopard lizards.

- To minimize the potential for take of blunt-nosed leopard lizards during O&M activities, a biologist approved by the Wildlife Agencies will survey areas of suitable habitat for blunt-nosed leopard lizards 24 hours prior to ground disturbance to determine suitability for blunt-nosed leopard lizards. These areas include remnant patches of annual grassland that occur along roadsides and in other areas that have not been cultivated. Roads will also be surveyed since blunt-nosed leopard lizards utilize roadways for basking on warm days. A biologist will search the work area for ground squirrel or gopher burrows and mark any burrows within the work area with visible pin flags. A buffer distance of at least 50 feet will be maintained around burrows to avoid collapsing them. If burrows cannot be avoided and it is determined that the activities will destroy the burrows, the burrows will be excavated by hand. If it is determined that the burrow is occupied by a blunt-nosed leopard lizard the lizard will be allowed to leave the burrow and move to an area that will not be disturbed.
- If a blunt-nosed leopard lizard is encountered during these surveys, the location of the observation will be marked and the Wildlife Agencies will be contacted. No ground-disturbing activities will occur until the lizard has been allowed to passively disperse or is relocated with the approval of the Wildlife Agencies to a location that has been pre-approved by the Wildlife Agencies. A report of the preconstruction survey will be submitted to the Wildlife Agencies for review and approval.
- No monofilament plastic will be used for erosion control.

- Avoid using rodenticides and pesticides within the project site. Herbicide application will be limited to areas where mowing is not possible (e.g., around buildings and against poles and infrastructure).
- Optimal activity temps for blunt-nosed leopard lizards are between 77F – 95F measured 1-2 cm above the ground over the surface of a project site (CDFW 2004). Between April 1 – September 30 mowing will occur when the animals are underground and temperatures are below 75F, measured 1-cm above the ground in the sun.

The following measures will be incorporated during decommissioning of the solar park to avoid effects on blunt-nosed leopard lizards.

- Prior to decommissioning activities, an agency-approved biologist experienced in surveying for blunt-nosed leopard lizard will assess site conditions for supporting the species.
    - Presence/absence surveys for the species will be conducted in those areas where ground disturbing activities will occur. Surveys will be conducted according to the most recent agency-approved survey protocol. The surveying biologist will notify the Wildlife Agencies if blunt-nosed leopard lizard is detected within the project site.
    - If a blunt-nosed leopard lizard is encountered during these surveys, the Wildlife Agencies will be contacted. No ground-disturbing activities will occur until the lizard has been allowed to passively disperse or is relocated with the approval of the Wildlife Agencies to a location that has been pre-approved by the Wildlife Agencies. A report of the preconstruction survey will be submitted to the Wildlife Agencies for review and approval.
    - If burrows within 50 feet of where a blunt-nosed leopard lizard was observed cannot be avoided and it is determined that the decommissioning activities will destroy the burrows, those burrows will be hand dug. If it is determined that the burrow is occupied by a blunt-nosed leopard lizard the lizard will be allowed to leave the burrow and move to an area that will not be disturbed or the lizards will be captured and relocated to a location that has been pre-approved by the Wildlife Agencies.

California Tiger Salamander

The following measures will be incorporated during construction, O&M, and decommissioning of the solar park to avoid effects on California tiger salamanders.

- To minimize the potential for take of California tiger salamanders, a biologist approved by the Wildlife Agencies will survey grassland areas for California tiger salamanders 24 hours prior to ground disturbance. These surveys will involve looking for California tiger salamanders beneath boards and within discarded pipe that were observed within in these areas during reconnaissance level surveys. A biologist will search the work area for ground squirrel or gopher burrows and mark any burrows within the work area with visible pin flags.
- Burrows will be avoided to greatest extent practicable to avoid collapsing them. If burrows cannot be avoided and it is determined that the activities will destroy the burrows, the burrows will be hand dug. If it is determined that the burrow is occupied by a CTS, it will be allowed to leave the burrow and move to an area that will not be disturbed or the salamander will be

captured and relocated to a location that has been pre-approved by the Service. If a CTS is encountered during these surveys, and is in danger of being harmed, as defined in the Act, the supervisory project biologist will temporarily stop all activities that threaten harm, remove the animal from the area, and relocate it to the pre-approved relocation location. Relocations will be described to the Service in the annual report. No ground-disturbing activities will occur until the salamander has been allowed to passively disperse or has been relocated.

- During O&M and decommissioning of the site, ground-disturbing activities will be limited to dry weather between April 15 and October 31 to the greatest extent practicable. Wet weather is defined as when there has been 0.25 inch of rain in a 24-hour period. Ground-disturbing activities halted due to wet weather may resume when precipitation ceases and the National Weather Service 72-hour weather forecast indicates a 30% or less chance of precipitation. No ground-disturbing work will occur during a dry-out period of 48 hours after the above referenced wet weather.
- If a California tiger salamander is found in the work area during construction and cannot or does not move offsite on its own, the approved biologist will trap and move the California tiger salamander to a location outside of the work area consistent with a Service-approved relocation plan.
- No monofilament plastic will be used for erosion control to minimize the risk to tiger salamanders of entrapment.
- Tightly woven exclusion fencing should be installed between the work area and the alkali vernal pool to prevent California tiger salamander from entering the work area. The fencing should be at least 24 inches above ground with the bottom 6 inches buried. The fencing stakes should be installed facing the work area to prevent amphibians from using stakes to climb over the fence. The specifics of the location of the fencing will be determined in consultation with the Wildlife Agencies.
- Avoid using rodenticides and pesticides within the project site. Herbicide application will be limited to areas where mowing is not possible (e.g., around buildings and against poles or other infrastructure).

5.4 Habitat Preservation

Throughout the San Joaquin kit fox's range, more than 80% of the remaining lands that are suitable occur on privately owned lands. The loss of high and medium quality habitat is continuing at a rapid rate, and thus, each year, less habitat is available for protection. Consequently, efforts to protect suitable San Joaquin kit fox habitat should target lands that will provide maximum benefit for conservation and recovery (Cypher et al. 2013). Protecting and managing habitat in southwestern Merced County and movement corridors connecting this population and the core population in Panoche Valley should be among the highest priority tasks for any kit fox conservation strategy in order to enhance the long-term viability of populations present in western Merced County (Constable et al. 2009). Thus, conserving areas of medium to high quality habitat south of Santa Nella would help to perpetuate populations of kit foxes in western Merced County. The preservation

of medium to high quality kit fox habitat will also benefit blunt-nosed leopard lizards because their habitat requirements are similar, and will benefit upland aestivation and movement habitat for California tiger salamanders.

Habitat preservation will occur to offset the effects of habitat loss that result from the construction of the project. All land that is protected for the purpose of mitigation will be placed under a permanent conservation easement.

5.4.1 Total Conservation Area

To offset the estimated 1,200 acres of permanent habitat loss and degradation and 200 acres of temporary habitat disturbance a compensatory mitigation proposal is described below. The mitigation land includes approximately 2,450 acres of grazed grassland located 5 miles south of Los Banos Reservoir (Figure 1-2).

5.4.2 Habitat Management within the Project Site

The area that will be disturbed during construction, which will ultimately be under the panels once the project is built, will be seeded with a native grass mix. Due to the perennial disturbance of the site from dry-land farming for many years establishing a weed-free grassland will be difficult, but is possible with careful management. The goals of grassland management onsite will be focused on fire suppression and providing habitat for grassland species. Once established this newly seeded grassland is expected to provide ecological benefits to native species in the region because it will support a prey base (e.g., small mammals, insects) that has been absent for several decades while the land has been under cultivation. As described above, the perimeter fencing will be designed to allow kit fox movement through the site. The project site will not be placed under a conservation easement and is therefore not included in the compensatory mitigation package, but it is expected to provide additional habitat value for the covered species during project operations.

5.4.3 Offsite Mitigation

Concurrent to construction activities, but before the Wright Solar park may begin generating electricity, the Applicant has identified 2,450 acres of land approximately 5 miles south of the project site that will be placed under conservation easement (Figures 1-1 and 1-2). The conservation easement would require continuation of current land management practices, including livestock grazing, which favors upland habitat for San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander. San Joaquin kit fox scat as well as many suitable burrows has been observed on site as well as numerous ground squirrel colonies

The proposed mitigation site has been identified as moderate to high quality kit fox habitat by ESRP (Constable et al. 2009) and ICF biologists observed kit foxes on the parcels during spotlight surveys conducted October 29 and 30, 2013. Surveys for California tiger salamanders or blunt-nosed leopard lizards were not conducted on the proposed offsite mitigation lands. However, the site is located within 1.24 miles of suitable aquatic habitat for California tiger salamander (based on aerial photograph interpretation) and the site provides suitable upland habitat for California tiger salamander. The site includes a historic occurrence of blunt-nosed leopard lizard (CDFW 2013) along

the western boundary and provides low quality (i.e., grassland) habitat for species across the entire site. Setting aside this site under a conservation easement would ensure that these lands remain suitable for the covered species and serve as a movement corridor for kit foxes in perpetuity.

5.5 Monitoring

Monitoring is an integral part of the conservation strategy and adaptive management plan. The monitoring program is designed to fulfill three purposes.

- Verify completion of HCP requirements as stated in this document (compliance monitoring).
- Assess the levels of take resulting from the HCP (effects monitoring).
- Monitor and evaluate the effectiveness of the conservation strategy (effectiveness monitoring).

The type and level of monitoring was designed to ensure that the biological goals and objectives of this HCP are achieved. Future management and monitoring of the 2,450 acre mitigation site will be detailed in a USFWS approved Habitat Management Plan. Monitoring will inform the adaptive management process and will be used to change and/or improve management actions to improve their effectiveness for covered species.

5.5.1 Effectiveness Monitoring

Both the project site and mitigation lands will be monitored following completion of project construction. The primary goal of effectiveness monitoring on the mitigation lands is to ensure habitat on the mitigation area remains suitable for San Joaquin kit fox, blunt-nosed leopard lizard and California tiger salamander. San Joaquin kit fox are wide-ranging mammals that could use the mitigation lands in many ways (i.e., movement, foraging, denning), any of which would contribute to the success of the species in the region.

Project Site

Two of the biological objectives of this HCP are to allow for kit fox movement within and through the project site to sustain the local population. It is possible that kit fox may start using the site after the solar project is constructed. In order to monitor whether that is occurring the Applicant will install motion activated cameras to detect kit foxes moving around the periphery of the site, through the movement corridors that run through the site, and within the solar arrays themselves. Cameras will be in fixed locations along the outer fence along the periphery and will be located no more than 250ft apart. Similarly cameras will be place along the interior of the solar site, along the transmission corridors at similar intervals. Cameras will be fixed unless the qualified biologist on-site determines more appropriate locations with a higher detection probability.

Cameras will be activated each year starting February 15th and will run continuously until at least August 15th. Cameras will be installed within 6 months following the completion of construction, and camera monitoring will begin once the site is constructed and operational and will continue for the first five (5) years. Images from the cameras will be downloaded at least monthly. The frequency of

image collection will be modified following the first two months and will depend on the level of activity detected by the cameras and the size of the memory cards. Any detection of kit foxes will be reported to the USFWS immediately and also summarized in the annual report. Any detection of other canids (i.e., red fox, coyote) or other notable species (e.g., American badgers) will be summarized in the annual report.

To supplement the camera monitoring, surveys using scat detection dogs will be conducted during Years 1, 3, and 5 following construction. These surveys will occur in the spring, once young kit foxes have emerged from dens and are dispersing to new territories. Surveys will cover the solar array itself, all movement corridors within the arrays, and the accessible undeveloped lands adjacent to the solar arrays. Survey results will be summarized in the annual report. Any detection of kit fox scat will be reported to the USFWS.

Mitigation Site

Success criteria for the covered species on mitigation lands will be based on the existing vegetation condition and on reference sites. The baseline condition will be quantitatively estimated during surveys conducted in the first year after the mitigation lands are put under permanent protection (conservation easement). Both springtime grass height surveys, and fall residual dry matter (RDM) and grass height surveys will be conducted. The results of these surveys during the first full year will be used to determine the baseline conditions of the site. Vegetation metrics will be adjusted to account for anomalies in rainfall during the previous rain year for this baseline measurement.

Success criteria against which future monitoring will be evaluated may be established utilizing the same parameters at a reference site (e.g., nearby conservation bank), if the site is accessible and kit fox have been detected there in the previous five (5) years. The success of the mitigation area can then be measured against similar, successful habitats in the region. The specific metrics will be detailed in a USFWS approved habitat management plan, but will generally include grass height during the spring and fall that is less than six (6) inches tall during the monitoring event. In the fall, the RDM will not exceed 500lbs/acre. Following monitoring each year, the Applicant, under the direction of a USFWS- approved biologist, will adjust management (i.e., grazing) activities to attempt to replicate the baseline conditions or improve them if necessary. Any recommended changes will be discussed with the USFWS, and documented in the HCP annual report.

In addition to the methods described above, land management staff with range management experience will continue to qualitatively assess the vegetation condition on mitigation lands at least annually to help guide vegetation management. Qualitative vegetation monitoring will be conducted periodically during the year. The grazing intensity may be modified on an annual basis, based on monitoring results and management recommendations. Use of controlled burning as a management tool will not be used on the mitigation site.

Effectiveness Monitoring Schedule on Mitigation Lands

Effectiveness monitoring for San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander will be conducted annually for the first 5 years and then at a reduced frequency for the remainder of the permit term. Monitoring is primarily habitat-based because of the low impacts on individuals expected from covered activities. Following 5 years of annual monitoring, quantitative effectiveness monitoring may be reduced to once every 5 years if results indicate that success criteria are being met (qualitative vegetation monitoring will continue annually). If subsequent surveys indicate that success criteria are not being met, monitoring surveys will revert to an annual quantitative monitoring schedule, until criteria are met for 3 consecutive years. This monitoring schedule will continue through the permit term, unless a new schedule is developed via adaptive management and with the agreement of the Wildlife Agencies.

Even if quantitative monitoring is reduced to every 5 years, qualitative vegetation monitoring will continue annually prior to the application of vegetation management treatments (e.g., livestock grazing). Habitat based monitoring shall continue into perpetuity past the permit term, and will focus on maintaining the habitat conditions that were achieved during the permit term. It is not anticipated that any major management actions will be needed, however if any issues arise an adaptive management approach will be taken to determine appropriate actions.

5.5.2 Compliance and Long-Term Monitoring

Compliance monitoring is required to verify and document that all requirements in this HCP and terms and conditions of the incidental take permit are carried out. The Applicant must verify that the construction avoidance and minimization measures have been implemented successfully. In order to satisfy this condition, the Applicant will hire biologists approved by the Service, as described in section 5.3, to conduct necessary preconstruction surveys and construction monitoring. The consultant will document compliance with the avoidance and minimization measures of this HCP by submitting monthly and year-end reports, through the Applicant, to the Wildlife Agencies. These reports will present the construction activities that occurred and which avoidance and minimization measures were implemented. The HCP will be deemed “in compliance” if all of the terms and conditions of the incidental take permit have been implemented and documented.

5.6 Adaptive Management

Uncertainty is an unavoidable component of managing natural systems. To address such uncertainties, the Applicant will implement this HCP based on the principles of adaptive management. Adaptive management is the process by which management is implemented, monitored and evaluated, and then refined, based on monitoring results. Successful adaptive management in conservation planning requires the following components.

- Success criteria based specifically on the biological goals and objectives for each species.
- An explicit link between monitoring and the success criteria.
- A mechanism to refine or redirect management activities if success criteria are unmet.

The primary source of uncertainty in this HCP, relative to the biological goals and objectives, involves the likelihood that the mitigation areas will provide habitat for the covered species over time. For example the habitat quality at the mitigation sites for San Joaquin kit fox, blunt-nosed leopard lizards, and California tiger salamander is highly dependent on the presence of California ground squirrels. While land management practices can enhance habitats to promote ground squirrel colonization, ultimately the factors that influence their population dynamics, such as disease, drought, predation, inter- and intraspecies competition, may be difficult to control or predict.

5.6.1 Evaluation and Action

The success of the conservation strategy will be measured by evaluating the monitoring results in light of the success criteria. Success criteria will be described in the management plan for the mitigation areas. If monitoring results indicate that the success criteria are unmet and the quality of the habitat is declining, adaptive management will be employed to change the current management techniques so that they can achieve the success criteria to the maximum extent practicable.

If, at any time during monitoring, the adaptive management process results in substantive changes to any conservation measure or management activity, the Applicant will notify the Wildlife Agencies. Specific reporting requirements for the adaptive management plan are described below. Major changes to the conservation measures or management activities may require a more intensive monitoring schedule, to be determined in conjunction with the Wildlife Agencies, and may require an amendment to the HCP or incidental take permit (see Chapter 6, *Implementation and Funding*). Species-specific considerations for adaptive management are described below.

Quantitative and qualitative vegetation monitoring of the mitigation areas is the primary measure of habitat suitability for the covered species. If success criteria are not met, management techniques will be adjusted. For example, because livestock grazing is the primary tool to manage vegetation, the timing of grazing can be changed (e.g., begin earlier in the summer, or extend later in the fall) or the intensity of grazing can be increased or reduced (e.g., grazing for longer duration or for shorter duration using more livestock) without having to notify the Wildlife Agencies in advance (such changes are reported in the annual report, however). During years of extreme weather such as drought or above average rainfall, the grazing intensity will be adjusted to achieve the success criteria. In general this management tool is somewhat self-regulating, as the land manager does not want to overstress the livestock or the land and will therefore adjust the number of animals and duration of grazing to match the annual conditions.

Compared with other federally and state listed species, the life history and habitat requirements of the covered species are relatively well studied. Therefore, research is not included in the conservation strategy for this HCP. If additional information about the species, their use of upland grassland habitat, or their use of habitats within the mitigation areas becomes available, the Applicant will assess this information and adjust the management regime if necessary to account for the new information.

Chapter 6
Implementation and Funding

6.1 Overview

Under the Endangered Species Act (ESA), habitat conservation plan (HCP) implementation begins when the Section 10(a)(1)(B) incidental take permit is issued. Wright Solar, LLC (Applicant) is also applying for a Section 2081(b) permit under the California Endangered Species Act (CESA) for three state-listed species. Implementation for this HCP will begin when the first permit is issued. This chapter describes the implementation of the HCP, including Applicant implementation responsibilities, land acquisition, reporting, funding, changed and unforeseen circumstances, and modifications to the HCP.

6.2 Implementation

HCP implementation will be overseen by the Applicant, with day-to-day tasks managed by staff and consultants. Other experts may be consulted as needed, including biologists from Wildlife Agencies, conservation organizations, consultants, and academia. Unless otherwise stated all obligations and responsibilities described in this chapter to implement the HCP rest with the Applicant.

6.2.1 Implementation Responsibilities

Wright Solar, LLC Staff

The Applicant will oversee HCP implementation and will retain all program records. HCP implementation responsibilities will be assigned to various staff and consultants to form a functional unit to carry out this program. Annual meetings may take place following submittal of the annual report if any issues that warrant discussion. Meetings can be requested at any point by the applicant or the USFWS. The Additional meetings and conferences may be called by any of the parties at any time to address immediate concerns. The purpose of the annual meeting is to evaluate the efficacy of monitoring methods, compare the results of monitoring to the estimated take, evaluate the success of mitigation, and develop recommendations for future monitoring and mitigation. Regular meetings also provide opportunities to consider the need for adaptive management measures.

The Applicant is also responsible for providing data collected in relation to the HCP within 30 days of requests by USFWS unless otherwise identified. The Wildlife Agencies will provide the Applicant and/or its consultant's sufficient notice prior to conducting a site visit of the project site or mitigation areas to enable appropriate project or HCP implementation staff to participate.

Consultants and Contractors

The Applicant will retain consultants to meet all reporting, technical, and/or scientific needs that cannot be effectively or efficiently addressed through in-house staff. It is expected that consultants will be utilized more heavily during the early stages of HCP implementation. All consultants will be responsible for understanding the requirements of the HCP regarding avoidance and minimization measures. Contractors used during construction, as well as those used for operations and maintenance (O&M) will be trained in avoidance and minimization measures to avoid and minimize impacts on the covered species. Additionally, some work may be performed by grazing lessees.

Regulatory Agencies

USFWS issues the federal permit for incidental take and regulate implementation of the HCP. The successful execution of the conservation strategy—including those management actions, monitoring, and reporting that are part of the HCP—requires coordination between the Applicant and the regulatory agencies.

As discussed above, annual meetings will keep the Wildlife Agencies informed about implementation of conservation measures, progress toward biological goals and objectives, results of monitoring and adaptive management, and other relevant topics. Meeting frequency may be changed by the parties as necessary. These meetings will serve as a means for USFWS to provide advice to the Applicant before implementation of key conservation measures such as adaptive management and monitoring. The meetings will also serve as a forum to troubleshoot issues that arise before they may affect permit compliance. The Wildlife Agencies will receive and review annual reports (Section 6.2.2, *Reporting*) concerning HCP implementation.

6.2.2 Reporting

The Applicant will oversee the preparation of the annual reports that document permit compliance and implementation of the conservation strategy over the term of the HCP. The annual reports will summarize the previous calendar year's implementation activities and will be completed by February 28 following the reporting year. No annual report will be required for the first partial calendar year. Annual reports will require synthesis of data and reporting on important trends such as land acquisition and habitat restoration. A due date at the end of February will allow time for the data from the previous year to be assembled and presented in a clear and concise format.

Annual reports will be submitted to designated representatives of the Wildlife Agencies, and will be available to the public if requested. The Wildlife Agencies will use results presented in the annual reports, as well as other available information and any additional monitoring reports produced under the conservation strategy, to assess success of the HCP in meeting the biological goals and objectives and to formulate recommendations to the Applicant for HCP implementation in subsequent years. Annual reports will be required in perpetuity to document all restoration and management activities occurring on the mitigation property.

The goals of the annual reports include the following.

- Providing the information and data necessary for the Applicant to demonstrate to the Wildlife Agencies and the public that the HCP is being implemented properly and as anticipated.
- Disclosing any problems with HCP implementation so they can be corrected.
- Documenting issues with HCP implementation that may require coordination with the Wildlife Agencies.
- Identifying administrative or minor changes to HCP components required to increase the success of conservation measures.

At a minimum, annual reports will include the following information.

- A description of all covered activities implemented during the reporting period.
- A year-to-date and cumulative summary of impacts and conservation for all land cover types. The impact summary will report the amount of habitat lost for each covered species as well as the amount of take of each species.
- A description of the monitoring undertaken during the reporting period and a summary of monitoring results.
- A description of any actions taken or expected regarding changed circumstances, including remedial actions.
- A description of the adaptive management process utilized during the reporting period.
- An assessment of the efficacy of habitat management methods in achieving performance objectives and recommended changes to improve the efficacy of the methods.
- An assessment of the appropriateness of performance indicators and objectives based on the results of effectiveness monitoring, and recommended changes to performance indicators and objectives.
- A summary of any administrative changes or amendments proposed or approved during the reporting year.

6.3 HCP Costs and Funding

6.3.1 Costs

HCPs are required to describe the funding that will be made available to implement the plan. The estimated costs of the plan elements are listed in Tables 6-1, 6-2, and 6-3. Cost assumptions for plan implementation were developed using comparable cost data from similar Habitat Conservation Plans, local mitigation programs and land management agencies, and from other sources where data from local agencies were unavailable. Costs for HCP implementation are divided between the cost of avoidance and minimization measures during construction (Table 6-1), the cost of interim management actions during the first 5 years while the endowment matures (Table 6-2), and the

long-term management costs including an endowment that would fund management at the mitigation property in perpetuity (Table 6-3).

All totals include a 10% contingency that could be used for additional costs such as changes in management or monitoring needs in response to adaptive management. This contingency fund could also be used to address unforeseen circumstances at the discretion of the Applicant. The one-time costs exclude the cost of acquiring the 40-year conservation easement on the 2,450-acre mitigation site (i.e., land acquisition and transactional costs). This cost would be borne by the Applicant as part of overall project costs. There are no costs identified in perpetuity on the project site, because the project site would be returned to pre-project conditions prior to permit expiration and no further mitigation would be required after the permit term ends. Because there would be 1,200 acres of permanent impacts to kit fox annual management and maintenance of the mitigation site must be implemented in perpetuity. Therefore, those costs are identified as occurring in perpetuity.

The HCP includes a habitat conservation program with measures that the Applicant will undertake to monitor, minimize, and mitigate the incidental take of the covered species. The Applicant will implement the conservation described in this HCP, monitoring, minimization, and mitigation measures, in full, even if the actual costs are greater than anticipated.

Table 6-1. Estimated Costs of Avoidance and Minimization Measures during Construction

Avoidance and Minimization Measure	Number of Units	Cost Per Unit	Total Cost
Biological Monitoring During Construction	280 days	$800	$224,000
Conduct Employee & Contractor Training/Education	4 training sessions	Included in monitoring line item	$0.00
Preconstruction Surveys	12 surveys before new ground disturbance	Included in monitoring line item	$0.00
Blunt-Nose Leopard Lizard & California Tiger Salamander Relocation Plan	1 plan	$2,500	$2,500
Blunt-Nose Leopard Lizard Relocation	4 Relocations	$500	$2,000
California Tiger Salamander Relocation	4 Relocations	$500	$2,000
Exclusion Fencing – to be installed between the work area and the alkali vernal pool	500 feet	$10/foot	$5,000
Subtotal			$235,500
Contingency 10%			$23,550
Total			$259,050

Table 6-2. Interim Management Costs (First 5 Years) of HCP Implementation

Management Action[a]	Total Units	Cost Per Unit	Total Cost	Cost Per Year (5 Years)
Maintain Fences and Gates	10 events	$600	$6,000	$1,200
Road Maintenance	1 event	$600	$600	$120
Maintain Existing Livestock Water Features	5 events	$300	$1,500	$300
Vandalism Monitoring	Will be completed by livestock operator	–	–	–
Motion Activated Cameras	10	$300	$3,000	$600
San Joaquin kit fox surveys	5 events	$10,000	$50,000	$10,000
Habitat monitoring	5 events	$3,000	$15,000	$3,000
Easement Monitoring	5 events	$1,500	$7,500	$1,500
Annual Reporting to Wildlife Agencies	5 events	$2,000	$10,000	$2,000
Subtotal			$93,600	$18,720
Contingency 10%			$9,360	$1,872
Total Interim Management Costs			$102,960	$20,592

[a] Livestock grazing operation is assumed to be revenue neutral.

Table 6-3. Estimated Costs of Long-Term Management of Mitigation Property

Management Action[a]	Total Units Per Year	Cost Per Unit	Total Cost Per Year
Maintain Fences and Gates	2 events	$600	$1,200
Road Maintenance	0.20 event	$600	$600
Maintain Existing Livestock Water Features	1 event	$300	$1,500
Vandalism Monitoring	Assume this will be completed by livestock operator	–	–
Habitat monitoring	0.5 events	$3,000	$1,500
Easement Monitoring	1 event	$1,500	$1,500
Annual Reporting to Wildlife Agencies	1 event	$2,000	$2,000
Subtotal			$8,300
Contingency 10%			$830
Total Long-Term Management Cost			$9,130
Total Endowment (Assumes a 2.5% Net Rate of Return)			$365,200

[a] Livestock grazing operation is assumed to be revenue neutral.

6.3.2 Funding

Funding for implementation of the interim management actions will be provided by the Applicant as an annual operating expense paid with other operating expenditures. These funds will be guaranteed with a Letter of Credit from the Applicant, which will be executed prior to ground disturbing activities authorized under the permit. The Letter of Credit will in the amount of one year of costs and will be renewed annually or if the Letter of Credit is equal to the total 5 year cost, the amount will be reduced by 20% of the first year value for years 2-5. On an annual basis these HCP expenditures will be paid ahead of both debt service to lenders and dividends to equity investors. The Applicant may budget for years 1-5 of implementation on an annual basis, and will set aside an endowment for the long-term management (year 6 and beyond) of the mitigation lands, assuming a net 2.5% capitalization rate, the Applicant would need approximately $365,200 to be invested to produce a sufficient capital return-on-investment to fund annual long-term management activities. The endowment will be held by a USFWS approved entity.

6.3.3 Cost and Funding to Decommission the Project

As described in Chapter 2 the solar facility will be decommissioned at the end of the project life. During decommissioning all infrastructure will be removed from the site and the site will be returned to a pre-project condition. The process of decommissioning is described in detail in Chapter 2 and the potential for decommissioning activities to impact covered species is described for each species in Chapter 4. Decommissioning of this facility is regulated by the California Public Utilities Commission (CPUC). The total cost of decommissioning is shown in Tables 6-4 and 6-5. A description of how decommissioning will be funded is discussed below.

Table 6-4. Estimated Cost of the Labor Required to Decommission the Wright Solar Park

	Labor	Hours Labor	$/hour	Estimated Cost
Removal Summary	**Civil Removal**			
	Road/Surfaces	688	75	$51,600.00
	Fence/Signage	168	50	$8,400.00
	MV Collection System			
	Above Ground	32	75	$2,400.00
	Below Ground	830	65	$53,950.00
	Inverters	160	100	$16,000.00
	Panel System			
	Pier	3,000	75	$225,000.00
	Racking	8,000	35	$280,000.00
	Panel Removal	11,840	35	$414,400.00
	Substation			
	Steel/Equipment Removal	416	50	$20,800.00
	Foundation	160	65	$10,400.00
	Rock and Ground Grid	48	50	$2,400.00
	Gen Tie			
	Wire	8	100	$800.00
	Poles	0	75	$0.00
	Foundation	0	65	$0.00
	O&M Building			
	Removal of Structure	0	20	$0.00
	Foundation	0	30	$0.00
Restoration	**Soil**			
	Ripping/Grading/Leveling	640	75	$48,000.00
Total Labor Costs				$1,134,150.00

Table 6-5. Estimated Cost of Equipment Required to Decommission the Wright Solar Park

	Equipment	Hours Equip	$/hour	Estimated Cost
Removal Summary	**Civil Removal**			
	Road/Surfaces	664	100	$66,400.00
	Approaches	24	100	$2,400.00
	Fence/Signage	80	75	$6,000.00
	MV Collection System			
	Above Ground	32	50	$1,600.00
	Below Ground	350	75	$26,250.00
	Inverters	160	100	$16,000.00
	Panel System			
	Pier	3,000	75	$225,000.00
	Racking	8,000	50	$400,000.00
	Panel Removal	11,840	50	$592,000.00
	Substation			
	Steel/Equipment Removal	96	100	$9,600.00
	Foundation	80	125	$10,000.00
	Rock and Ground Grid	24	75	$1,800.00
	Gen Tie			
	Wire	8	80	$640.00
	Poles	0	195	$0.00
	Foundation	0	110	$0.00
	O&M Building			
	Removal of Structure	0	50	$0.00
	Foundation	0	50	$0.00
Restoration	**Soil**			
	Ripping/Grading/Leveling	640	150	$96,000.00
Haul Away	Material Haul Out			$500,000.00
Mobilization		80	100	$8,000.00
Total Equipment Costs				$1,961,690.00

Table 6-6. Estimated Cost of Management and Monitoring to Decommission the Wright Solar Park

	Labor	Hours Labor	$/hour	Estimated Cost
Management/Monitoring	Project Management	320	100	$32,000.00
	Environmental Monitor	160	75	$12,000.00
	Permitting	320	100	$32,000.00
Total Management Costs				$76,000.00

The total cost of decommissioning activities is estimated at $3,171,840.00 based on the breakdown of costs shown in Tables 6-4, 6-5, and 6-6 for Labor, Equipment, and Management/Monitoring.

6.3.4 Funding Assurances for Decommissioning Activities

Financial assurance will be provided to Merced County prior to the issuance of a building permit. Financial assurances will be provided in one of the forms listed below, subject to the approval the Merced County.

a. A surety bond,

b. An irrevocable letter of credit,

c. A trust fund in accordance with the approved financial assurances to guarantee that deconstruction shall be completed in accordance with the approved decommissioning plan, or

d. Other financial assurances as reviewed and approved by Merced County.

6.4 Changed and Unforeseen Circumstances

This section discusses the rights and responsibilities of the Applicant and USFWS with regards to changed and unforeseen circumstances that may occur over the permit term. The No Surprises Rule limits the scope of an Applicant's responsibility as part of an HCP to respond to changed and unforeseen circumstances and to provide additional mitigation and conservation measures. CESA has no comparable regulation, so these provisions of the HCP apply only to the federal permit.

6.4.1 Definitions

Changed circumstances are defined by federal regulation (50 Code of Federal Regulations [CFR] 17.3) as those circumstances affecting a species or geographic area covered by the HCP that can be reasonably anticipated by the applicant or wildlife agency and to which the parties can plan a response. The No Surprises Regulation requires that an Applicant's response to changed circumstances through additional conservation or mitigation be limited to those measures that are defined in the HCP.

Unforeseen circumstances are defined by federal regulation (50 CFR 17.3) as changes in circumstances affecting a species or geographic area covered by an HCP that could not reasonably have been anticipated by the Applicant or the Wildlife Agencies at the time of the HCP's development, and that result in a substantial and adverse change in the status of the covered species. Applicants are not required to respond to unforeseen circumstances, although they may voluntarily do so.

The *No Surprises Regulation* prohibits the USFWS from requiring any additional commitment of land, water, or financial resources or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed upon in the HCP.

Remedial measures are defined as actions taken in response to changed environmental circumstances and designed to compensate for the adverse impacts on covered species.

6.4.2 Federal Assurances

The changed circumstances that could arise in the HCP Permit Area have been identified and are described in the sections below.

If the Applicant becomes aware of a changed circumstance within the HCP Permit Area as defined by these sections, the Applicant will notify the USFWS to determine whether additional conservation or mitigation measures, known as remedial measures, may be necessary. If the HCP defines remedial measures for the changed circumstance, the Applicant will work with USFWS to determine the manner in which to implement any necessary remedial measures. Pursuant to the No Surprises Regulation, USFWS may not require remedial measures to respond to changed circumstances not specifically addressed in this HCP or any additional conservation or mitigation actions not described for HCP-defined changed circumstances without the consent of the Applicant, as long as the Applicant is properly implementing the HCP.

Unforeseen circumstances involve changes to land cover types or covered species within the HCP Permit Area that are not anticipated to occur during the 40-year permit term. In the highly unlikely event of an unforeseen circumstance, the federal No Surprises Regulation would provide the Applicant assurances that the USFWS will not require or impose the following.

- The commitment of additional land, water, or financial compensation by the Applicant in response to unforeseen circumstances other than those agreed to elsewhere in the HCP.
- Additional restrictions on the use of land, water, or natural resources otherwise available for use by the Applicant under the original terms of the HCP to mitigate the effects of the covered activities or in response to unforeseen circumstances.

If USFWS determines that additional conservation and mitigation measures are necessary to address these circumstances, the obligations of the Applicant to implement remedial measures are limited by the No Surprises Regulation to modifications within conserved habitat areas, if any, or to the HCP's operating conservation program for the affected species. Under such circumstances, USFWS and the Applicant would work together to identify opportunities to redirect resources to address unforeseen circumstances.

As described in the No Surprises Regulation, it is USFWS' responsibility to use the best scientific and commercial data available to demonstrate the finding that an unforeseen circumstance would result in a "substantial and adverse" change in the affected species' status.

The federal No Surprises Regulation does not limit or constrain the USFWS or any federal, state, local, or tribal government agency, or private entity, from taking additional actions at its own expense to protect or conserve covered species. The federal No Surprises Regulation also does not prevent USFWS from asking the Applicant to voluntarily undertake additional mitigation on behalf of the affected species. However, the remedial measures discussed in the following sections define the limit for funding obligations to respond to changed and unforeseen circumstances.

6.4.3 Changed and Unforeseen Circumstances Addressed by this HCP

The changed and unforeseen circumstances listed below are recognized by this HCP. Remedial actions to address changed circumstances are funded by the HCP and are described in the discussion of each circumstance that follows.

- Non-Covered Species Listed.
- Global Climate Change.
- Invasive Species.
- Wildfire.

Non-Covered Species Listed

Over the course of the permit term (40 years), USFWS may list as threatened or endangered under ESA or CESA species that are not covered under the HCP. USFWS shall notify the Applicant when a non-covered species associated with habitat in the Permit Area may be or has been proposed for listing or candidacy (*New Non-Covered Species*). Once the Applicant becomes aware that a New Non-Covered Species associated with habitat in the Permit Area may be or has been proposed for listing or candidacy, the following remedial measures will be taken.

- The potential impacts of covered activities on the New Non-Covered Species will be evaluated, including an assessment of the presence of suitable habitat in impact areas. If the Applicant determines that the new species occurs or may occur within the plan area and once the Wildlife Agencies have made a *may be warranted* finding, the Applicant shall use its best efforts to identify any necessary measures to avoid the likelihood of jeopardy to or take of the New Non-Covered Species. These measures shall be developed in coordination with the Wildlife Agencies.
- If the New Non-Covered Species is listed and the applicable federal/state permit has not been amended to include the New Non-Covered Species as a covered species, the Applicant shall implement *no jeopardy/no take* measures until the applicable permit is amended or a separate incidental take permit is issued to cover the species or the Wildlife Agencies notify the Applicant that such measures are no longer necessary.

Should a species not covered by the HCP be listed, proposed, or petitioned for listing, the Applicant may, at its discretion, seek an incidental take permit from the USFWS. In determining whether or not to seek incidental take coverage for the species, the Applicant will consider, among other things, whether the species is present in the Permit Area and if otherwise lawful activities could result in incidental take of the species. If incidental take coverage is desired, the HCP and existing 10(a)(1)(B) and/or 2081(b) permits could be modified or amended. Alternatively, the Applicant could apply for new and separate permits. Procedures for modifications and amendments to the HCP are outlined in Section 6.5, *Modifications to the HCP*.

Global Climate Change

Climate change is the observed increase in mean global temperature due to an increase in greenhouse gas emissions, primarily carbon dioxide (CO_2), as a result of human industrialization (Intergovernmental Panel on Climate Change 2007). Climate change is also predicted to include secondary effects such as changing climatic patterns that may affect the frequency of disturbance events such as drought and fire. The effects on covered species and their habitat resulting from climate change may include changes in the distribution and abundance (Root et al. 2003), timing of phenological events, and increased risks from disease and invasive species increases (Dukes and Mooney 1999; Walther et al. 2009).

Current global and regional trends indicate that the climate is likely to change within the Permit Area in response to increasing levels of CO_2 and other greenhouse gases. A primary effect of climate change is a general warming of air temperatures. Projections for warming vary depending on the model used and assumptions about future emissions. There is consensus, however, that average global warming by the end of the twenty-first century could range from as low as 2°C (3.6°F) in the most optimistic scenario to as high as 5°C (8.5°F) if mitigation efforts fail (Intergovernmental Panel on Climate Change 2012). Increasing temperatures will occur in terrestrial environments and will have secondary effects for which projections are less precise. For example, rising atmospheric temperatures will affect the timing and magnitude of precipitation, increase the amount of precipitation falling as rain rather than snow, and likely increase the severity of droughts and extreme precipitation events (Intergovernmental Panel on Climate Change 2007). These precipitation changes, in turn, will affect terrestrial and aquatic habitats by altering runoff and soil moisture. For the purposes of identifying changed circumstances, the HCP describes the potential effects of climate change on covered species and develops remedial actions that will be implemented should those effects be observed. Also, the potential anticipated effects of climate change are assessed by incorporating a greater frequency or intensity of natural disturbance events than one would otherwise ascribe based on the historical record. The increase in frequency or intensity of these events is incorporated into the following sections: natural communities lost to fire, expansion of new or existing nonnative species or disease, and mitigation sites lost to drought. The discussion below provides context for how climate change may cause these secondary effects and describes remedial actions that will be taken for the direct effects of climate change on species.

Climate change may play a role in shifting the range and distribution of covered species and natural communities (Parmesan et al. 1999; Pimm 2001; Walther et al. 2002; Easterling et al. 2000). Range is the area over which a species occurs or potentially occurs, whereas distribution refers to where a species is located within its range. This is of particular concern for narrowly distributed species that already have restricted ranges due to urban growth or altitudinal gradients. Historically, some species could shift their ranges across the landscape. Today, urban and suburban development prevents the movement of many species. Species that are already restricted in range are particularly vulnerable to changing climate because they likely have nowhere to move if their habitat becomes less suitable (Shainsky and Radosevich 1986; Murphy and Weiss 1992; Thorne 2006)

The number or density of covered species found in a specific location or population may change. This may be triggered in large part by changes in resource availability associated with an increase or

decrease in precipitation (Martin 1998; Dukes and Mooney 1999; Walther et al. 2002; Lenihan et al. 2003; Millar et al. 2006; Pounds et al. 2006). These changes may benefit one species at the expense of another.

The conservation strategy focuses on protecting and enhancing grassland landscapes in the Permit Area and a range of habitat types. The project has also been design to preserve movement through the region (and enhance it on the mitigation site), which is important to facilitate range shifts in response to climate change.

Implementing conservation actions that protect the covered species over a large scale provides flexibility for shifts in range and distribution of species and natural communities. Habitats will be managed to ensure natural-community and species persistence in the face of abundance shifts driven by climate change. Enhancement, restoration, and management actions will likely increase the resilience of natural communities by improving habitat quality overall and controlling invasive plants and nonnative predators. Status and trends monitoring will serve as an early warning for the possible effects of climate change and will allow the conservation strategy to adapt to ensure species persistence in the Permit Area.

Although climate change is reasonably foreseeable over the permit term, it is not within the scope of this HCP to respond directly to temperature increases or other parameters (e.g., rainfall, soil moisture, and runoff). Additionally, it is not possible to determine within the 40-year permit term whether changes in the Permit Area (e.g., temperature and rainfall) are the result of climate change or other non-climate stressors. Confounding factors such as the seasonality of rainfall in the Permit Area or an increase in winter precipitation may be offset by increased evapotranspiration during the summer months (Intergovernmental Panel on Climate Change 2007) further complicating quantification of climate change.

Because of the high level of uncertainty surrounding how natural communities and species will respond to climate change, remedial actions will be implemented through the Adaptive Management Program consistent with the scope and extent of the minimization and mitigation measures defined in this HCP and limited to the funding allocated for HCP implementation and adaptive management. Such remedial actions may include the following.

- Modified or enhanced monitoring to detect ecological responses to climate change, including threat monitoring.
- Altered or focused management actions on the covered species to facilitate shifts in species distribution.
- Targeted control of invasive species that respond positively to climate change.

Invasive Species or Disease

An invasive species is any nonnative animal or plant whose introduction to an area does or is likely to cause economic or environmental harm or harm to human health. When species that evolved in one region are moved to another, some flourish, crowding out native vegetation and animals. Invasive species have lasting impacts on ecosystems. They can dominate an area, disrupting its

natural functions and diversity so that it no longer supports its native habitat. Invasive species currently inhabit the Permit Area and exist outside the Permit Area with the potential to spread

Nonnative annual grassland is the most common land cover type in the Permit Area and is dominated by nonnative annual grasses and herbaceous species. Construction activities, grading, and other ground or vegetation-clearing disturbances can eliminate the native plant population and allow invasive nonnative species to become established. As native plants are replaced by exotic species, indirect impacts on the habitat of covered species would occur, such as modification or degradation of habitat.

Infestations of a new or existing disease, nonnative plant or animal over a large area often require a landscape-level, multi-agency response that can take many years and significant human and financial resources beyond the scope of the Applicant's expertise and the operating budget of the HCP. For the purposes of this HCP, infestations of invasive species, or spread of existing invasive species beyond 25% of baseline cover within one of the HCP's land cover types is considered an unforeseen circumstance. Infestations below 25% of baseline condition are considered changed circumstance infestations and will be addressed through the remedial measures described below. The threshold of 25% was determined somewhat arbitrarily as the line below which a strong localized response by the Applicant was likely to eradicate or substantially control an infestation of a new invasive species. The monitoring program will identify existing nonnative species in the Permit Area so that new, nonnative species can be identified quickly and removed.

The Applicant will coordinate with the Wildlife Agencies and use best science to remain informed of potential diseases or infestations that may pose a threat to covered species in the Permit Area. An assessment of the threat of known diseases/infestations will be carried out as part of the conservation strategy.

The Applicant will implement remedial actions to respond to changed circumstance infestations through the Adaptive Management Program in ways consistent with existing funding and permit obligations and with the consent of the Wildlife Agencies. Such remedial actions may include the following.

- Develop methodologies for measuring and tracking extent of an infestation.
- Prepare a damage-assessment report within 3 months of identifying a significant threat (i.e., a threat with the potential to affect more than 25% of a land cover).
- Coordinate with invasive species initiatives conducted by the Wildlife Agencies.
- Implement actions to address the threat and either eradicate the invasive species or disease, or control it to a point where it is having minimal or no effects on the covered species.

If an infestation that is bounded by the description of changed circumstances (i.e., affects up to 25% of a natural community) results in substantial impacts on covered species such that it cannot reasonably be addressed by remedial actions within the HCP operating budget, the Applicant shall prepare a report identifying the problem and include a cost analysis for funding a control program. This report shall be submitted to the USFWS for approval. The Applicant and the USFWS may seek

additional outside funding to implement the program. The feasibility of a control program will depend on the success of additional fundraising.

Wildfire

Historically, fire is a natural component of many ecosystem types, including grasslands. Fire, as a result of lightning and geological activity, is a natural occurrence. Human activities such as smoking, debris burning, and equipment operation are the major causes of wildfires.

Wildfire hazards exist in varying degrees over approximately 90% of Merced County. The fire season extends approximately 5–6 months, from late spring to fall, and is influenced by a combination of climatic, vegetative, and physiographic conditions. The rolling foothills on the county's west side, although well grazed, have had extensive burning in the past. The county's valley floor tends to be less susceptible to wildfires than foothills due to the presence of abundant water resources. Nonetheless, wildfires can occur there, damaging valuable agricultural and recreational lands and wildlife habitats.

CAL FIRE rates fire threat using a combination of two factors: (1) fire frequency, or the likelihood of a given area burning, and (2) potential fire behavior (hazard). The majority of land within the permit area is characterized as having a *Moderate* fire threat. However, a portion of land (164 acres) in the northeast corner of the Permit Area, has been characterized by CAL FIRE has having a *High* fire risk.

Recent fire history indicates that there have been 1,399 fires in Merced County from 1980 to 2012 (Table 6-7). During this period, Merced County averaged 42.3 wildfires annually, burning 2,624 acres per year (CAL FIRE 2013). In 1996, a catastrophic fire (over 10,000 acres) burned approximately 23,660 acres of grassland in the county, including over 80% of the off-site mitigation property. Most fires during this time however, ranged from a low of less than 1 acre to approximately 3,000 acres.

Since 2011, two wildfires have occurred within 1 mile of the Permit Area. In 2011, a wildfire occurred adjacent to Billy Wright Road and Interstate (I-) 5 near Los Banos. The fire burned approximately 140 acres. The second wildfire occurred in 2012. This fire occurred along Billy Wright Road and Bonilla Road near Santa Nella. The wildfire burned approximately 434 acres (CAL FIRE 2013).

Based on the historic fire regime and potential changes in frequency and extent of wildfires due to climate change, it is foreseeable that up to 60,000 acres in Merced County could be altered through fire over the permit term. The Permit Area constitutes less than one percent of burnable land cover in Merced County. This translates to approximately 600 acres of wildfire expected over the permit term, with an average size of 1 to 15 acres. For purposes of delineating changed circumstances, we do not anticipated any fires larger than two standard deviations from the largest average size (10 acres), or 35 acres (SD = 9.8). Wildfires in excess of this amount or size are unforeseen for the purposes of the HCP.

Table 6-7. Merced County Fire History

Year	Number of Wildfires	Total Burn Area (acres)
2012	15	435
2011	23	1,398
2010	28	3,059
2009	22	74
2008	35	1,575
2007	46	215
2006	43	1,590
2005	52	6,730
2004	42	815
2003	48	2,960
2002	40	1,520
2001	45	2,566
2000	23	1,458
1999	49	2,304
1998	32	6,127
1997	46	288
1996	32	23,664
1995	35	2,515
1994	43	770
1993	58	5,730
1992	63	5,908
1991	41	151
1990	50	290
1989	44	1,923
1988	56	801
1987	128	756
1986	52	956
1985	37	3,143
1984	45	3,118
1983	43	61
1982	25	891
1981	17	575
1980	41	2,229
Total	1,399	86,595

Fire management and protection measures conducted by the Applicant on site will minimize the risk of damage to habitats and natural communities from abnormally frequent fire (normal fire frequency is described above). Preventative measures include the following actions.

- Existing roads have served as adequate fuel breaks historically. There is no plan to add any new fuel breaks to the property.
- Maintain roads and prevent vegetation on roads to limit the spread of fire.
- Work with local fire agencies to improve fire-suppression preparedness and strategies to protect habitat during fire response.

In the event of a changed circumstance fire, the Applicant will work closely with local fire-response crews to ensure that impacts on covered species are minimized within safety limits. In addition, monitoring will assess changes to land cover type and the response of invasive plants. In the event of habitat loss, land management and habitat-restoration measures will be implemented within affected areas to encourage the reestablishment of native vegetation through active or passive management (Chapter 5).

The Applicant will implement remedial actions in the areas that are designated for conservation (i.e., mitigation sites) within the Permit Area. The Applicant would not be responsible for remediating all burned areas as a result of a fire or fires that exceed the thresholds described above.

6.5 Modifications to the HCP

The HCP and/or incidental take permits can be modified in accordance with USFWS regulations and the terms of the IA. HCP modifications are not anticipated on a regular basis. Modifications can be requested by the Applicant USFWS. The categories of modification that are recognized, in order of significance, are administrative changes, minor amendments, and major amendments, as described below.

6.5.1 Administrative Changes

Administrative changes are internal changes or corrections to the HCP. Administrative changes will be made in writing and documented by the Applicant and approved by the Wildlife Agencies. The Wildlife Agencies will be provided a summary of administrative changes in an annual report. All administrative changes require coordination with the Wildlife Agencies and an agreement that an amendment is not required. Examples of administrative changes are listed below.

- Corrections of errors in the HCP that do not change the intended meaning or obligations.
- Minor changes to survey or monitoring protocols that are not proposed in response to adaptive management.
- Updates to the land cover map or to species-occurrence data that are consistent with the predictions and expectations of the HCP.

6.5.2 Amendments

Amendments to the HCP that do not affect the impact assessment or conservation strategy described in the HCP and do not affect the ability of the Applicant to achieve the biological goals and objectives of the HCP do not require an amendment to the permits, but they do require preapproval by the Wildlife Agencies before being implemented. Examples of this type of amendment are listed below.

- Minor changes to the biological goals or objectives in response to adaptive management.
- Modification of existing or adoption of additional conservation measures that improve the likelihood of achieving HCP species objectives.
- Discontinuing implementation of an avoidance or minimization measure if it has been determined to be ineffective.
- Modification of existing or adoption of additional covered species objectives where such changes are consistent with achieving overall HCP goals for covered species.
- Changes to the reporting requirements of the HCP.
- Other changes that do not result in adverse effects on covered species beyond those analyzed in the HCP, and do not limit the ability of the Applicant to achieve the biological goals and objectives of the HCP.

All amendments of this type must be approved by the Applicant and the Wildlife Agencies. To modify the HCP without amending the permits, the agency proposing the change (the Applicant or USFWS) will submit to the other agencies a written description of the proposed change and an explanation of why its effects are not believed to be significantly different from those described in the original HCP. The Wildlife Agencies will provide a response within 60 days of the proposal submission. Upon unanimous concurrence with the proposal, the USFWS will provide the Applicant written authorization to modify the HCP, and the modification shall be considered effective on the date of the last written authorization.

An amendment that may affect the impact analysis or conservation strategy in the HCP requires amending the HCP and the incidental take permit through a formal review process. This may include evaluation under the National Environmental Policy Act (NEPA) and/or the California Environmental Quality Act (CEQA), public notice, and ESA Section 7 consultation by USFWS.

Examples of changes that would require this type of amendment include those listed below.

- Revisions of the Permit Area boundary that do not qualify for a minor modification (e.g., modifications that increase the Permit Area by 10% or more).
- Addition of new species to the covered species list for reasons other than taxonomic reclassification, including changes at a level below species (e.g., distinct vertebrate population segment or subspecies) which would be considered administrative or minor amendments.
- Increasing the allowable take limit of existing covered activities or adding new covered activities to the HCP.

- Modifications of any important action or component of the conservation strategy under the HCP, including funding, that may substantially affect levels of authorized take, effects of the covered activities, or the nature or scope of the conservation strategy.
- A major change in performance standards if monitoring or research indicates that performance standards are not attainable because technologies to attain them are either unavailable or infeasible.
- Extending the permit term beyond 40 years.

Amending the Section 10(a)(1)(B) Permit

To amend a Section 10(a)(1)(B) permit, the Applicant will submit an application to USFWS that will include a revised HCP, a permit application form, any required fees and any required compliance document under NEPA. The appropriate NEPA compliance process and document will depend on the nature of the amendment being proposed. Upon submission of a completed application package, USFWS will publish a notice of the proposed application in the Federal Register, initiating the NEPA and HCP public review process. After public review and comment, USFWS may approve or deny the permit amendment application.

Chapter 7
Alternatives to Take

7.1 Introduction

The Endangered Species Act (ESA) requires that applicants for an incidental take permit specify what alternative actions to the take of federally listed species were considered and the reasons why those alternatives were not selected. The *Habitat Conservation Planning and Incidental Take Permit Processing Handbook* (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1996) identifies two alternatives commonly used in HCPs: (1) any specific alternative that would reduce take below levels anticipated for the proposed project and (2) an alternative that would avoid take and therefore not require a permit from the U.S. Fish and Wildlife Service (USFWS). This chapter discusses both approaches.

The choice of the proposed project represents the Applicant's best attempt to eliminate or reduce adverse direct and indirect impacts on the covered species while allowing the Wright Solar Park (WSP) to be built and operated consistent with its business goals.

In accordance with ESA, this chapter discusses project alternatives that were considered but not selected, and the reasons those alternatives were not selected. These alternatives are called "take alternatives" because of their limited scope in reducing the level of take of one or more covered species. Other alternatives to the project are discussed in the Environmental Impact Report (EIR) and in the Environmental Assessment (EA). The goals of the alternatives discussed in the EIR and EA are different and broader than the goals of the take alternatives; see those documents for details on other project alternatives.

7.2 Description of Take Alternatives

The following take alternatives are addressed in this chapter: No Take Alternative and Alternate Project Location. These take alternatives, and the rationale for their elimination, are discussed below.

7.2.1 No Take Alternative

Under the No Take Alternative, the Applicant would not construct the WSP that would result in a take of any covered species, and therefore would not need an incidental take permit from USFWS. (The No Take Alternative is the same as the No Action alternative described in the EIR and EA.)

By not undertaking the development of WSP, the Applicant will be unable to provide renewable solar energy to be sold to a load-serving entity through a power contract, generating electrical power from a clean source that would supplement the energy capacity of the existing power grid, thereby increasing the stability and operability of the transmission system, as well as offsetting supplies from fossil fuel generating sources. Therefore no energy would be generated by the project

that could be sold to public utilities, municipal utilities, or large private consumers of power. The No Take Alternative would not meet the project goal and objective to construct and operate a solar power facility. Therefore, this take alternative was rejected.

7.2.2 Alternate Project Location

To achieve the project goal and objective, it is necessary for the Applicant to place the solar power facility in a location that has a high solar irradiance. The proposed location has the potential to produce solar power exceeding 480 gigawatt hours (gWh), allowing it to generate clean renewable energy for more than 48,000 homes. The proposed location will also provide the Applicant with low cost connection to an existing electrical transmission system.

The combination of a site with high solar irradiance with an already disturbed site in such close proximity to electric transmission lines and landowner support make this the ideal project location. Other project sites were considered in Merced County and surrounding areas. However, no other project site has the unique combination of the proposed project site of supportive landowners, suitable topography, high solar irradiance, low agricultural productivity, and access to the existing power grid. For these reasons, alternative project locations were rejected in favor of the proposed project site.

Chapter 8
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Appendix A

Species Considered for Coverage

Table A-1. Wildlife Species Considered as Covered or No-Take Species

Species	Status[a]		Criteria[b]				Recommended Covered Status[c]	Notes
	State/ CNPS	Federal	Range	Status	Impact	Data		
Plants								
Heartscale *Atriplex cordulata*	–/1B.2	–	Y	N	N	N	N	No known extant occurrences in the study area
Lost Hills crownscale *Atriplex coronata* var. *vallicola*	–/1B.2	–	Y	N	N	N	N	No known extant occurrences in the study area
Round-leaved filaree *California macrophylla*	–/1B.1	–	Y	N	N	N	N	No known extant occurrences in the study area
Lemmon's jewel-flower *Caulanthus lemmonii*	–/1B.2	–	Y	N	N	N	N	No known extant occurrences in the study area
Hoover's spurge *Chamaesyce hooveri*	–/1B.2	T	N	N	N	N	N	Project is outside of species' range or current distribution.
Hispid bird's-beak *Chloropyron molle* subsp. *hispidum*	–/1B.1	–	Y	N	N	N	N	No known extant occurrences in the study area
Recurved larkspur *Delphinium recurvatum*	–/1B.2	–	Y	N	N	N	N	No known extant occurrences in the study area
Hall's bush mallow *Malacothamnus hallii*	–/1B.2	–	Y	N	N	N	N	No known extant occurrences in the study area
Prostrate vernal pool navarretia *prostrata*	–/1B.1	–	N	N	N	N	N	Project is outside of species' range or current distribution.
Shining navarretia *Navarretia nigelliformis* subsp. *radians*	–/1B.2	–	Y	N	N	N	N	No known extant occurrences in the study area
Chaparral ragwort *Senecio aphanactis*	–/2B.2	–	Y	N	N	N	N	No known extant occurrences in the study area
Arburua Ranch jewel-flower *Streptanthus insignis* subsp. *lyonii*	–/1B.2	–	Y	N	N	N	N	No known extant occurrences in the study area
Slender-leaved pond weed *Stuckenia filiformis* subsp. *alpina*	–/2B.2	–	N	N	N	N	N	Project is outside of species' range or current distribution.

Species	Status[a]		Criteria[b]				Recommended Covered Status[c]	Notes
	State/ CNPS	Federal	Range	Status	Impact	Data		
Invertebrates								
Conservancy fairy shrimp *Branchinecta conservatio*	–	FE	Y	Y	N	Y	N	Species not expected to be impacted by covered activities.
Longhorn fairy shrimp *Branchinecta logiantenna*	–	FE	Y	Y	N	Y	N	Species not expected to be impacted by covered activities.
Vernal pool fairy shrimp *Branchinecta lynchi*	–	FT	Y	Y	N	Y	N	Species not expected to be impacted by covered activities.
Vernal pool tadpole shrimp *Lepidurus packardi*	–	FE	Y	Y	N	Y	N	Species not expected to be impacted by covered activities.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	–	FT	Y	Y	N	Y	N	One elderberry shrub (host plant) on Project site that will not be impacted by project; species not expected to be impacted by covered activities.
Fish								
Delta smelt *Hypomesus transpacificus*	CSC	FT	N	Y	N	Y	N	Project will not impact suitable habitat; species not expected to be impacted by covered activities.
Central Valley steelhead *Onchrynchus mykiss*	SE/FP	FT	Y	Y	N	Y	N	Project will not impact suitable habitat; species not expected to be impacted by covered activities.

Species	Status[a] State/ CNPS	Status[a] Federal	Criteria[b] Range	Criteria[b] Status	Criteria[b] Impact	Criteria[b] Data	Recommended Covered Status[c]	Notes
Amphibians								
California tiger salamander *Ambystoma californiense*	ST	FT	Y	Y	Y[9]	Y	Y	Project is within the range and one potential breeding pool within Plan area. Several potential breeding pools within 1.24 miles of Project. Marginal upland habitat in Plan area. Suitable upland habitat may become more prevalent after project is built and restoration is completed.
California red-legged frog *Rana draytonii*	CSC	–	Y	Y	N	Y	N	Project is within the range. However, there is no breeding habitat within 1 mile of Project; species not expected to be impacted by covered activities.
Foothill yellow-legged frog *Rana boylii*	CSC	–	N	N	N	Y	N	No suitable habitat in the study area. Not expected to become listed during permit period
Western spadefoot *Spea hammondii*	CSC	–	Y	N	N	N	N	Not expected to become listed during permit period

[9] No impact expected during construction. Impacts could occur during operations and maintenance at the site and during decommissioning activities.

Species	Status[a] State/ CNPS	Federal	Criteria[b] Range	Status	Impact	Data	Recommended Covered Status[c]	Notes
Reptiles								
Western pond turtle *Actinemys marmorata*	CSC	–	Y	N	N	N	N	No suitable habitat within project area; not expected to become listed during permit term
Silvery legless lizard *Anniella pulchra*	CSC	–	Y	N	N	N	N	Suitable habitat may occur in the study area; not expected to become listed during permit term
Blunt-nosed leopard lizard *Gambelia silus*	SE,FP	FE	Y	Y	Y[10]	Y	Y	Project is within the range. Marginal grassland habitat in Plan area. Suitable habitat may become more prevalent after project is built and restoration is completed.
Giant garter snake *Thamnophis gigas*	ST	FT	Y	Y	N	Y	N	No suitable habitat within project area; species not expected to be impacted by covered activities.
San Joaquin coachwhip *Masticophis flagellum ruddocki*	CSC	–	Y	N	N	Y	N	Not expected to become listed during permit term
California horned lizard *Phrynosoma coronatum frontale*	CSC	–	Y	N	N	N	N	Not expected to become listed during permit term

[10] No impact expected during construction. Impacts could occur during operations and maintenance at the site and during decommissioning activities.

Species	Status[a]		Criteria[b]				Recommended Covered Status[c]	Notes
	State/ CNPS	Federal	Range	Status	Impact	Data		
Birds								
Tricolored blackbird *Agelaius tricolor*	CSC	MBTA	Y	N	Y	Y	N	Successful conservation is difficult to prescribe and implement through the HCP process
Grasshopper sparrow *Ammodramus savannarum*	CSC	MBTA	Y	N	Y	Y	N	Unlikely to be listed during the permit term
Golden eagle *Aquila chrysaetos*	CSC, FP	BGPA, MBTA	Y	N	N	Y	N	No breeding pairs known to occur in study area. Individuals may be observed flying over or foraging in or in vicinity of study area; species not expected to be impacted by covered activities.
Long-eared owl *Asio otus*	CSC	MBTA	Y	N	N	Y	N	Not expected to become listed during permit term
Short-eared owl *Asio flammeus*	CSC	MBTA	Y	N	Y	Y	N	Not expected to become listed during permit term
Burrowing owl *Athene cunicularia*	CSC	MBTA	Y	N	Y	Y	N	Not expected to become listed during permit term; may become state listed during permit term; mitigation typically required under CEQA; individuals observed using burrows on proposed mitigation site.
Aleutian Canada goose *Branta canadensis leucopareia*	–	FD, MBTA	Y	N	N	Y	N	Species in recovery, not expected to become relisted during permit term; rare wintering visitor to study area
Northern harrier *Circus cyaneus*	CSC	MBTA	Y	N	Y	Y	N	Not expected to become listed during permit term
Fulvous whistling duck *Dendrocygna bicolor*	CSC	MBTA	Y	N	N	Y	N	Not expected to become listed during permit term

Species	Status[a]		Criteria[b]				Recommended Covered Status[c]	Notes
	State/ CNPS	Federal	Range	Status	Impact	Data		
White-tailed kite *Elanus leucurus*	FP	MBTA	Y	N	N	Y	N	Species is relatively common in study area so not likely to be state or federally listed if fully protected designation is withdrawn
American peregrine falcon *Falco peregrinus anatum*	SE/FP	FD, MBTA	Y	Y	N	Y	N	Not likely to be listed under the federal ESA because it was recently removed from the list; removal of limited habitat not expected to rise to the level of habitat take under the state ESA
California condor *Gymnogyps californianus*	SE/FP	FE, MBTA	N	Y	N	Y	N	No suitable nesting habitat within study area and only known as a rare migrant in study area; species not expected to be impacted by covered activities.
Bald eagle *Haliaeetus leucocephalus*	SE/FP	FD, BGPA, MBTA	Y	Y	?	Y	N	No breeding pairs known to occur in study area, but breeding range may expand; individuals occasionally winter at San Luis Reservoir northwest of the study area; species is state-listed as endangered but delisted by USFWS; species not expected to be impacted by covered activities.
Yellow warbler *Icteria virens*	CSC	MBTA	Y	N	Y	Y	N	Not expected to become listed during permit term
Loggerhead shrike *Lanius ludovicianus*	CSC	MBTA	Y	N	Y	Y	N	Not expected to become listed during permit term
Long-billed curlew *Numenius americanus*	CSC	MBTA	N	N	N	Y	N	Not expected to become listed during permit term
Yellow-headed blackbird *Xanthocephalus*	CSC	MBTA	Y	N	Y	Y	N	Not expected to become listed during permit term

Species	Status[a] State/ CNPS	Status[a] Federal	Criteria[b] Range	Criteria[b] Status	Criteria[b] Impact	Criteria[b] Data	Recommended Covered Status[c]	Notes
Mammals								
Greater western mastiff bat *Eumops perotis*	CSC	–	Y	N	N	Y	N	Not expected to become listed during permit term; suitable roosting habitat is lacking in the study area.
Pacific Townsend's (=western) big-eared bat *Corynorhinus townsendii*	SC[11]	–	Y	Y	Y	N	N	Species could become listed during permit term due to population declines throughout most of range. However, suitable roosting habitat is lacking in the study area; species not expected to be impacted by covered activities.
Pallid bat *Antrozous pallidus*	CSC	–	Y	N	N	Y	N	Not expected to become listed during permit term.
Red bat *Lasiurus blossevillii*	CSC	–	Y	N	N	N	N	Unlikely to become listed during permit term; data on distribution and ecology in California insufficient for HCP/NCCP (see Western Bat Working Group at www.wbwg.org for more information on this and other bats)
Spotted bat *Euderma maculatum*	CSC	–	Y	N	N	N	N	Unlikely to become listed during permit term; data on distribution and ecology insufficient; unknown if species occurs in study area.
American badger *Taxidea taxus*	CSC	–	Y	N	Y	Y	N	Suitable habitat occurs in the study area; not expected to become listed during permit term
San Joaquin kit fox *Vulpes macrotis mutica*	ST	FE	Y	Y	Y	Y	Y	Known to occur near the study area (ICF observations 2013; CNDDB 2013, Constable et al. 2009)

[11] The Game Commission passed a motion to designate the Townsend's big-eared bat as a candidate for Threatened or Endangered species status on June 26, 2013; a formal Notice of Findings was published on December 27, 2013..

[a] **Status**

State Status

FP = Fully Protected.
SE = State listed as endangered.
ST = State listed as threatened.
SC = State candidate for listing.
CSC = California special concern species (January 2011 list).

Federal Status

BGPA = Bald Eagle and Golden Eagle Protection Act.
MBTA = Migratory Bird Treaty Act.
FE = Federally endangered.
FT = Federally threatened.
FD = Federally delisted.

California Native Plant Society (CNPS) Rank

1B = rare or endangered in California and elsewhere.
2 = rare or endangered in California, more common elsewhere.

[b] **Criteria**

Range: The species is known to occur or is likely to occur within the HCP/NCCP study area, based on credible evidence, or the species is not currently known in the study area but is expected in the study area during the permit term (e.g., through range expansion or reintroduction to historic range).

Status: The species is either:

- listed under the federal ESA as threatened or endangered, or proposed for listing;
- listed under CESA as threatened or endangered or a candidate for such listing, or listed under the Native Plant Protection Act as rare; or
- expected to be listed under ESA or CESA within the permit term. Potential for listing during the permit term is based on current listing status, consultation with experts and Wildlife Agency staff, evaluation of species population trends and threats, and best professional judgment.

Impact: The species or its habitat would be adversely affected by covered activities or projects that may result in take of the species.

Data: Sufficient data exist on the species' life history, habitat requirements, and occurrence in the study area to adequately evaluate impacts on the species and to develop conservation measures to mitigate these impacts to levels specified by regulatory standards.

Species proposed for coverage in the Plan were limited to those species for which impacts from covered activities were likely, in order to provide take authorization for the highest priority species. However, many other special-status species are expected to benefit from the Plan, as described in Chapter 5.

[c] **Recommended Covered Status**

Y recommended as covered species in the Wright Solar Project HCP
N not recommended for coverage in the Wright Solar Project HCP