DRAFT
HABITAT CONSERVATION PLAN

FOR THE

PROPOSED SHILOH IV WIND PROJECT, SOLANO COUNTY, CALIFORNIA

PREPARED FOR:

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December 2011

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ICF International. 2011. *Habitat Conservation Plan for the Proposed Shiloh IV Wind Project, Solano County, California*. Draft. December. (ICF 00810.10) Sacramento, CA. Prepared for Shiloh IV Wind Project, LLC, Tracy, CA.

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Acronyms and Abbreviations

AB	Assembly Bill
ABAG	Association of Bay Area Governments
BMP	best management practice
CAISO	California Independent System Operator
CFR	Code of Federal Regulations
County	Solano County
CTS	California tiger salamander
CUP	Conditional Use Permit
DFG	California Department of Fish and Game
EA	environmental assessment
EIS	environmental impact statement
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FR	Federal Register
GHG	greenhouse gas
HCP	Habitat Conservation Plan
HDD	horizontal directional drilling
ITP	incidental take permit
kV	kilovolt
kWh	kilowatt hour
mph	miles per hour
MW	megawatt
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
O&M	operation and maintenance
Plan Area	3,513-acre Shiloh IV property
project or proposed project	Shiloh IV Wind Project

SMUD	Sacramento Municipal Utility District
SR	State Route
SWPPP	storm water pollution prevention plan
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WRA	Wind Resource Area

Chapter 1
Introduction

1.1 Overview of the Habitat Conservation Plan

Shiloh IV Wind Project, LLC (Shiloh IV), a subsidiary of enXco, an EDF EN Company , a publicly traded company, has prepared the Shiloh IV Wind Project Habitat Conservation Plan (Shiloh IV HCP) to request an incidental take permit and to satisfy requirements under Section 10 of the federal Endangered Species Act (ESA) for activities associated with construction, operation, and maintenance of the Shiloh IV Wind Project (project or proposed project). The project is located in Solano County, California, near the community of Rio Vista, in an area locally known as the Montezuma Hills Wind Resource Area (Figure 1-1). The HCP Plan Area encompasses approximately 3,513 acres. The proposed Shiloh IV wind energy project is within the current and historical range of the central California Distinct Population Segment of California tiger salamander (*Ambystoma californiense*) (CTS), a species listed as threatened under both ESA and the California Endangered Species Act (CESA). This HCP addresses a single-species, California tiger salamander. The proposed term of the HCP, which includes construction, operation, and decommissioning of the proposed project, is 36 years.

1.2 Overview of the Shiloh IV Wind Project

Shiloh IV proposes to construct and operate a commercial wind energy facility in the Montezuma Hills Wind Resource Area of Solano County, California, that would collect and deliver renewable energy to the California Independent System Operator (CAISO) power grid. The project would contribute to California's Renewable Energy Portfolio Standard goals and help reduce greenhouse gas (GHG) emissions pursuant to California Assembly Bill (AB) AB32 and Solano County's General Plan. California has a goal of generating 33% of the energy it uses through renewable energy sources such as wind and solar energy by 2020. The project would reduce greenhouse gas emissions when compared to traditional generation methods such as fossil fuel power plants. The project would also contribute to policies in the Solano County General Plan which encourage local power production and allow the conditional development of wind projects in this area.

To achieve a generation capacity of up to 100 megawatts, Shiloh IV's covered activities include the installation of up to 50 wind turbines, each with a rated capacity of 2.0 megawatts (MWs) to be built on the approximately 3,513-acre Shiloh IV property (i.e., the Plan Area) in Solano County (Figure 1-1). The wind energy facility project would be constructed in a location that is already predominantly used as a wind farm. The proposed wind energy turbines and associated facilities would be located primarily in cultivated dryland farmed agricultural lands, with limited annual grassland habitat and aquatic habitat within the planning area. This HCP has been developed by Shiloh IV to ensure that potential impacts on this state- and federally listed species are avoided, minimized, and mitigated to the maximum extent practicable, in accordance with requirements pursuant to Section 10 of the ESA.

1.2.1 Land Ownership

The Plan Area is entirely under private ownership. It comprises 30 parcels owned by 13 local private landowners. Shiloh IV does not own any of the land in the Plan Area, but leases it for the proposed wind project.

1.3 Permit Holder/Permit Duration

The proposed permit duration for the Shiloh IV Wind Energy Project HCP is 36 years as this is expected to be the operational period of the project. The proposed permit holder is Shiloh IV Wind Project, LLC (Permittee). Pursuant to 65 FR 352422, Shiloh IV has considered the duration of the planned covered-activities, the varying length of biological impact resulting from the proposed covered-activities, as well as the possible positive and negative effects on listed species associated with the proposed permit duration, including the extent to which the HCP's conservation program will increase the long-term survivability of the covered-species and enhance its habitat. Section 10(a)(2)(A) of the ESA, requires each applicant for an incidental take permit to submit a "conservation plan" that specifies, among other things, the impacts that are likely to result from the taking, the measures the permit applicant will undertake to minimize impacts, measures to mitigate impacts. Shiloh IV has prepared this Habitat Conservation Plan pursuant to the requirements of ESA Section 10(a)(2)(A) as well as the permit issuance criteria described in 50 CFR17.22(b).

The Permittee's future responsibilities and commitments as an ESA Section 10(a)(2)(B) incidental take permit holder are discussed later, in Chapter 6 and Section 7.1 of this HCP. Shiloh IV's proposed facility construction and decommissioning schedule is illustrated in Table 1-1.

Shiloh IV's proposed conservation strategy—(i.e., purchase of credits at a USFWS- and California Department of Fish and Game (DFG)–approved conservation bank— see Chapter 5) would be completed by Shiloh IV prior to project construction. Shiloh IV commits to completing the conservation actions (see Chapter 5) prior to, during and post-construction as appropriate.

The proposed permit term of 36 years is requested to allow sufficient time to include the duration of the covered activities (i.e. a 30-year Conditional Use Permit (CUP) from Solano County, possible CUP extensions of 4 years, and 2 years for decommissioning/restoration).

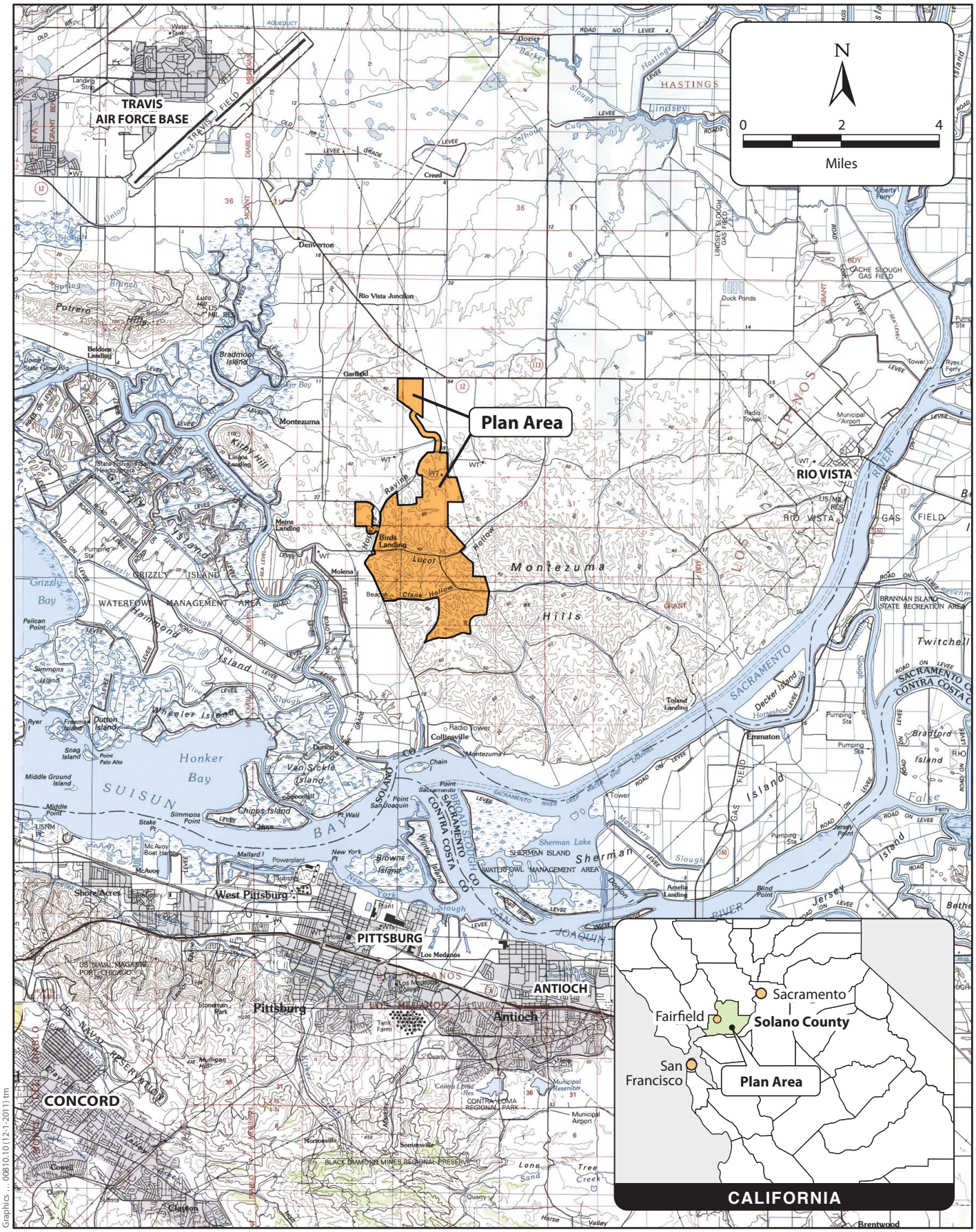

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Figure 1-1
Shiloh IV Project Region

Table 1-1. Shiloh IV Wind Project Anticipated Project Schedule

Activity	Timeframe
Obtain County CUP decision	December 2011
Obtain USFWS ITP/DFG 2081 ITP permits	February/March 2012
Submit plans to County	February/March 2012
Begin construction	April 2012
End construction	December 2012
Facility operation and periodic maintenance	2012–2048
CUP extension decision	June 2041
Continued operation	2041–2045
Decommissioning	2045–2048
HCP expiration	January 2048

1.3.1 Plan Area

The Shiloh IV Plan Area encompasses approximately 3,513 acres within the Montezuma Hills Wind Resource Area of Solano County, California, comprising 30 privately owned parcels (Figure 1-1). The Plan Area boundary is marked by the outer property lines of these specific parcels where enXco has the landowners' permission (through lease or other agreement) to permit and construct the Shiloh IV project facilities. Wind turbines and related access roads, power collection systems, and a proposed equipment laydown yard would be sited within this Plan Area.

1.3.2 Covered Species

The Shiloh IV Wind Energy HCP proposes a single covered-species. The California tiger salamander (CTS) is federally listed as threatened under the ESA and State listed under the CESA. An additional 23 state- and federally listed species potentially occurring in the Montezuma Hills Region were considered for inclusion in this HCP but are not covered primarily because of the unlikelihood of these species to occur on cultivated agricultural lands. Some species such as migratory birds and bats were also not proposed for coverage because of their listing status and infrequent or unlikely occurrence on site. These species, and the rationale for not including each in the HCP, are discussed in Appendix A.

1.3.3 Covered Activities

The proposed covered activities under this HCP are the construction and installation of wind turbines and associated electrical facilities and access roads, the expansion of the existing enXco operations and maintenance yard by 8,000 square feet, installation of a new 230 kilovolt (kV) substation (to be built on an existing pad), future maintenance of the new wind turbines and the associated facilities, and later facility decommissioning and restoration of the site. Specifically, proposed covered activities include site grading, excavation to support access roads, trenching to install underground electrical lines, installation of erosion-control measures during construction and maintenance covered-activities, installation of new gravel roads, pouring a cement footing to support each turbine, installation of other infrastructure, gravel placement for road maintenance, vehicle travel, transport of equipment and supplies, and other similar actions necessary to support

the construction, maintenance, and operation of the proposed Shiloh IV Wind Energy Project. Detailed descriptions of each Shiloh IV Wind Energy Project HCP covered-activities are presented in Chapter 2.

1.4 Regulatory Framework

1.4.1 Federal Endangered Species Act

Section 9 of the ESA prohibits the take of any fish or wildlife species that is federally listed as threatened or endangered except as provided in Section 10 of the ESA, or when interagency cooperation under Section 7 of the ESA provides an exemption for a specified level of incidental take. ESA defines *take* as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." 50 CFR 17.3 further defines the term "harm" in the definition of take to means any act which actually kills or injures a federally listed species, including significant habitat modification or degradation where it kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding, and sheltering. Harass in the definition of "take" means 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 behavioral patterns, which include, but are not limited to breeding, feeding, or sheltering.

ESA Section 10—Incidental Take Permit Regulations and Policies

Section 10(a) of ESA establishes a process for permitting incidental take. Such a permit allows permittees to take federally listed wildlife or fish subject to certain conditions as defined in Section 10(a)(2)(B). Incidental take of a listed fish or wildlife species is defined as take incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Submission of a conservation plan, generally referred to as a Habitat Conservation Plan (HCP), is required for all Section 10 permit applications. USFWS and the National Marine Fisheries Service (NMFS) have joint authority under ESA for administering the ESA, including incidental take permits. NMFS has jurisdiction over anadromous fish species, and USFWS has jurisdiction over all other fish and wildlife species.

A permit applicant's process for obtaining an ITP often has three primary phases: (1) the HCP development phase, (2) the permit processing phase, and (3) the post-issuance/implementation phase. During the HCP development phase, the project applicant prepares an HCP that minimizes and mitigates the adverse effects of the applicant's project activities on listed species. HCPs submitted in support of an ITP application must include the following information.

- Determine the type and potential amount of covered-species take, and specify the impact likely to result from such taking;
- Steps and measures that the applicant will implement to avoid, minimize, and mitigate such impacts, to the maximum extent possible.
- Adequate funding that will be made available to implement such avoidance, minimization, and mitigation measures.
- Procedures and funding to deal with changed circumstances.
- Alternative actions to such taking that were considered, and the reasons why such alternatives are not being utilized.

- Biological goals and objectives.
- A monitoring plan.
- An adaptive management plan (if applicable).
- A implementing agreement (if applicable).
- Additional measures USFWS may require as necessary or appropriate for purposes of the HCP.

The applicant's HCP development phase concludes and the U.S. Fish and Wildlife Service's (USFWS's) permit processing phase begins when a complete application package is submitted by the Applicant to the appropriate USFWS office. Adaptive management is discussed in this HCP, though most adaptive management related to species conservation will be completed by the conservation bank where Shiloh IV purchases its credits. Similarly, because of the focused nature of this HCP and its conservation strategy, an implementation agreement is not proposed.

A complete application package consists of (1) the draft HCP, (2) an ITP permit application form 3-200, (3) a $100 application fee from the applicant, (4) a draft Implementing Agreement (if required), and (5) a draft National Environmental Policy Act (NEPA) document (either an environmental assessment (EA) or environmental impact statement (EIS)). A copy of the applicant's draft HCP will be an appendix attached to USFWS's draft NEPA document.

USFWS will publish a Notice of Availability (NOA) in the Federal Register for the draft NEPA document. USFWS will submit the required number of the draft NEPA document copies to the EPA Office of Federal Activities, which then starts the required public comment period. The public comment period on an EA is typically 60 days, and the public comment period for an EIS is typically 90 days, pursuant to USFWS's 5-point policy (65 FR 35242). Once the public comment period is complete, USFWS will consider all comments and suggestions received and prepare a final NEPA document. USFWS will publish an NOA for the final NEPA document in the Federal Register. After a final 30-day public review period, USFWS can prepare the NEPA decision document (either a Finding of No Significant Impact [FONSI] if the NEPA document is an EA, or a Record of Decision [ROD] if the NEPA document is an EIS). During the public review period, USFWS will also begin to prepare an internal Section 7 Biological Opinion (BO). When the BO is completed, USFWS will prepare required ESA Findings, which will analyze and justify each component of the HCP relative to each covered species and each Permit Issuance criterion. The statutory and regulatory permit issuance criteria are listed below.

- The taking will be incidental.
- The applicant has minimized and mitigated the impacts of such take to the maximum extent practicable.
- The economic analysis and other content of the HCP indicate that the applicant can ensure adequate funding for the HCP conservation strategy, and has procedures and adequate funding to handle any changed or unforeseen circumstances.
- The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild.
- The applicant will provide additional measures that USFWS requires as being necessary or appropriate.
- USFWS has received assurances that the applicant will implement the HCP.

During the post-issuance phase, the applicant (now a permittee) will implement the HCP as described in the HCP document, the Implementing Agreement (if prepared), and the permit. The Applicant will prepare regular monitoring reports, and will contact and meet with the USFWS as specified in the HCP and IA (if prepared). The USFWS will monitor and review the permittee's compliance with the HCP permit, including the progress and success of the HCP biological goals and objectives over the entire permit term. Details about Shiloh IV's proposed future implementation of the Shiloh IV Wind Energy Project HCP are presented in Chapters 5, 6, and 7.

ESA Section 7 Consultation and Biological Opinion

Section 7 of 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 species listed under ESA, or to result in the destruction or adverse modification of its habitat. The issuance of an ITP is a federal agency discretionary decision, which triggers intra-Service consultation under Section 7 of the ESA. Consequently, in conjunction with issuing a permit, USFWS must conduct an internal Section 7 consultation on the proposed HCP and prepare a BO as described above. The internal consultation results in a BO prepared by USFWS regarding whether implementation of the HCP and the effects of such taking would result in jeopardy to any listed species, or would result in an adverse modification of designated species critical- habitat.

1.4.2 National Environmental Policy Act

NEPA requires that federal agencies analyze the environmental impacts of their discretionary decisions (in this instance, USFWS issuance of an ITP) and ensure that environmental information is available to agency officials before decisions are made and before actions are taken. NEPA also ensures public scrutiny during project planning and decision making. The NEPA process usually requires the federal agency to preparation one of three environmental documents: (1) a categorical exclusion (allowed for low-effect HCPs), (2) preparation of an EA (generally prepared for moderate-effect HCPs); or (3) preparation of an EIS (generally prepared for high-effect HCPs)(see 65 FR 35242). The NEPA process helps federal agencies make informed decisions with respect to the environmental consequences of their actions and ensures that measures to protect, restore, and enhance the environment are included, as necessary, as a component of their actions. An EA is likely to be prepared for this project and its covered activities as only small- to moderate-effects are expected to occur from project buildout in this wind resource area.

Chapter 2
Proposed Covered Activities

2.1 Proposed Covered Activities

Shiloh IV intends to design and construct a commercially viable wind energy facility that will deliver renewable energy to the CAISO power grid to meet California's Renewable Portfolio Standard goals and help reduce greenhouse gas emissions pursuant to AB32 and the County's General Plan. In order to qualify for the federal investment tax credits, the project must be fully operational by the end of 2012. The proposed Shiloh IV Wind Energy project includes the facilities listed below. All activities associated with construction of the project are proposed covered activities under the Shiloh IV Wind Energy HCP.

- Install up to 50 wind turbines, with associated generators, towers, foundations, and pad-mounted transformers.
- Install access roads, power collection cables, and transmission lines necessary to serve the project.
- Construct a new 230 kV substation on an existing substation pad.
- Expand the existing enXco operations and maintenance facility.

2.1.1 Project Construction Covered Activities

Project Construction Covered Activities

Shiloh IV is a repowering project to be developed in the Montezuma Hills area adjacent to the Shiloh I, High Winds, and proposed Montezuma II project areas (Figure 2-1).

The power generated by the turbines would be conveyed to a new 230 kilovolt kV substation (built on an existing pad) by an electrical power collection system that would be installed as part of the proposed project. The system would comprise pad-mounted transformers, buried cables, and junction boxes. The pad-mounted transformers would be connected to each turbine by buried power cables. Junction boxes—part of the buried cable system—would house cable splices and allow access to the cable. The cables would be buried between turbines and transformers and between transformers and the new substation. The existing (i.e., enXco V) operations and maintenance facility would be expanded by 8,000 square feet. The existing transmission facility in the Montezuma Hills would be used for the Shiloh IV project and would not require any expansion.

The project would require the construction of access roads, foundations for wind turbine towers and meteorological towers, underground power lines, a 230 kV substation, and other minor support facilities such as staging and storage areas. In addition, 8,000 square feet would be added to the existing operations and maintenance facility. Grading would be required for the construction of new access roads, the improvement of existing access roads, and the construction of pads to support wind turbine foundations. To minimize the amount of earth movement, grading would follow existing elevation contours to the degree possible; moreover, the project has been designed to avoid

wetlands, low-lying drainage areas, and residences throughout the Plan Area. Wetlands are being avoided through siting and subsurface horizontal directional drilling (HDD).

Turbine Construction Covered Activities

Up to 50 wind turbines would be placed in the Plan Area, each with a rated capacity of 2.0 MW. Two turbine types (Repower MM 92-2.0 MW and Vestas V90-1.8/2.0 MW) are being considered for the project. Both turbine types have the same approximate rotor diameter. The turbine type ultimately selected for the proposed project would depend primarily on product availability and the manufacturer's ability to support the construction schedule.

In the context of this document, the term *wind turbine*—or *turbine*—refers to the entire structure that produces electricity: three rotor blades, a nacelle (the housing for the generator, which is connected via a gear box to the blades), and a tubular tower (Figure 2-2).

Each wind turbine, including the rotor blade (when pointing straight up), would be a maximum of 415 feet (126.5 meters) tall. Each tower (measured to the rotor hub) would be a maximum of 262 feet (80 meters) tall. The rotor blades would be a maximum of 305 feet (93 meters) in diameter. The turbine towers would be painted a neutral color to reduce their visibility.

The proposed project must comply with Federal Aviation Administration (FAA) rules for interference with navigational systems (including radar), structural lighting, locations, and height. Specific FAA requirements for the proposed project would be developed in coordination with the FAA and Solano County.

For protection from potential lightning strikes, each wind turbine, including the rotor blades, is equipped with a lightning protection system. The lightning protection system is connected to an underground grounding arrangement to facilitate lightning flow to the ground. In addition, all equipment, cables, wind turbines, and structures would be connected by a robust metallic, project-wide grounding network.

Wind turbine towers would be set back from public rights-of-way and existing residences in accordance with Solano County requirements. All turbine towers would be locked, and the substation and operations and maintenance yards will continue to be fenced and locked to prevent unauthorized entry.

The freestanding tubular towers would sit atop steel and concrete foundations designed for the specific soil conditions at the individual turbine sites. The foundation design would be based on site-specific conditions and the design engineer's requirements.

Up to 50 turbines would be placed in the Plan Area at the locations shown in Figure 2-3). The preliminary turbine placement plan was developed using computerized modeling software that incorporates wind resource considerations from meteorological data collected in the Plan Area, long-term weather data, Plan Area topography, and environmental factors including the location of wetlands and sensitive plant species. The turbine placement plan includes 50 proposed locations and two alternate locations that may be used if engineering constraints make any of the proposed locations infeasible. No more than 50 turbines will be constructed for the project. The environmental factors associated with the site are described in Chapter 3, *Physical and Biological Resources*.

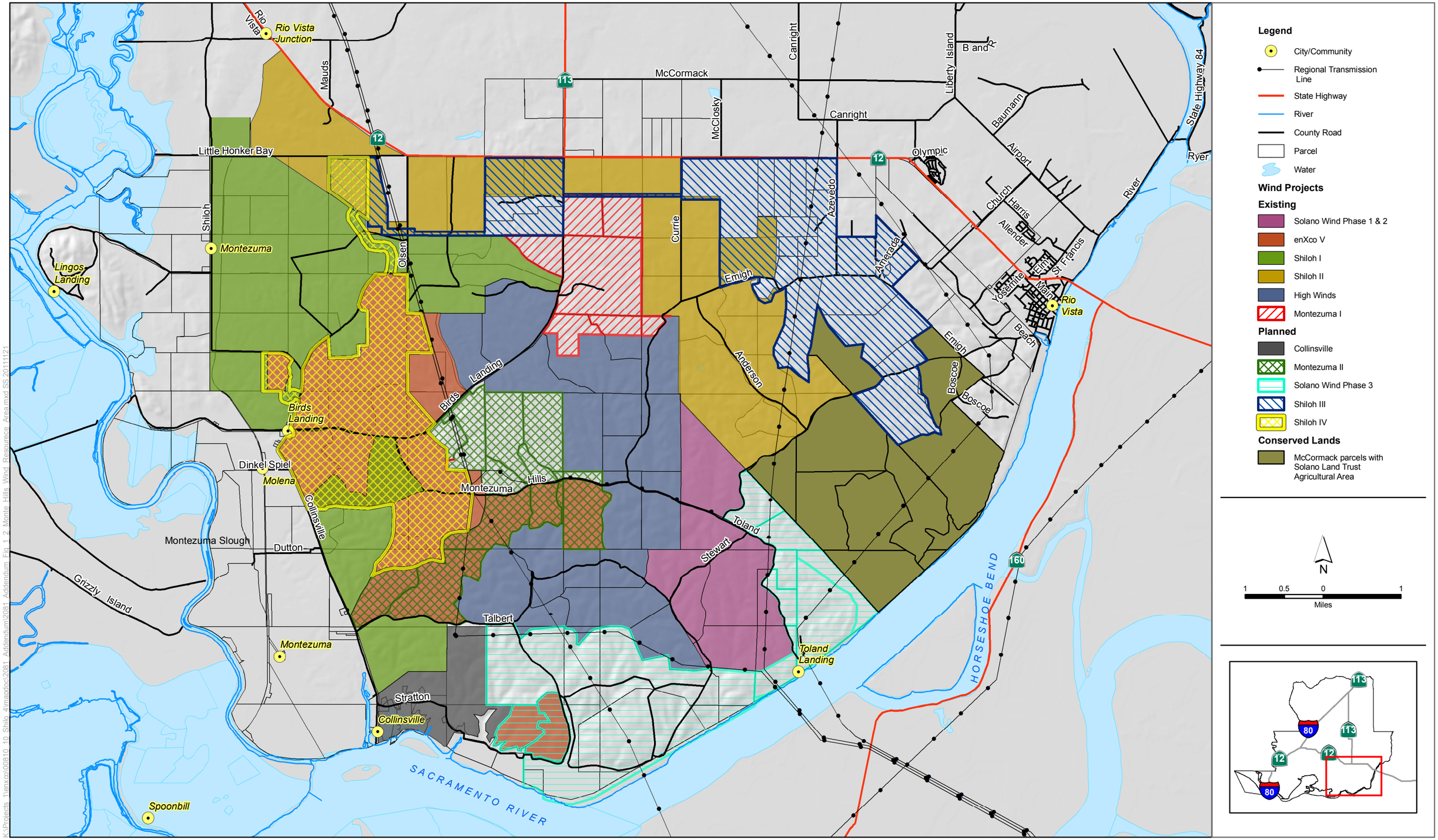

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Figure 2-1
Montezuma Hills Wind Resource Area

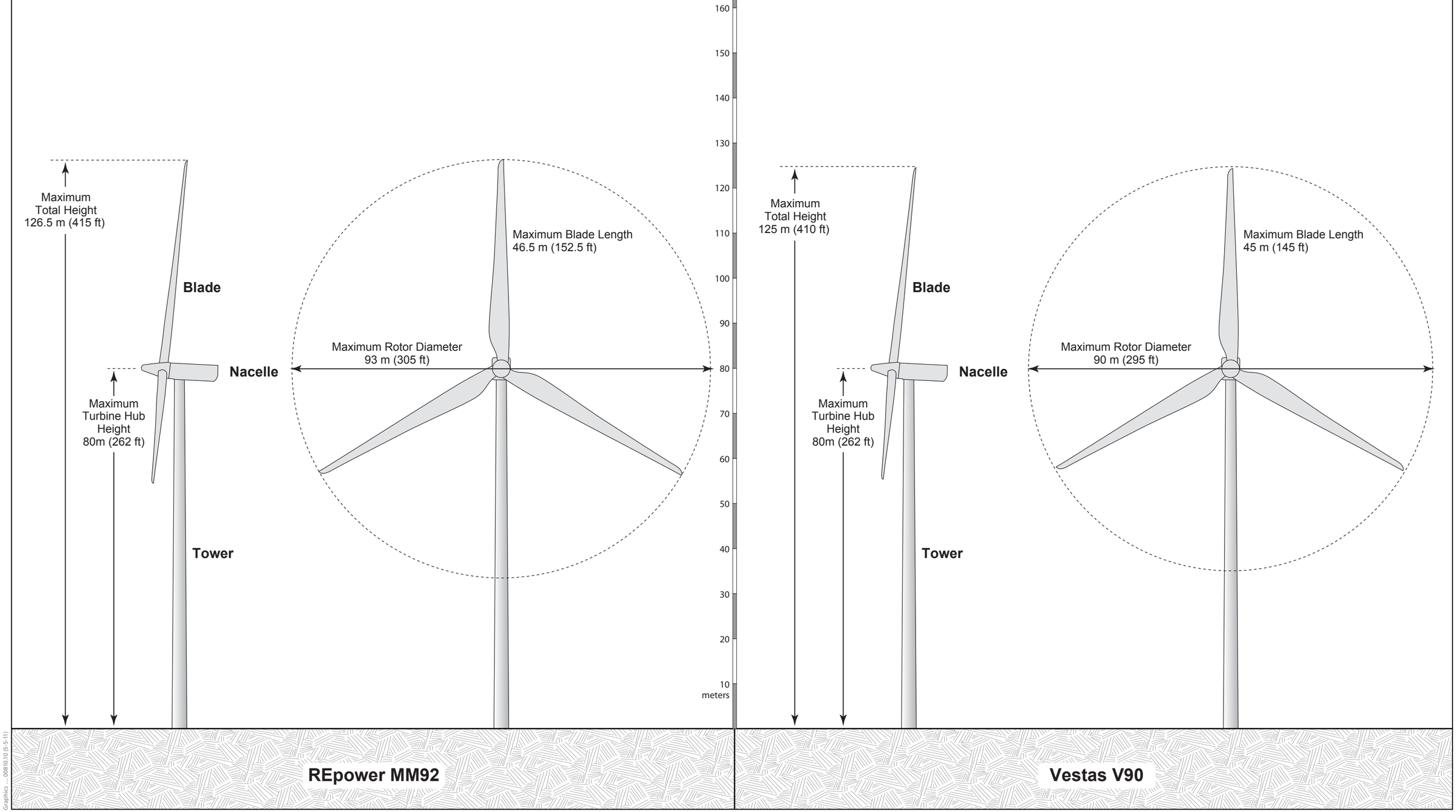

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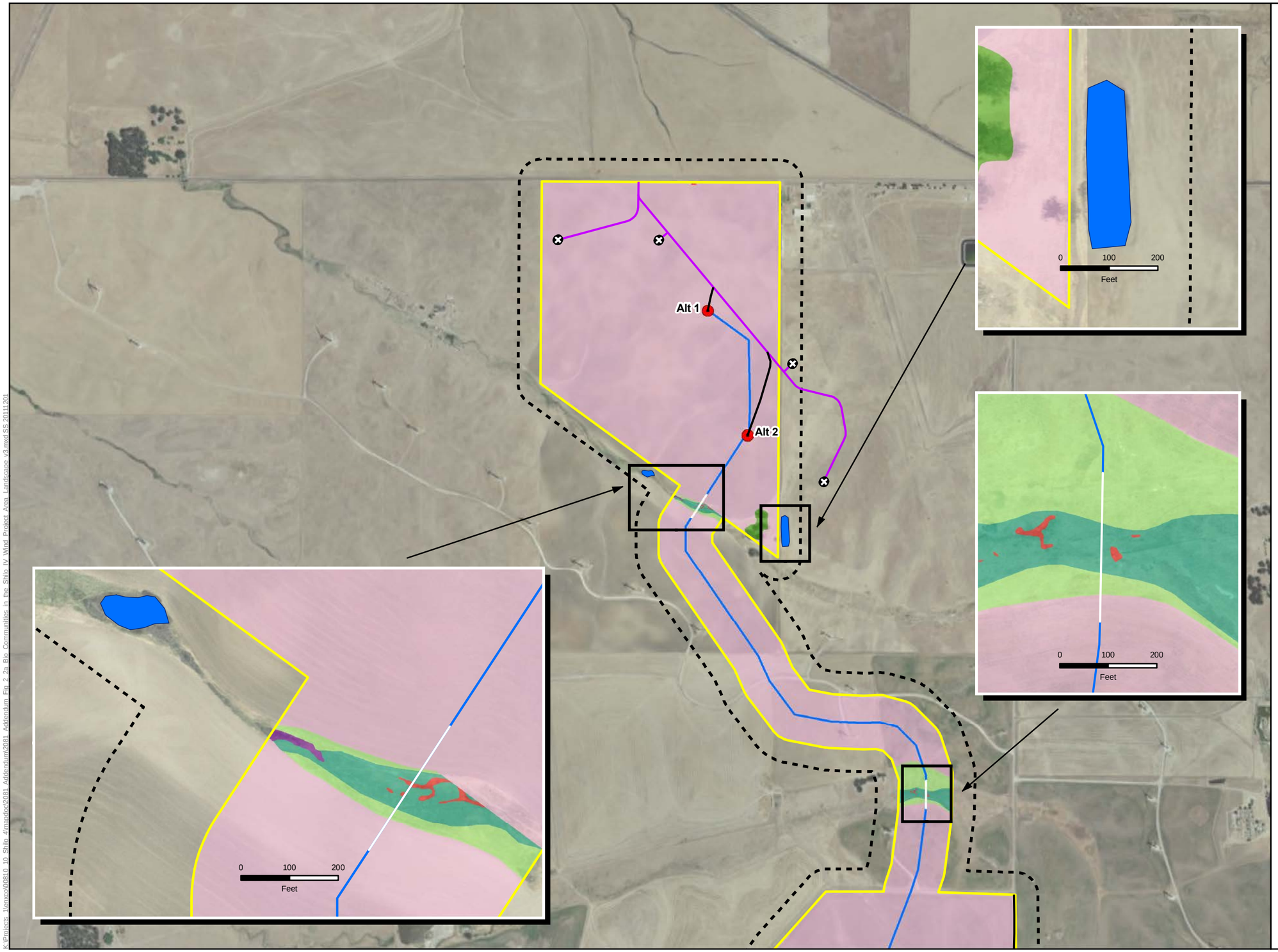
Figure 2-2
Turbine Options



Legend

- Existing Shiloh III Turbine
- Existing Shiloh III Access Road

Project Elements

- Shiloh IV Plan Area Boundary
- Shiloh IV Project Area 250 Foot Buffer
- Proposed Turbine
- Proposed Access Roads
- Proposed Electrical Collection Line
- Proposed Directional Drilled Electrical Collection Line
- Proposed Substation
- Proposed Laydown Yard
- Proposed O&M Facility

Land Cover Type

- Agriculture
- Annual Grassland
- Developed

Wetlands

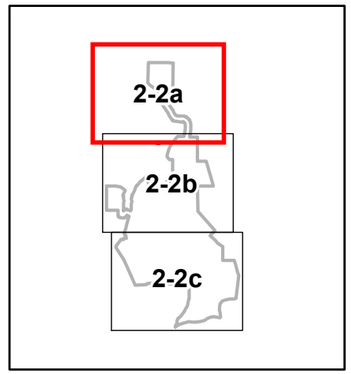
- Eucalyptus/Tree Grove
- Seasonal Wetland
- Bulrush-Cattail Wetland
- Alkali Meadow
- Pond

N

0 375 750 1,500

Feet

Insets of ponds and wetland crossings are shown at a larger scale to provide greater detail.



Base Map: ESRI Stream Imagery, iCubed 2010

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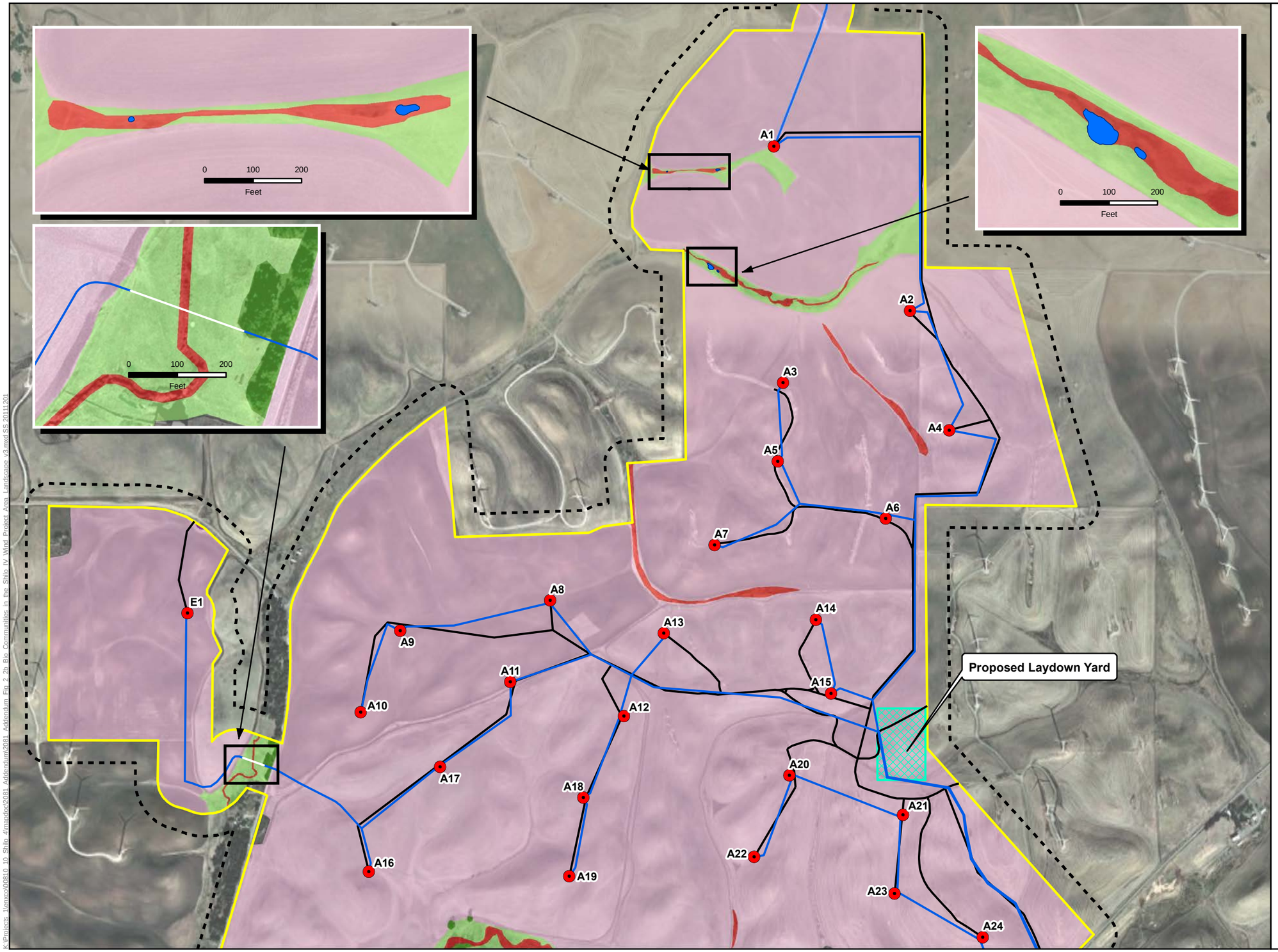
Figure 2-3a
Biological Resources in the Plan Area



Legend

- Existing Shiloh III Turbine
- Existing Shiloh III Access Road

Project Elements

- Shiloh IV Plan Area Boundary
- Shiloh IV Project Area 250 Foot Buffer
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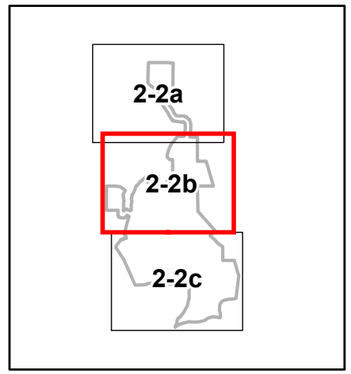

Base Map: ESRI Stream Imagery, iCubed 2010

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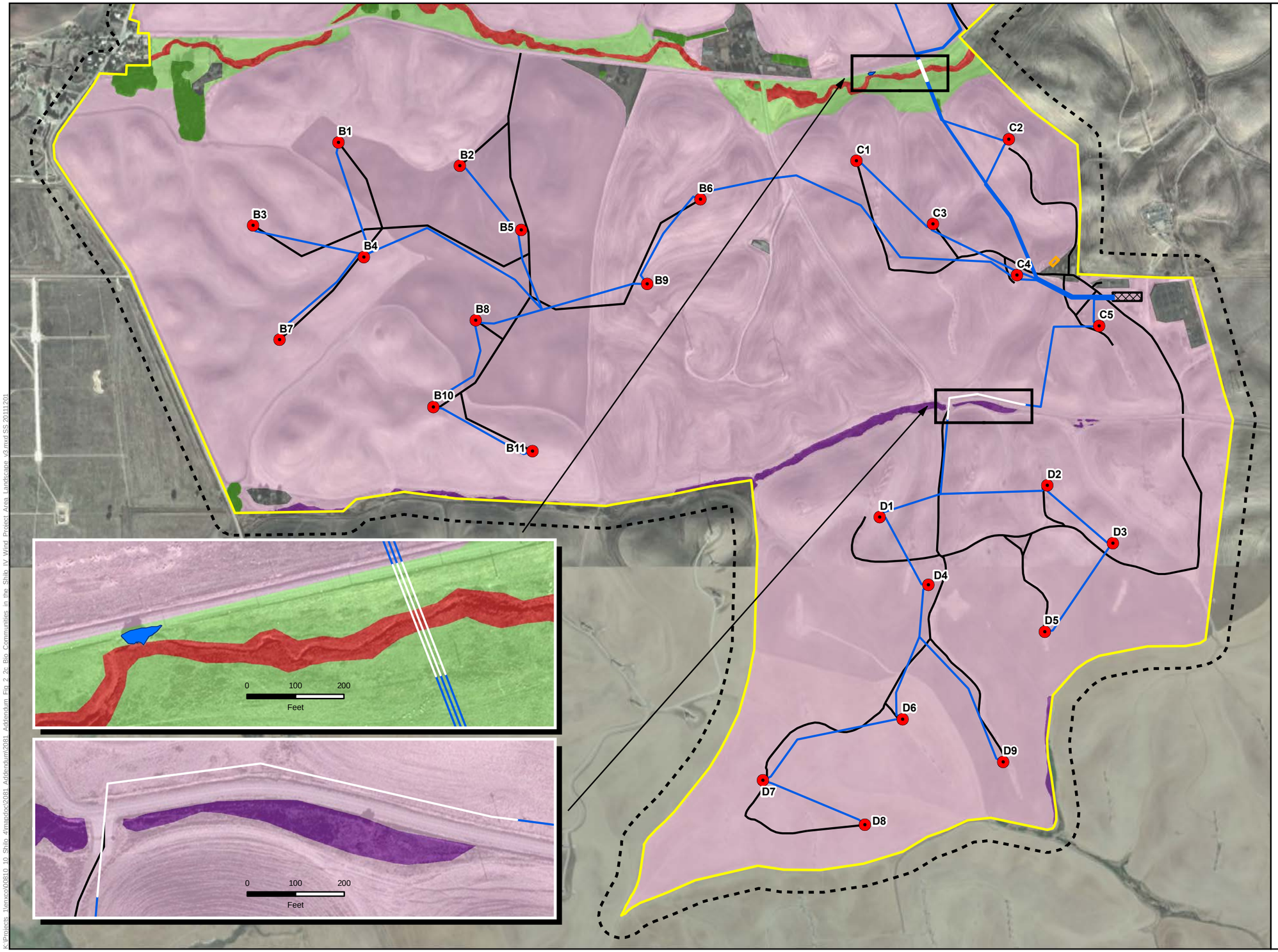
Figure 2-3b
Biological Resources in the Plan Area



Legend

- Existing Shiloh III Turbine
- Existing Shiloh III Access Road

Project Elements

- Shiloh IV Plan Area Boundary
- Shiloh IV Project Area 250 Foot Buffer
- Proposed Turbine
- Proposed Access Roads
- Proposed Electrical Collection Line
- Proposed Directional Drilled Electrical Collection Line
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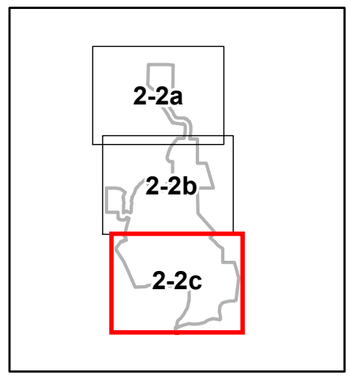

Base Map: ESRI Stream Imagery, iCubed 2010

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Figure 2-3c
Biological Resources in the Plan Area

The wind turbines locations shown in Figure 2-2 are conceptual only but will be situated to maximize exposure to wind from all directions, with emphasis on exposure to the prevailing southwesterly wind direction through the Plan Area. Sufficient spacing was established between wind turbine towers to minimize turbulence between and among the turbines. The turbine foundations will include a concrete foundation (12-foot radius) and a graveled area surrounding each turbine (34-foot radius) (see Chapter 4, *Impact Assessment* for temporary effect areas).

Power Collection System Covered Activities

The project's power collection system would collect the power produced by the turbines. Power generated by each turbine would be directed into a pad-mounted transformer, which is in turn connected to an array of electrical junction boxes distributed throughout the Plan Area to facilitate power collection. Collection lines for the project would be installed underground from each turbine site to the substation and occur with a 20-foot wide corridor.

In most cases, collection lines are constructed by excavating a trench; laying power collection lines; and recovering, recompacting, and reseeding soil above the collection line. Where the collection lines could intersect with seasonal wetlands, Shiloh IV will use HDD. HDD is expected to be necessary in approximately five locations (Figure 2-3). HDD bores can be steered: this allows the bore machine to sit at ground level, bore down and along the alignment, and direct the bore back up to the surface at a distant point. The bore machine uses a drilling fluid in the drilling process. The drilling fluid is typically 5% fine clay (such as bentonite) mixed with 95% fresh water. The clay and water mixture coats the wall of the borehole to help hold it open and to provide lubrication for the drill stem and conduit being installed. The drilling fluid is circulated back to the bore site for filtering and reuse.

The Shiloh IV substation, proposed to be built on an existing graded substation pad in the southern part of the Plan Area, near the eastern boundary (Figure 2-2), would connect to the underground system carrying electricity from the individual turbines. The substation would increase the voltage generated by the turbines and collected through the power collection system to meet the electrical transmission system's higher 230 kV voltage.

2.1.2 Facility Maintenance Covered-Activities.

Maintenance activity in the Plan Area would consist of equipment replacement, collection system repair, and gravel application and repair to roads as necessary. Maintenance-related ground disturbance would occur within the footprint of the initial construction-related disturbance areas.

Road gravelling covered-activity and road repair covered-activities would occur within to the footprint of the 16-foot wide corridor for existing and new roads. Turbines may need to be repaired or replaced at a rate of approximately one every 5 years. No new permanent effects are anticipated during maintenance activities, and temporarily affected areas would be restored within 1 year of disturbance.

2.1.3 Facility Decommissioning Covered-Activities

When Shiloh IV decommissions the project, the following activities would be conducted.

1. The turbine access roads would be removed unless the landowner desires that they be retained (in accordance with County regulations and County permit terms).
2. All hard facilities, including turbine foundations and wires at the substation, would be removed to a depth of 3 feet during the dry season.Large equipment such as graders and bulldozers would be necessary to remove the roads by returning them to grade. All decommissioning-related ground disturbance would be temporary, occur within the original construction footprint, and returned to cultivated agriculture.

2.1.4 Non-Covered Activities

Ongoing farming practices or other uses carried out by the underlying landowners, such as rural residential uses, are not under the control of Shiloh IV and are not covered activities under this HCP.

Chapter 3
Physical and Biological Resources

3.1 Plan Area Existing Land Use

Most of the land within the Plan Area boundaries is actively farmed, and currently includes other wind-energy project turbines and facilities. The primary land uses in the Plan Area are dryland farming and wind power production. Six rural residential dwellings are present within the Plan Area.

3.1.1 Surrounding Land Use

Most of the land surrounding the boundaries of the Plan Area consists of agriculture (dryland farming and grazing). Surrounding communities include Bird's Landing, less than 1 mile from the western border of the Plan Area, and Rio Vista, approximately 9 miles east of the Plan Area.

In addition to agricultural use, the Montezuma Hills region surrounding the Plan Area hosts existing energy producing facilities, most notably wind turbine generators in the Sacramento Municipal Utility District (SMUD) project area, the High Winds LLC project area, and the Shiloh I, Shiloh II and Shiloh III project areas. The Shiloh IV project boundary overlaps a large portion of the enXco V site (Figure 2-1).

Other scattered residences, as well as residences of the community of Birds Landing are less than one-quarter mile from the Plan Area.

3.1.2 Solano County General Plan Zoning

Land within the Plan Area is zoned Exclusive Agriculture (A-160) according to the 2010 Code of Solano County, Zoning Regulations. Wind farms are allowed as conditional uses in Exclusive Agricultural zone designations. The project is also within one of the County's designated Wind Resource Area (WRAs) identified in the Resources Element of the 2010 General Plan.

Shiloh IV must obtain a CUP to develop the project. The project must also comply with requirements, including setbacks, set forth in the County General Plan with respect to wind energy development.

3.2 Physical Resources

3.2.1 Location and Setting

The approximately 3,513-acre Plan Area is approximately 9 miles west of Rio Vista and 14 miles southeast of Fairfield (Figure 1-1). It consists of three separate but nearby areas connected by linear easement corridors to allow construction of the electrical collection lines: a western area encompassing approximately 100 acres, an eastern area encompassing approximately 3,000 acres, and a northern area encompassing approximately 400 acres. The three areas are separated by less than 2 miles. Access to the Montezuma Hills is via State Route (SR) 12, with primary access to the

Plan Area from Birds Landing Road and Montezuma Hills Road and from Shiloh Road for the western project site. Other roads in the vicinity include Collinsville Road and Olsen Road.

3.2.2 Topography

The Plan Area is characterized by rolling hills with a relatively constant crest elevation between 100 and 272 feet above mean sea level. Valleys in the Plan Area transition to sloped hillsides with relatively flat ridgelines. The Sacramento and San Joaquin Rivers lie to the south.

The Plan Area predominant landform is a relatively uniform pattern of treeless hills separated by narrow valleys and drainages that provide visual corridors and limited protection from the wind. In this portion of the county, the topographic and meteorological conditions consistently produce strong, steady winds.

3.2.3 Soil Conditions

The plan area is underlain primarily by Altamont, Diablo, San Ysidro, and San Benito soils, either individually or in complexes (Natural Resources Conservation Service 2011). This group of soil types has a typical profile of 25-30 inch deep clay, 25-38 inches of clay loam, and a weathered bedrock layer at 38 inches. When the soils are dry, there are many large cracks on the surface which extend into the substratum (Natural Resources Conservation Service 2011).

3.3 Biological Resources

3.3.1 Vegetation Communities

The distribution and abundance of the seven land-cover types present in the Plan Area are shown in Figure 2-3 and described below.

Agricultural Lands

Agricultural land-cover type, including dryland farming and livestock grazing, are the dominant land uses in the Plan Area. As of May 2011, 98% of the Plan Area was in wheat production, in preparation for wheat production, or recently fallow. The farmers in the Montezuma Hills typically use a 1- to 3-year crop rotation cycle, where grazing and fallow years follow planting and harvesting. A typical rotation cycle includes several tilling passes in the summer/ early fall, planting in late fall, harvest the following summer, and grazing for up to a year, after which the cycle begins again. Some farmers are able to cultivate two years in a row based on rainfall or application of biosolid fertilizer. Pre-emergent herbicide is often applied to minimize the number of weeds and undesirable broadleaf plants. (Allen, personal communication). The rotation in the Plan Area appears to be on a similar schedule.

Annual Grassland

The annual grassland in the Plan Area is dominated by nonnative annual grasses such as ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), and Italian ryegrass (*Lolium multiflorum*). No native grasses were observed in the Plan Area. Annual grassland in the Plan Area also supports a forb flora that includes filaree (*Erodium* spp.), fiddleneck (*Amsinckia menziesii* var.

intermedia), yellow star-thistle (*Centaurea solstitialis*), and scattered native perennial and annual forbs.

Annual grassland is limited in the project area to a few small areas totaling approximately 80 acres (2% of the total project area), primarily adjacent to Birds Landing Road and to wetland areas in the northern portion of the project area. These small patches of grassland are currently used for grazing or as staging areas for farming operations. Annual grassland habitat such as that found in the project area is relatively uncommon in the Montezuma Hills region because most areas in the region are under intensive cultivation.

Eucalyptus and Ornamental Trees

Eleven groves (defined for the purposes of this document as more than two trees) of eucalyptus and other ornamental trees are present in the Plan Area. These groves are typically found around residences or abandoned homesteads and were planted as windbreaks or for landscaping.

Wetlands and Aquatic land cover

Wetlands and aquatic land cover types in the Plan Area plus a 250-foot buffer were identified by an ICF botanist to ensure that these features were evaluated for potential indirect effects.

Bulrush-Cattail Wetland with Willow Riparian Scrub Inclusions

Bulrush-cattail wetlands occur in topographically low-lying areas adjacent to Birds Landing Road and Montezuma Hills Road and in scattered locations within valleys in the Plan Area. Generally, they are long, relatively narrow corridors characterized by erect, rooted, herbaceous hydrophytes (i.e., species adapted to very wet conditions). The species composition varies in these wetlands, but many are monotypic stands of cattail (*Typha latifolia*), common tule (*Scirpus acutus*), or three square (*Scirpus americanus*). Willow riparian scrub inclusions occur within these wetlands. These wetlands are typically surrounded by a very narrow fringe of the seasonal or alkali meadow wetland types (described below), constituting a transition to the upland community.

Alkali Meadow

Alkali meadow habitats are uncommon in the Plan Area, occurring at two locations along a proposed collection line route. In total, they occupy approximately 3 acres (less than 1% of the total Plan Area). Generally, they occur in low, uncultivated areas. Typical vegetation consists of saltgrass (*Distichlis spicata*), fiddle dock (*Rumex pulcher*), and Mediterranean barley (*Hordeum marinum ssp. gussoneanum*) and has a seasonal moisture regime. Alkali meadows, when present, are typically within a mosaic of other types of wetlands (described below), and thus they can provide habitat for several wildlife species.

Seasonal Wetland

Seasonal wetlands typically occur in topographically low-lying areas along the edges of bulrush-cattail wetlands and along seasonal streams. The primary distinction between these two types of wetlands is the length of time each is inundated with water. Bulrush-cattail wetlands typically retain water for extended periods into the growing season, while seasonal wetlands usually flood or are saturated for short periods and do not remain inundated for very long into the growing season. Dominant species in seasonal wetlands in the Plan Area include Italian ryegrass, pale spikerush

(Eleocharis macrostachya), bird's-foot treefoil (*Lotus corniculatus*), Baltic rush (*Juncus balticus*), and curly dock (*Rumex crispus*).

Seasonal Stream

Two seasonal streams, named Lucol Hollow and Clank Hollow on U.S. Geological Survey (USGS) topographic maps are present in the Plan Area. Several other features that are shown as "blue-line" streams on the USGS topographic maps are also present in the Plan Area. In the Montezuma Hills, these blue-line streams typically exhibit intermittent stream characteristics (such as a defined bed and bank and/or scour) or no stream characteristics at all. Several roadside drainages specifically constructed for the purpose of removing and channeling runoff from roads are also present in the Plan Area.

Pond

Five ponds are present in the Plan Area (ponds 2–5 and pond 12 as identified in the CTS site assessment (ICF International 2011). Two ponds are within the 250-foot buffer around the Plan Area but 18 additional ponds are located within 1.24 miles of the Plan Area. The ponds are variable in size and duration of ponding, and most have been constructed by landowners for agricultural or personal use. All the ponds appear to impound seasonal streams and are entirely supported by runoff from surrounding lands. Pond 12, a ponded area in Lucol Hollow, is fed by an intermittent drainage. Vegetation is variable, but most ponds are open water with a narrow ring of emergent wetland vegetation along the edges. Most dry completely or nearly completely by mid to late summer. A few small willows (*Salix* sp.) are often present around ponds in the Montezuma Hills area, but extensive riparian areas are generally lacking. Farmers cultivate to the edge of ponds in some instances (Pond 4 and 5) or leave a combination of cultivated/uncultivated grassland near other ponds (Pond 2, 3, and 12).

3.3.2 Covered Species (California Tiger Salamander)

The species covered under this HCP is CTS (central California Distinct Population Segment). Other species considered for inclusion but not covered under this HCP are listed in Appendix A, with the rationale supporting the decision to exclude.

CTS is a large terrestrial salamander with a broad, rounded snout. Adult lengths up to 8.2 inches have been recorded (Stebbins 2003). Tiger salamanders exhibit sexual dimorphism, with males tending to be larger than females. Typical adult coloration is a black body with random white or yellowish markings that tend to be more concentrated on the sides of the body.

CTS larvae are roughly one-half inch long at hatching. They have yellowish gray bodies; broad fat heads; large, feathery external gills; and broad dorsal fins that extend well up their backs. They can grow to more than 2 inches before metamorphosis (69 Federal Register [FR] 149 47215).

Geographic Distribution

CTS is endemic to California. This species historically occurred at elevations up to 3,900 feet (Shaffer et al. 1993; Jennings and Hayes 1994) from Sonoma County south to Santa Barbara County along the Coast Ranges, and from northern Yolo County south to northwestern Kern and northern Tulare Counties in the Central Valley and surrounding foothills.

CTS presently occurs in reduced and fragmented portions of its historic range (Figure 3-1). Moreover, USFWS recognizes three distinct population segments—one in the Santa Maria area in Santa Barbara County, one in the Santa Rosa Plain in Sonoma County, and the remaining one in Central California. The Santa Barbara County and Santa Rosa Plain distinct population segments are considered to be at greater peril than the distinct population segment in central California; accordingly, these distinct population segments have been federally listed as endangered, while the central California distinct population segment remains federally listed as threatened.

Life History and Habitat Requirements

CTS has an obligate biphasic life cycle (Shaffer et al. 2004). The larvae develop in vernal pools and ponds, but the species is otherwise terrestrial and spends most of the post-metamorphic phase in underground retreats (Shaffer et al. 2004; Trenham et al. 2001). As a result of spending most of their lives underground, CTSs are rarely encountered even where they are abundant. Subadults and adults typically spend the dry summer and fall periods in the burrows of California ground squirrels (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), and other small mammals (Trenham 1998). CTSs may also use other landscape features, such as leaf litter or cracks in desiccated soil, for upland refugia. CTSs are not known to create their own burrows, and are dependent on small mammal activity to create, maintain, and sustain sufficient underground refugia.

CTSs typically emerge from their underground refugia at night during the fall or winter rainy season (November–May) to migrate to their breeding ponds (Shaffer et al. 1993; Trenham et al. 2000). The breeding period is closely associated with rainfall patterns each year, with fewer adults migrating and breeding in drought years (Trenham et al. 2000). Male salamanders are generally first to arrive and remain in the ponds longer than females (average 44.7 days for males and 11.8 days for females) (Trenham et al. 2000). CTSs mate and lay their eggs in breeding ponds then return to upland refugia.

Breeding ponds were likely historically limited to vernal pools, but CTSs now also breed in stock ponds. Ideal breeding ponds are free of nonnative predators and fish, and are seasonal or semipermanent (Barry and Shaffer 1994). Some seasonal pools may not exhibit sufficient depth or persistence during times of drought (Barry and Shaffer 1994).

CTS larvae generally hatch within 10–24 days after egg laying, and the peak emergence of metamorphs is typically between mid-June and mid-July (Trenham et al. 2000). The larvae are completely aquatic. They feed on zooplankton, small crustaceans, and aquatic insects for about 6 weeks after hatching, after which they switch to larger prey such as larval Pacific treefrogs (*Pseudocris regilla*), western spadefoot (*Spea hammondii*), and California red-legged frogs (*Rana aurora*).

The larval stage is typically completed in 3–6 months, and most metamorphs enter upland habitat during the summer. Amphibian larvae must grow to a critical minimum body size before they can metamorphose to the terrestrial stage, and they do not survive if the breeding pond dries before metamorphosis is complete. However, larval development and metamorphosis can vary, and larvae may develop faster in smaller, more rapidly drying pools. Feaver found that larvae metamorphosed 60–94 days after eggs had been laid (Feaver 1971, in U.S. Fish and Wildlife Service 2008).

Following metamorphosis, juvenile CTSs leave their pools and move to upland habitat. This can occur in both wet and dry conditions (Loredo and Van Vuren 1996), although wet conditions are more favorable for upland travel. Under dry conditions, juveniles may remain near their natal pool,

and may wait until the following winter rains to move farther into suitable upland habitat. Depending on location and other development factors, metamorphs do not return as adults to aquatic breeding habitat for 2–5 years (Trenham et al. 2000).

CTSs in Santa Barbara County have been recorded dispersing up to 1.3 miles from breeding ponds (Sweet 1998, in U.S. Fish and Wildlife Service 2008), although they typically remain close to their associated breeding ponds. One study found 95% of captured juveniles within 2,099 feet of the breeding pond, with the remaining 5% being found at greater distances. This study also found that adult CTSs travel between ponds from year to year (Trenham et al. 2001). These dispersal distances were reconfirmed with subsequent research (Trenham et al. 2005).

Threats

Factors associated with declining CTS populations include continued habitat loss and degradation due to agriculture and urbanization; hybridization with the nonnative eastern species (*Ambystoma tigrinum*), and predation by introduced species. Habitat isolation and fragmentation within many watersheds have precluded dispersal between subpopulations. The remaining small, isolated populations are vulnerable to extirpation as a result of chance environmental or demographic events.

Status in the Plan Area

Mapping and surveys conducted by ICF in 2009 and 2011 identified a total of 25 potential breeding sites (defined as sites that pond water or appear to pond water for more than 3 months of the year). Five ponds within the Plan Area provide suitable breeding habitat, but probably only in average to above-average rainfall years. The remaining 20 potential breeding sites are within a 1.24-mile radius (Figure 3-2).

Farmland in the Plan Area is typically managed on a 3-year rotation—that is, the land is planted and harvested in year one, grazed with sheep in year two, and allowed to remain fallow in year three, at which point the cycle is repeated. Some farmers are able to cultivate two years in a row based on rainfall or application of biosolid fertilizer. Pre-emergent herbicide is often applied to minimize the number of weeds and undesirable broadleaf plants. (Allen, personal communication). Areas currently mapped as grasslands are not included in these rotation cycles; however, grazing may or may not occur depending on the individual landowner's management.

Refuge habitat in the Plan Area is limited, consisting mostly of cracks in the soil, found throughout the Plan Area. There is a noticeable lack of ground squirrel burrows in the Plan Area, although a detailed burrow census was not conducted; no ground squirrels were observed in the Plan Area during the CTS site assessment; however they occasionally occur in the Montezuma Hills.

The California Natural Diversity Database (2011) lists one recent occurrence (2007) of an adult CTS in the Plan Area vicinity; it was found dead in a disked field immediately adjacent to the northern portion of the project area (Figure 3-2). Additionally, biologist Stephanie Myers, conducting independent field surveys, observed a CTS larva on May 8, 2009, in pond 9, a seasonal pond near the corner of Olsen Road and SR 12, approximately 0.75 mile from the Plan Area (Figure 3-2). There are no additional CTS occurrences within 3.2 miles of the Plan Area. In a 4- to 10-mile radius there are another 18 occurrences to the north (Jepson Prairie) and 4 occurrences to the northwest (Portrero Hills). There are also occurrences more than 10 miles from the Plan Area, south of the Sacramento and San Joaquin Rivers (Figure 3-1). SR 12 may present some impediment to movement as a result

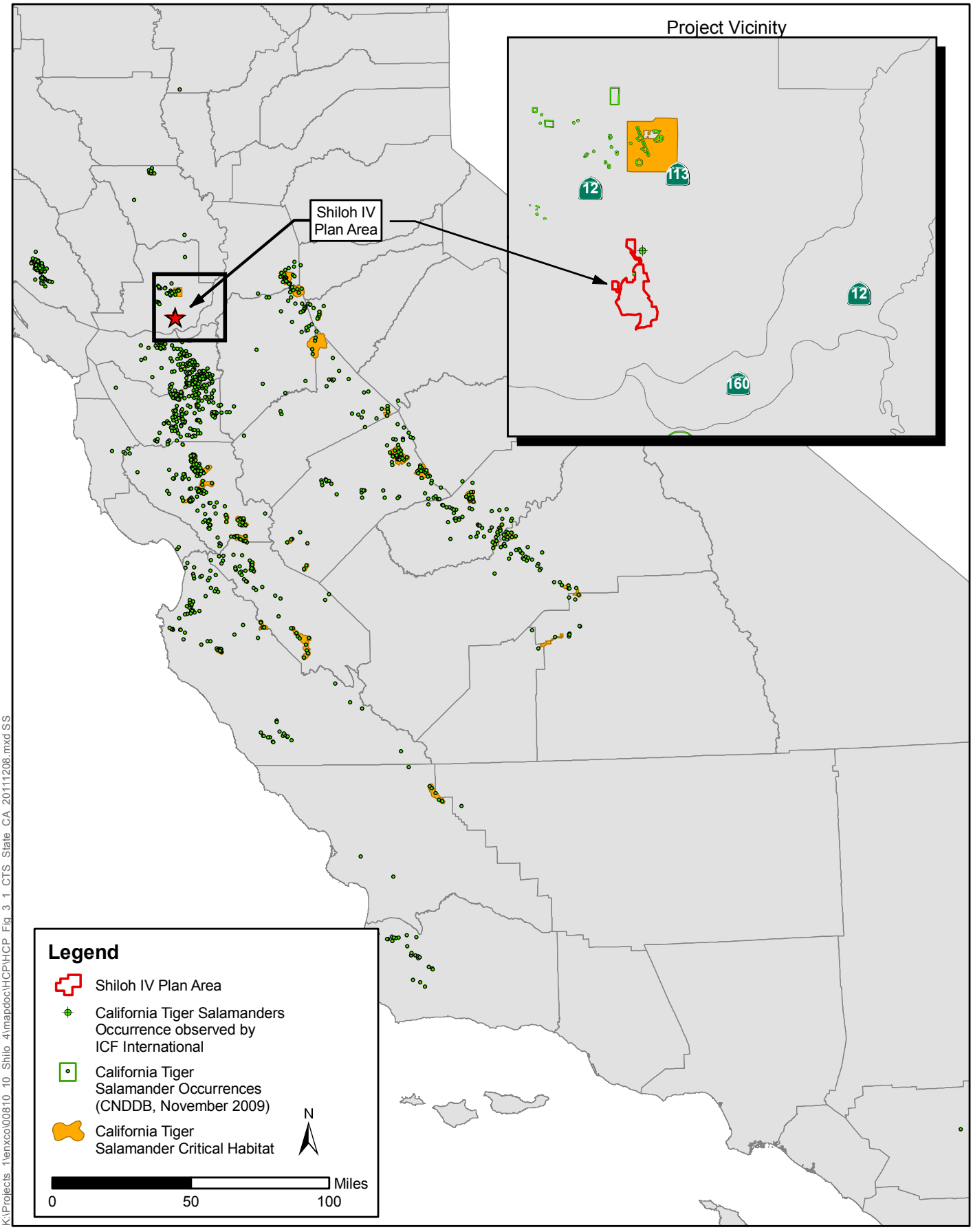

Figure 3-1
California Tiger Salamander Occurrences

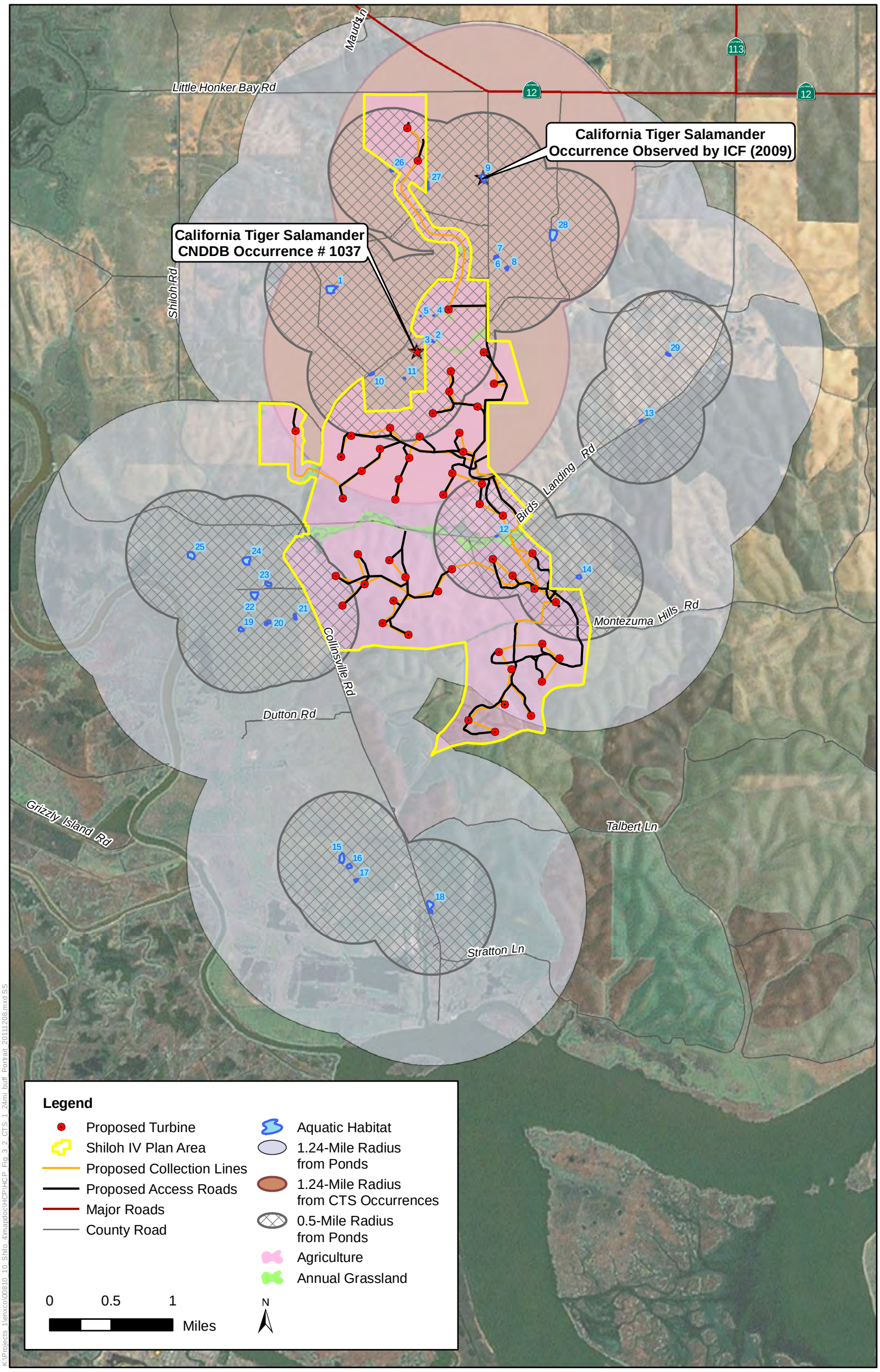

Figure 3-2
California Tiger Salamander Habitat in the Shiloh IV Project Vicinity

of traffic and new drains added on the shoulder of the road. Collinsville Road may also present an impediment to movement east of the project. Suisun Marsh is a potential barrier between the Plan Area and occurrences to the west. The Sacramento and San Joaquin Rivers are impassable barriers between the Plan Area and occurrences south of it.

As the first step in reaching a determination on the presence of CTS in the Plan Area, a site assessment (ICF International 2011) was conducted in accordance with the procedures set forth in *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander* (U.S. Fish and Wildlife Service and California Department of Fish and Game 2003) (interim guidance). The interim guidance describes two components to the assessment process: an assessment of potential habitat and documented CTS occurrences in and around the project site, and protocol-level field surveys of breeding pools and associated uplands to determine presence or absence.

The site assessment indicated that potential aquatic habitat on the project site is limited to several ponds in the northern portion of the Plan Area and within 1.24 miles of the Plan Area. Nearly all upland habitat areas in the project vicinity are in agricultural use with limited grassland at the edges of seasonal wetlands, drainages and roads. Burrows, necessary for CTS underground refugia, are limited because ground squirrels and other burrowing animals have nearly been eliminated from the Montezuma Hills area by farming and ranching activities. Because soils in the area are primarily clays, they are prone to extensive shrinking and swelling, creating deep crevices during part of the year. CTS have been observed using these types of soil crevices in other locations, although such crevices may not be a reliable source of cover because they are prone to shrinkage during the fall and winter months, possibly entombing resident salamanders. The site assessment concludes that it is unlikely that CTS occurs in a majority of the project area, or occur in very low densities, because nearly the entire area is disked regularly for farming operations. CTSs, if they were to occur, would likely be concentrated in uncultivated areas adjacent to ponds and within the limited grassland areas.The literature indicates that if the buffers are less than 2,000 feet around ponds population sizes would be reduced by greater than 80% (Trenham et al. 2005); for this project area, buffers are substantially smaller than this indicating an inability for CTS to survive over the long-term in these locations. Despite these conditions, and in view of the two observations described above, CTS are most likely to be present within 0.5 miles of existing ponds (i.e., contain approximately 95% of the population) but could be present within 1.24 miles of suitable breeding ponds and could disperse into the agricultural lands within the project area. This distance is based on observed mobility of the species as described in USFWS and DFG interim guidance.

Based on the results of the site assessment and in consideration of these occurrences, Shiloh IV has elected to seek take coverage in the event the species is encountered during construction and operations.

Chapter 4
Impact Assessment

4.1 Project-Specific Impacts

The covered activities may result in adverse effects on CTS. Impacts such as habitat loss, degradation, or fragmentation; direct mortality; injury; and harassment of individual juveniles and adults could result from construction-related activities or vehicle strikes. As shown in Figure 3-1, there is no designated critical habitat in the Plan Area or its vicinity; consequently, the covered activities would not affect critical habitat. For the purposes of this HCP, temporary impacts are impacts that occur and are restored within 1 year. All other impacts are considered permanent. Potential impacts are described below.

4.1.1 Habitat Loss

As discussed in greater detail in Chapter 5, *Conservation Strategy*, no seasonal wetlands or ponds appropriate for salamander breeding would be directly affected by the covered activities. In addition, limited upland habitat, consisting primarily of agricultural lands, occurs in the Plan Area. The agricultural lands provide dispersal habitat, but have limited value for salamander foraging and cover when in agricultural production, because disking destroys burrows and crevices.

Permanent and temporary habitat impacts were calculated using the assumptions listed below.

Permanent Impacts

- **Wind turbine foundations**. A 92-foot-diameter permanent impact area would result from the concrete foundation (24 feet in diameter) and additional graveled area surrounding each turbine (a 34-foot radius from the foundation perimeter).
- **Roads**. Each new road would entail a 16-foot-wide corridor of permanent impact.
- **Substation**. The designated area would constitute an area of permanent impact.
- **Operation and maintenance facility expansion**. The designated area would constitute an area of permanent impact (8,000-square-foot expansion area).

Temporary Impacts

- **Wind turbine sites**. Temporary disturbance to a distance of 42 feet beyond the permanent impact area would result from turbine installation.
- **Laydown areas**. Temporary impacts would occur within designated laydown areas.
- **Roads**. An additional 34 feet of temporary impacts (17 feet on either side of the permanent impact area) would result from road construction activities and transporting turbines.
- **Substation**. Temporary disturbance beyond the permanent impact area would result from substation construction.

- **Operation and maintenance facility expansion**. Temporary disturbance from expansion of these facilities.
- **Collection lines**. Installation of collection lines would result in a temporary disturbance corridor 20 feet wide.
- **Maintenance**. Additional temporary impacts would result from wind turbine repair or replacement, electrical line repair or maintenance, and road maintenance. Such activities would be undertaken only on an as-needed basis—typically, individual turbines need major repair or replacement every 5–10 years, requiring several days of activity.

Figure 4-1 illustrates these spatial assumptions. Figure 2-3 depicts the impacts of the proposed project throughout the Plan Area.

The initial construction phase would result in the permanent loss of 25.7 acres of agricultural land from construction and placement of wind turbines, substation, permanent roads, and expansion of the operations and maintenance facility, and 0.2 acre of annual grassland from construction of an access road. Temporary impacts on 126 acres, primarily agricultural land (approximately 0.8 acre of grassland and 125.2 acres of agricultural) would result from installation of collection lines, a construction area around each turbine pad, temporary equipment access, and temporary laydown areas. Use of the existing operations and maintenance facility for some project staging activities will reduce the extent of impact.

In addition to temporary habitat loss incurred during the construction phase, land may be temporarily disturbed by maintenance activities over the permit term. Wind turbines may need to be repaired or replaced, at a rate of approximately one turbine/5 years, for replacement of a total of approximately six turbines over the 30-year CUP period. Based on an estimated 1.8-acre disturbance area for each turbine replacement, approximately 10.8 acres (6 x 1.8 acres) would be temporarily disturbed for wind turbine replacement. Other potential maintenance activities include road repair and reapplication of gravel. Portions of underground transmission lines may need to be replaced (approximately 1 mile over the permit term), for a total of up to 2.5 acres of temporary impacts. A total of up to 15 acres of agricultural land and approximately 1 acre of grassland may be temporarily disturbed from maintenance activities over the life of the project. (these impact acreages are approximate because maintenance activities are unknown until they become necessary). No permanent habitat loss is expected from maintenance activities, and temporary disturbance would occur primarily in the ground-disturbance footprint associated with project construction. All habitat temporarily disturbed during maintenance would be returned to preproject conditions within 1 year of disturbance.

A small percentage of the habitat in the Plan Area would be affected by the proposed project, as shown in Table 4-1.

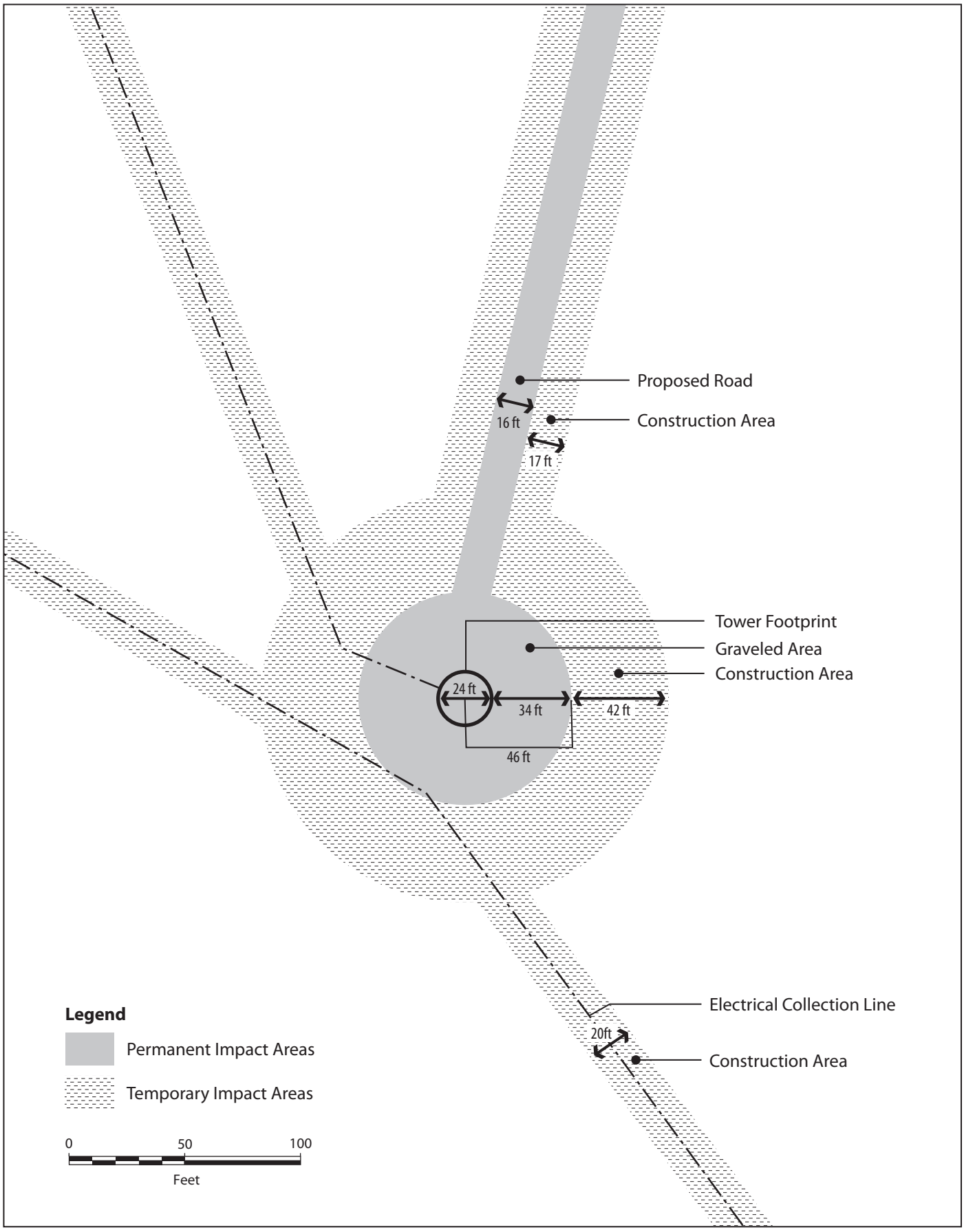

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Figure 4-1
Impact Analysis Schematic

Table 4-1.Impacts on Agriculture and Grasslands[a]

Land Cover Type	Acres in Plan Area	Impact Type	Impact Acres	% of Specific Land Cover Type in Plan Area
Agriculture	3,347	Permanent	25.7	<1
		Temporary: construction	125.2	<4
		Temporary: maintenance	15	<1
Grassland	80	Permanent	0.2	<1
		Temporary: construction	0.8	<1
		Temporary: maintenance	1	<1

[a] The impact analysis includes 50 proposed turbine locations plus two alternate turbine locations and associated facilities, and therefore slightly overestimates the anticipated impacts.

Of the permanent effects on agricultural land, approximately 8.5 acres of effects would occur within 0.5 mile of ponds, approximately 17 acres would occur within 0.5 to 1.24 miles, and 0.2 acre is beyond 1.24 miles from a pond. Loss of agricultural land has a small potential to affect CTS dispersal. As described above, the agricultural lands have limited value for the species' cover and foraging requirements and the remaining ponds, while some are suitable, are unlikely to harbor robust populations. Habitat degradation and fragmentation are further described below.

4.1.2 Habitat Degradation

No wetland breeding habitat will be permanently or temporarily affected from the project. A very small amount of grassland aestivation habitat (0.2 acre) would be permanently affected from the project, and approximately 0.8 acre of grassland aestivation habitat would be temporarily affected from the project. Figure 3-2 shows dispersal distances, land cover, and project facilities near aquatic habitat features and known occurrences within the Plan Area. Because of the small impact footprint in relation to the size of each watershed, the proposed project is not expected to significantly alter the extent of impervious surface that could otherwise alter the hydrology. Implementation of avoidance and minimization measures described in Chapter 5, *Conservation Strategy*, would ensure that the proposed project does not directly or indirectly contribute any sediments or other pollutants that would adversely affect aquatic habitat for CTS.

Access roads could degrade dispersal habitat by introducing different land cover types that salamanders would need to cross, resulting in possible increased exposure to predators. CTS mortality and injury occur when individuals attempt to cross roads and are hit by vehicles; accordingly, access roads associated with the proposed project may pose a threat to CTSs. CTS vehicle strikes are most likely to occur on rainy nights when the animals are moving to their breeding ponds; because the project-related access roads will seldom be traveled on rainy nights, the risk of vehicle strikes is not high.

When the turbines are operational, noise levels will be elevated over existing conditions. Studies of the effects of sound on other wildlife species have indicated that noise can cause alterations in behavior patterns. Studies on amphibians have mostly focused on vocalization and call detection by frogs. Noise can affect spacing and degree of aggregation of calling males frogs and it can also affect the emergence of spadefoot toads at times when water is not present. Increases in noise levels are not expected to affect CTS because they are primarily driven by temperature, moisture, and olfactory cues.

Habitat degradation resulting from water quality effects is expected to be negligible because of measures to protect water quality; habitat degradation resulting from new roads is expected to be low because of the small area affected by roads and because of their infrequent use during the rainy season; and habitat degradation resulting from turbine noise is also expected to be low because CTS respond to temperature, moisture, and olfactory cues.

Habitat degradation could occur if HDD activities result in migration of the bentonite (an inert and non-toxic clay material) and water drilling solution to surface wetlands (i.e., *frac-out*). enXco has directionally drilled thousands of feet of similar collection lines in dozens of locations in the area. If a frac-out occurs, drilling is slowed and stopped until containment measures can be put in place; when drilling is complete surface fluids are collected and disposed of in existing trenches or the landfill. Because no directional drilling is proposed under ponds, a frac-out in water is unlikely; however, directional drilling would be conducted under seasonal wetlands and indirect effects could occur in one pond (pond 12) that is downgradient if the area is not adequately contained and cleaned. Other sensitive resources are not expected to be adversely affected because of the low probability of species occurrence in an area of frac-out, containment, and mitigation measures.

Habitat degradation in agricultural lands resulting from temporary and permanent effects is expected to be minimal for CTS. While some agricultural lands may provide dispersal habitat, they have limited value for salamander foraging and cover when in agricultural production, because disking occurs on a regular basis (every 2 or 3 years), destroying burrows and crevices. Other existing agricultural practices, beyond the control of the applicant and outside the scope of this HCP, such as cultivation to the edge of ponds and herbicide application could also adversely affect the species. There is a noticeable scarcity of burrows in the agricultural lands of the Plan Area. Although a protocol-level survey for CTS has not been conducted, the ponds in and adjacent to the Plan Area are primarily surrounded by cultivated agricultural land and dispersal from or use of these ponds is unlikely.

4.1.3 Habitat Fragmentation

Studies suggest that the current patchy distribution of CTS was caused by a combination of the extreme anthropogenic changes in and around the Central Valley and the restrictive breeding requirements of the species. The threat of additional fragmentation resulting from urban development and conversion to more intensive agriculture is one of the primary factors leading to the listing of the species (U.S. Fish and Wildlife Service 2004).

Land conversion could create barriers to the dispersal of CTSs between breeding sites and upland habitat and between breeding areas. Existing barriers established by current agricultural land use practices would remain substantially unchanged. The nearest breeding populations are in Contra Costa County between Concord and Antioch, south of the Plan Area, and in the vicinity of Travis Air Force Base, north of the Plan Area (Jepson Prairie Critical Habitat Unit). The Contra Costa County population is separated from the Plan Area by the San Joaquin–Sacramento River complex, while the Jepson Prairie population is approximately 4 miles north and separated from the Plan Area by SR 12. While it is possible that CTS disperse across SR 12, it is unlikely that they would do so in large enough numbers to significantly affect breeding populations, given the high number of vehicles and potential for mortality on the road. The proposed project would not impede genetic exchange between known breeding populations.

There are presently no topographic or other physical barriers that limit salamander dispersal throughout the Plan Area, though the effect of existing land use practices on dispersal are unknown and likely adverse. The proposed project would not introduce substantial barriers to movement between habitat components in and near the Plan Area. Only a small proportion of dispersal habitat in the Plan Area would be lost and wind turbine spacing would not interfere with CTS movement through the site. The permanent roads would be 16 feet wide and infrequently travelled by vehicles and would not pose a barrier to salamander dispersal. The wind turbines would not impede CTS movement between aquatic habitat areas or between aquatic habitat and surrounding uplands; moreover, avoidance and minimization measures described in Chapter 5, *Conservation Strategy*, would ensure that suitable habitat is avoided or that compensatory mitigation is provided.

In light of the analyses above, the proposed project would neither impede regional movement between CTS populations, nor introduce barriers between aquatic habitat and upland habitat areas within the Plan Area beyond what currently exist. It would not isolate, fragment, or create barriers to dispersal between any known or potentially occupied CTS habitat.

4.1.4 Construction-Related Impacts

Mortality, injury, or harassment of CTS could result from project-related equipment or vehicles, construction debris, and worker foot traffic within the Plan Area. Individuals could fall into trenches, pits, or other excavations and be directly killed or, unable to escape, be killed by desiccation, entombment, or starvation. Disturbance and displacement associated with work activities may increase the potential for predation, desiccation, competition for food and shelter, or strike by vehicles on access roads.

Construction activities could result in the introduction of chemical contaminants to the site. Vehicles may leak hazardous substances such as motor oil and antifreeze. A variety of substances could be introduced during accidental spills of materials. Such spills can result from leaks in vehicles, small containers falling off vehicles, or accidents resulting in whole loads being spilled. Large spills may be partially or completely alleviated by clean-up efforts, depending on the substance. CTSs using these areas could be exposed to any contaminants that are present at the site. Exposure pathways could include inhalation, dermal contact, or direct ingestion. Exposure to contaminants can cause chronic or acute effects that could impair health and/or productivity or lead to mortality. Carcinogenic substances could cause genetic damage resulting in sterility, reduced productivity, or reduced fitness of progeny. Little information is available on the effects of contaminants on CTS. The effects may be difficult to detect. Morbidity or mortality would likely occur after the animals had left the contaminated site, and more subtle effects, such as genetic damage, could only be detected through intensive study and monitoring.

Construction vehicles parked in agricultural lands under dry conditions, as well as construction crew staff improperly extinguishing and disposing of their cigarettes, could accidentally cause a grassland fire during dry conditions. This impact mechanism is unlikely given past experience with wind farm development in the Montezuma Hills; moreover, potential effects will be minimized with development and implementation of a fire prevention and response plan as required by the County. Should wildfire occur, it would likely occur during the inactive period when CTSs are aestivating underground; direct mortality would be minimal, and agricultural lands would recover the following wet season.

Grassland habitat in the Plan Area is limited to areas along Birds Landing Road and wetland areas in the northern portion of the project area but is low quality. CTSs could be found dispersing across agricultural land. Overall, the likelihood of injuring CTSs during construction is very low. Impact avoidance and minimization measures described in Chapter 5 *Conservation Strategy*, will further reduce the likelihood of injuring CTSs during construction.

4.2 Cumulative Impacts

A number of ongoing and proposed projects could contribute to adverse effects on CTS habitat within Solano County. These activities may alter aquatic and upland habitats and could potentially harass, harm, injure, or kill CTSs. Activities that would potentially affect CTS include development associated with urban, water, flood control, highway/roadway, and utility projects; application of herbicides/pesticides; conversion to agricultural use; and indirect effects of adjacent development such as urban runoff altering the hydrologic regime.

CTS habitat in Solano County may be lost or degraded as a result of road and utility construction and maintenance, overgrazing, agricultural expansion, and water irrigation and storage projects. Other threats include contamination, poisoning, increased predation, competition from nonnative species, residential development, small mammal population control, and mosquito control.

Cattle grazing is a common land use practice in rural Solano County. Overgrazing can result in degradation and loss of riparian vegetation, increased water temperatures, streambank and upland erosion, and decreased water quality in streams. Livestock operations also degrade water quality with pesticides and nutrient contamination. However, light to moderate livestock grazing is generally thought to be compatible with continued successful use of rangelands by CTS, provided the grazed areas are not subject to intensive burrowing rodent control efforts (Shaffer et al. 1993; U.S. Fish and Wildlife Service 2008). The shorter vegetation associated with grazed areas may make the habitat more suitable for ground squirrels, whose burrows are utilized by CTSs for refugia (U.S. Fish and Wildlife Service 2008).

Agricultural development, impoundments, and irrigation can alter vernal pool hydrology, resulting in the loss of aquatic breeding habitat. Disking, a common practice on agricultural lands, can result in substantial losses of upland habitat for CTS. Significant amounts of rural, undeveloped land are currently being converted to agricultural land in Solano County, resulting in loss of upland habitat for listed species (U.S. Fish and Wildlife Service 2008). Moreover, agricultural development in the Montezuma Hills has substantially reduced remaining suitable habitat in this area; roads associated with wind project development have also contributed to the loss of habitat.

Current major development activities under Solano County's jurisdiction include proposed expansion of the Potrero Hills Landfill and additional wind energy/turbines in the Montezuma Hills WRA. Expansion of the Potrero Hill Landfill would affect approximately 245 acres of primarily upland habitat that is inhabited by CTS (U.S. Fish and Wildlife Service 2008).

The SR 12 corridor in the Fairfield–Suisun–Rio Vista area has experienced rapid growth over the last several decades. The Association of Bay Area Governments (ABAG) anticipates continued growth of both population and jobs through 2020. The California Department of Finance project that Solano County's population will increase from 339,000 in 2000 to 564,000 by 2020, with most growth occurring within the County's three largest cities: Vallejo, Fairfield, and Vacaville. Rio Vista, while still a relatively small community, has led Solano County growth (in terms of percentage growth

rate) for the last few years (U.S. Fish and Wildlife Service 2008). Increased demand for housing will likely result in loss of suitable CTS habitat as housing developments replace agricultural and ranch lands. Increased urbanization in the region will contribute to the degradation of water quality in streams, altered flow regimes, increased contaminated road runoff, loss of upland habitat, and increased human presence in natural areas. Improvements currently in progress on SR 12 include shoulder widening, centerline soft median barrier, left-turn channelization, drainage modifications, intersection widening, alignment improvements, and pavement and rehabilitation of existing roadway surfaces.

Cumulative effects on CTS include continuing and future loss of suitable breeding, foraging, sheltering, and dispersal habitat resulting from conversion to urban development. Additional urbanization can stimulate road widening projects and generate increased traffic on roads that bisect habitat, thereby increasing road-kill while reducing and further fragmenting remaining habitat. CTSs are likely exposed to a variety of pesticides and other chemicals throughout their range. Hydrocarbon and other contamination from oil production and road runoff; the application of numerous chemicals for roadside maintenance; urban/suburban landscape maintenance; and rodent and vector control programs may all have adverse effects on CTS populations.

Further habitat fragmentation, additional nonnative species introduction, and increased access to aquatic habitat could facilitate or increase the spread of amphibian diseases within the range of the CTS. The global mass extinction of amphibians primarily attributable to chytrid fungus is of significant concern to USFWS (U.S. Fish and Wildlife Service 2008). Long-term population viability can only be maintained with large tracts of intact upland habitat surrounding breeding sites (Trenham et al., 2005). This is further described in DFG's status review for CTS (California Department of Fish and Game 2010).

The global average temperature has risen by approximately 0.6°C during the twentieth century. Ongoing climate change may threaten CTS and the resources necessary for the species' survival. Because climate change threatens to disrupt annual weather patterns, it may result in a loss of suitable habitats and/or prey, and/or increased numbers of their predators, parasites, and diseases (U.S. Fish and Wildlife Service 2008).

4.3 Impacts with Respect to Survival and Recovery

A recovery plan has not been prepared for CTS. However, when designating critical habitat for CTS, USFWS determined that conserving the central population over the long term requires a five-pronged approach (70 FR 49379–49458) as shown below.

3. Maintaining the current genetic structure across the species range.
4. Maintaining the current geographic, elevational, and ecological distribution.
5. Protecting the hydrology and water quality of breeding pools and ponds.
6. Retaining or providing for connectivity between breeding locations for genetic exchange and recolonization.
7. Protecting sufficient barrier-free upland habitat around each breeding location to allow for sufficient survival and recruitment to maintain a breeding population over the long term.

The proposed project is expected to result in few CTS mortalities and in small and unlikely indirect effects on aquatic habitat; it would therefore not diminish the current genetic structure throughout the species' range, nor would it diminish the species' current geographic, elevational, or ecological distribution. As described in Section 5.1.3, the proposed project would retain connectivity between potential breeding locations to allow for genetic exchange and recolonization. The proposed project would not appreciably reduce upland areas surrounding breeding habitat. Permanent impacts would occur on agricultural lands that do not provide habitat values for the species other than for dispersal; no grasslands would be permanently affected. The construction and operation of the wind energy project will also maintain the site in its current agricultural or open space condition for at least 30 years, preventing the land from being developed for more intense uses. Furthermore, measures will be implemented as described in Chapter 5, *Conservation Strategy*, to minimize impacts and to mitigate the permanent loss of habitat through offsite preservation and management of high-quality occupied habitat. Considering both the effects of the proposed project and cumulative impacts on the species, the proposed project would not preclude the survival or recovery of the central population of CTS.

Chapter 5
Conservation Strategy

This chapter describes the conservation strategy that the permittee will implement to minimize and mitigate impacts on CTS as required under Section 10(a)(2)(B) of the ESA. This strategy is consistent with USFWS's "Five-Point Policy" (65 FR 35242), an addendum to USFWS's 1996 HCP Handbook, which provides guidance on biological goals and objectives, monitoring, and adaptive management for incorporation into HCPs.

5.1 Biological Goal

In the context of HCPs, biological goals form the guiding principle behind the operating conservation program. The biological goal of this HCP is to provide the continuing protection and existence of CTS in Solano County by purchasing mitigation credits at a USFWS- and DFG-approved conservation bank in Solano County.

5.2 Conservation Approach

The conservation approach described in this section comprises avoidance and minimization measures and compensatory mitigation.

5.2.1 Avoidance and Minimization

Although CTSs are unlikely to occur in the Plan Area and are unlikely to be significantly affected by the proposed project, to avoid significant impacts on CTS during construction, it is prudent to implement the following measures during ground-disturbing activities.

Avoidance and Minimization Measure AMM-1: Minimize Impact Area

- The location of aquatic habitats (i.e., ponds) will be identified on construction drawings. All covered activities will maintain a minimum distance of 250 feet from potential CTS aquatic habitat as identified in the CTS site assessment (i.e., specific ponds); a distance of 250 feet was selected as protective despite existing land use practice of cultivating to within 20 feet of the pond edge in many instances. Work areas will be flagged or otherwise marked, and no disturbance will occur outside these areas.
- Access routes, staging areas, and road-building activities will be limited to the minimum extent necessary. The main access roads will generally be limited to dirt and/or gravel and compacted roadside shoulders.

Avoidance and Minimization Measure AMM-2: Avoid Injury of Salamanders during Implementation of Covered Activities

- If CTSs are found within the work area during the course of the project, USFWS and DFG will be immediately notified. The USFWS- and DFG-approved biologist will move individual

salamanders and release them into nearby active Botta pocket gopher or California ground squirrel burrows that are outside the areas of disturbance.

- Work within 0.5 mile of aquatic CTS habitat will be limited to the dry season (April 15–October 15; the period can be extended depending upon the onset or cessation of rains). Work may take place during the wet season in areas at least 0.5 mile from aquatic CTS habitat, but such wet season work will be minimized to the extent possible.
- If work is to occur during the rainy season (characterized by the first significant rainfall amount of 0.25 inch of rain within a 24-hour period), temporary ramps will be installed in open trenches, and a monitor will inspect each trench before construction starts each day.
- All vehicles and project equipment will not exceed a 15 miles per hour (mph) speed limit on non-County-maintained roads.
- All deep trenches (2 feet deep or greater) that are within 2,000 feet of aquatic habitat will be covered overnight with boards or metal plates placed flush to the ground or backfilled at the close of each working day, with the exception of the trenches at the substation. Before the trench is filled, it will be thoroughly inspected for trapped CTS.
- All work will be conducted between sunrise and sunset.
- No pets will be allowed on the project site during construction.
- All foods and food-related trash items will be enclosed in sealed trash containers at the end of each working day and removed from the site every day.

Avoidance and Minimization Measure AMM-3: Avoid Habitat Impacts Associated with Erosion and Sedimentation Generated by Covered Activities

- Standard erosion and sediment control measures and best management practices (BMPs) will be identified in a Storm Water Pollution Prevention Plan (SWPPP) and will be implemented during construction; no plastic mesh will be used. Typical measures specify installation of silt fencing, parameters governing refueling activities, and so on.
- The SWPPP contractor will provide a draft of the SWPPP to the biological monitor, who will review the SWPPP and provide input to ensure that the SWPPP adequately protects CTS habitat in the vicinity of the covered activities from adverse erosion and sedimentation effects. The SWPPP contractor and biological monitor will coordinate throughout project construction to ensure that erosion and sedimentation control measures protecting CTS habitat are adequately implemented in accordance with the SWPPP.
- The potential for significant losses of drilling fluids into the environment will be minimized through several measures. Prior to drilling, the geological characteristics of the site will be evaluated so that the most appropriate route for the conduit installation can be determined. During drilling, the loss of drilling fluids to the formation would be assessed by monitoring returns of the drilling fluid to the entry point or changes in the pressure of the drilling fluid. If a loss of fluid volume or pressure is detected, drilling may be stopped or slowed to allow close observation for a surface release. If a release is discovered, the driller would take feasible measures to reduce the quantity of fluid released by lowering drilling fluid pressures and/or thickening the drilling fluid. However, the appropriate response depends on geologic conditions. Any surface releases would be contained with sand bags and sediment fences and collected for reuse or disposal.

Avoidance and Minimization Measure AMM-4: Minimize the Risk of Project-Related Toxic Spills that Could Adversely Affect California Tiger Salamanders or Their Habitat

- All equipment will be maintained to ensure that there will be no leaks of automotive fluids (e.g., gasoline, oils, solvents).
- Any hazardous materials such as fuels, oils, and solvents will be stored in sealable containers in designated locations at least 100 feet from aquatic habitat to protect water quality. Maintenance of vehicles and other equipment (if necessary) and establishment of staging areas will take place at least 100 feet from any aquatic habitat to protect water quality.

Avoidance and Minimization Measure AMM-5: Restore All Temporarily Disturbed California Tiger Salamander Habitat in the Plan Area to Preproject Conditions within 1 Year of Disturbance

- Following construction, Shiloh IV will remove all construction debris (including protective fencing, barriers, flagging, and steel plating).

Avoidance and Minimization Measure AMM-6: Ensure Implementation of the Avoidance and Minimization Measures

- Shiloh IV will designate a Superintendent or other designee who will be responsible for implementing the conservation measures in the HCP and the terms of the ITP. The Superintendent will maintain a copy of this HCP and the ITP onsite whenever construction is taking place. The Superintendent's name and telephone number will be provided to USFWS and DFG at least 30 calendar days prior to project groundbreaking.
- An experienced qualified biological monitor (i.e., appropriate degree and several years field experience), whose name and credentials will be provided to USFWS and DFG for approval, will be onsite during construction in areas within 250 feet of aquatic habitat. The monitor will have the authority to stop work. Any monitoring activities potentially resulting in harassment of CTS will be performed by a biologist with a current 10(a)1(A) permit for CTS.
- The biological monitor will conduct environmental awareness training for all onsite project personnel prior to the commencement of work.

5.2.2 Mitigation

Mitigation Measure MM-1: Offset Unavoidable Permanent Habitat Impacts on California Tiger Salamander through Habitat Conservation at a USFWS- and DFG-Approved Conservation Bank

The likelihood of take of CTS as a result of temporary or permanent effects on agricultural land is extremely low. Although temporary or permanent effects on agricultural land will not alter CTSs' ability to disperse across the area because these cultivated lands provide low-quality habitat for CTS due to lack of burrows and soil characteristics, Shiloh IV is seeking take authorization in its activities in agricultural areas for the remote possibility that take of individuals during construction or operation does occur. Based on guidance from USFWS and in an abundance of caution, Shiloh IV is providing mitigation for permanent effects on all lands within the project area regardless of their distance from potentially suitable aquatic habitat (i.e.,

ponds) in the Plan Area, and also applying its avoidance and minimization measures to the project as a whole.

Table 5-1.Impacts and Compensation[a]

Land Cover Type	Acres in Plan Area	Impact Type	Impact Acres	Compensation Ratio	Credits to be Purchased
Agriculture	3,347	Permanent	25.7	1:1	25.7
		Temporary: construction	125.2	0.1:1	12.5
		Temporary: maintenance	15	0.1:1	1.5
Grassland	80	Permanent	0.2	3:1	0.6
		Temporary: construction	0.8	1:1	0.8
		Temporary: maintenance	1	1:1	1
Total	3,427[1]		167.9		42.1

[a] Total acres in this table do not include other habitat types that are not affected and therefore the total does not equal the total Plan Area acres.

Shiloh IV will permanently protect a total of 42.1 acres of high-quality occupied upland habitat in an area with high long-term conservation value for the species. Although current literature demonstrates that 95% of CTS dispersal is expected to occur within 0.5 mile of aquatic habitats (Trenham et al. 2005), other literature indicates dispersal of individuals can occur beyond 1.24 miles (Orloff 2011). Shiloh IV has committed to mitigating for all impacts within the project area regardless of distance to aquatic habitats. The mitigation provided is expected to offset project effects as the ponds are unlikely to harbor a long-term viable population due to management activities occurring in close proximity to them, because current agricultural land use practices and soils are not conductive to dispersal and refuge, and because of the overall fragmented habitat in the area. This habitat compensation will be achieved through the purchase of compensation credits at an existing USFWS- and DFG-approved mitigation bank, as appropriate for the species in Solano County. The approved bank will have sufficient reserves or contingency funds to address changed circumstances that arise.

5.3 Monitoring and Adaptive Management

5.3.1 Monitoring

The Five-Point Policy (U.S. Fish and Wildlife Service 2000) addresses requirements for the HCP monitoring program, which should provide information to (1) evaluate compliance, (2) determine if biological goals and objectives are being met, and (3) provide feedback information for an adaptive management strategy. The Five-Point Policy describes compliance monitoring and effects and effectiveness monitoring.

Compliance monitoring involves verifying that the permittee is carrying out the terms of the HCP. As described in Section 5.2.1, a biological monitor will be present during construction activities in the vicinity of suitable aquatic habitat and a Superintendent or other appropriate staff person will be responsible for ensuring adherence to the other environmental commitments. This and additional monitoring to ensure that the conservation measures are implemented are described in Chapter 6, *Plan Implementation*.

5.3.2 Adaptive Management

USFWS broadly defines *adaptive management* as a method for examining alternative strategies for meeting measurable biological goals and objectives, and then, if necessary, adjusting future conservation management actions according to what is learned. USFWS believes that either active or passive adaptive management can be appropriately applied to HCPs. Active adaptation involves testing a range of alternative strategies, whereas passive adaptation uses information gathered to determine the single best course of action (U.S. Fish and Wildlife Service 2000). This HCP employs passive adaptive management, because mitigation will be occurring at an approved bank.

5.3.3 Reporting

Reporting under the monitoring and adaptive management program will adhere to the requirements listed below.

- Monthly emails will be sent to USWFS and DFG during construction confirming that avoidance and minimization measures are being implemented and indicating if any issues have arisen regarding CTS (e.g., frac-outs).
- USFWS and DFG will be immediately notified by facsimile or telephone and in writing within 1 working day if CTS are discovered onsite or if an individual mortality occurs. Notification must include the date, time, precise location of the occurrence/incident (clearly indicated on a USGS 7.5-minute quadrangle and other maps at a finer scale as requested by USFWS), and any other pertinent information. Any dead specimen will be sealed in a zip-lock plastic bag with a paper listing the date, time, and location of the find and the name of the person who found it; the bag will be stored in a freezer in a secure location.
- A postconstruction report will be submitted to USFWS and DFG within 60 days following completion of construction. The report will include a summary of conservation measures implemented prior to and during construction, success of these measures, and actual temporary and permanent impact acreages. A similar report will be submitted to USFWS and DFG within 60 days of completion of any subsequent maintenance activities requiring ground disturbance.
- Annual reports will be submitted to USFWS and DFG during the operational period of the project following construction.

5.4 Summary of Conservation Strategy

In summary, the conservation strategy consists of measures that minimize habitat disturbance and avoid injury to CTSs, restore temporarily affected habitat areas, and mitigate permanent unavoidable impacts through offsite conservation at a 1:1 ratio for permanent effects on agricultural areas and temporary effects on grasslands, at a 0.1:1 ratio for temporary effects on agricultural

areas, and a 3:1 ratio for permanent effects on grasslands, regardless of the distance to suitable aquatic habitat. Covered activities would not preclude or disrupt important connectivity within or between CTS populations: the Plan Area is not in a key habitat connection for the species, and the covered activities will not preclude movement between aquatic habitat and surrounding upland areas because the development activities, unlike urban development, are widely dispersed and of low intensity. Moreover, suitable aquatic habitat will be avoided. In addition, wind energy development in this area will maintain the land in relative open space for the approximately 30-year life of the project and will prevent future rezoning and possible more intensive development from occurring during that period. The lands to be conserved and managed offsite will be within a large, contiguous habitat block within a core population for the species, and will have high long-term conservation value for the species, thereby fully offsetting unavoidable impacts on habitat.

Chapter 6
Plan Implementation

6.1 Responsible Parties

This section of the HCP describes the responsibilities of each party involved in implementation of the HCP.

6.1.1 Permittee

The permittee will be responsible for implementing the conservation measures described in Chapter 5. The permittee will track and document compliance with the conservation measures and will be responsible for preparing compliance reports to be submitted to USFWS and DFG as described in Section 6.2, *Compliance Monitoring and Reporting*.

6.1.2 U.S. Fish and Wildlife Service

USFWS will receive monitoring reports submitted by the permittee and will have an opportunity to review and comment on these reports. If USFWS determines upon review of monitoring reports that the permittee is not in compliance with the terms of the HCP, it is USFWS's responsibility to inform the permittee of its responsibility to bring conservation activities back into compliance with the HCP.

6.1.3 California Department of Fish and Game

DFG is not a party to the HCP; however, Shiloh IV is pursuing a take permit under the California Endangered Species Act that will mirror the commitments and obligations in this HCP. Accordingly, Shiloh IV will also be reporting to DFG.

6.2 Compliance Monitoring and Reporting

The permittee will submit to USFWS and DFG compliance monitoring and reporting consistent with Section 5.3.3, *Reporting*.

Chapter 7
Funding and Assurances

7.1 Funding

The ESA and its implementing regulations (50 CFR 17 and 222) require that HCPs specify the measures the permittee will adopt to ensure adequate funding for the HCP. Shiloh IV will be responsible for funding all aspects of HCP implementation, as shown below.

- Shiloh IV will acquire credits from a USFWS and DFG-approved conservation bank as described in Section 5.2.2, *Mitigation*. Credits will be acquired concurrent with issuance of the section 10 ITP.
- Construction-related surveys and biological monitoring will be included in the project construction budget.

7.2 Assurances

7.2.1 "No Surprises" Assurances, Definitions and Background

Section 10 regulations [50 CFR 17.22 (b)(1)(iii)] require that an HCP specify the procedures to be used for dealing with unforeseen circumstances that may arise during the implementation of the HCP. In addition, the Habitat Conservation Plan Assurances ("No Surprises") Rule [50 CFR 17.21(b)(5)-(6) and 17.22(b)(5)-(6); 63 FR 8859] defines *unforeseen circumstances* and *changed circumstances* and describes the obligations of the permittee and USFWS.

The purpose of the No Surprises Rule is to provide assurances to nonfederal landowners participating in habitat conservation planning under ESA that no additional land restrictions or financial compensation will be required for species adequately covered by a properly implemented HCP, in light of changed or unforeseen circumstances, without the consent of the permittee. *Changed circumstances* means changes in circumstances affecting a species or geographic area covered by the HCP that can reasonably be anticipated by plan developers and USFWS and that can be planned for (e.g., the listing of a new species, fire or other natural catastrophic events in areas prone to such events). The rule defines *unforeseen circumstances* as changes in circumstances that affect a species or geographic area covered by the HCP that could not reasonably be anticipated by plan developers and USFWS at the time of the plan's negotiation and development and that result in a substantial and adverse change in status of the covered species.

7.2.2 Summary of Circumstances

No *changed circumstances* or *unforeseen circumstances* are anticipated in this HCP. Shiloh IV considered the potential for newly listed species and the designation of critical habitat; however, given the narrow and specific focus of this HCP on CTS, additional newly listed species would likely require additional analysis beyond that considered a changed or unforeseen circumstance. The designation of additional critical habitat for CTS, were it to include the Plan Area, would occur after

Shiloh IV's facilities are in place. This designation would not likely affect Shiloh IV because the HCP and its no surprises assurances would be in effect. If critical habitat was designated for another species, the permittee would only need to address that if they had a future Section 7 nexus.

Chapter 8
Alternatives to Take

8.1 ESA Requirement

Section 10(a)(2)(A)(iii) of the ESA requires that an HCP describe what "alternatives to such taking" were considered, and the reasons why such alternatives are not being utilized. Two alternatives commonly included in an HCP alternatives analysis are (1) any specific alternative that would reduce take levels below those anticipated for the project; and (2) a no-action alternative, under which either no permit would be issued and take would be avoided, or the project would not be constructed or implemented (U.S. Fish and Wildlife Service 1996). The reduced take and no-action alternatives to the proposed project are described below.

8.2 Reduced Take Alternative

Because of the overall marginal habitat suitability and project's limited effects to the species associated with agricultural dispersal habitat, it is challenging to devise an alternative that further reduces take. The Reduced Take Alternative could involve instituting additional setbacks from aquatic habitat. By instituting setbacks of 250-feet Shiloh IV may further reduce the potential for take; however these reductions are expected to be negligible because of the existing habitat conditions (i.e., agricultural lands). Aquatic habitat would remain unaffected. While dispersal habitat could be degraded, temporary effect areas are expected to fully recover their dispersal value within 1 year of disturbance, and permanent effect areas (i.e., roads) would not cause migration barriers, would still be suitable for dispersal, and would be mitigated. Overall, the magnitude of the degradation to dispersal habitat is very small compared to total suitable dispersal habitat; these effects are justified by the clear benefit of providing more than 320 million kilowatt hours (kWh) of renewable energy per year, the equivalent of the average annual consumption of 80,000 households. This alternative was rejected because project effects are already expected to be minimal in CTS dispersal habitat.

Alternative siting of facilities and routing of collection lines likely will not result in any measurable reduction in take. The estimates enumerated in the HCP represent a maximum disturbance footprint. Shiloh IV will seek to minimize its project footprint and further reduce its habitat effects without reducing the number of turbines. Such project modifications are expected to result in a nominal reduction in take because of the proposed avoidance and minimization measures and the project's limited effects on dispersal habitat.

8.3 No-Action Alternative

Under the No-Action Alternative, an ITP would not be issued and take would be prohibited under Section 9 of the ESA. Under this alternative, there would be no impacts on the species. This alternative was rejected because it would not meet the objective of developing a commercially viable wind energy facility that would deliver renewable energy to the CAISO power grid to meet

California's Renewable Portfolio Standard goals and help reduce GHG emissions pursuant to AB32 and the County's General Plan.

Chapter 9
Revisions and Amendments

Two types of changes may be made to the HCP, the ITPs, or associated documents.

- Minor amendments.
- Standard amendments.

Revisions and amendments will be processed in accordance with all applicable legal requirements, including ESA, NEPA, and other applicable regulations.

9.1 Minor Amendments

Minor amendments to the HCP are changes to the HCP that do not require an amendment to the ITP. Such changes are provided for under the conservation strategy (e.g., adaptive management changes and responses to changed circumstances). Revisions may not modify the scope or nature of activities or actions covered by the Section 10(a)(1)(B) permit; result in operations under the HCP that are significantly different from those contemplated or analyzed in connection with the HCP as approved; result in adverse impacts on the environment that are new or significantly different from those analyzed in connection with the HCP as approved; or result in additional take not analyzed in connection with the HCP as approved.

Minor amendments to the HCP may include those listed below.

1. Correction of any maps or exhibits to correct errors in mapping or to reflect previously approved changes in the Section 10(a)(1)(B) permit or HCP.
2. Modifying existing or establishing new incidental take avoidance measures.
3. Modifying reporting protocols for monitoring reports.
4. Minor changes to monitoring or reporting protocols.
5. Revising restoration techniques.
6. Any other modifications to the HCP that meet the criteria listed below.
    a. Will not result in operations under the HCP that are significantly different from those analyzed in connection with the HCP as approved.
    b. Will not result in impacts on the environment or take effects that are new or significantly different from those analyzed in connection with the HCP as approved.
    c. Will allow for the approval or execution of agreements to facilitate execution and implementation of the HCP.
    d. Will allow the permittee to delegate any of its duties specified by the HCP to a third party under its direct control.

Minor revisions may be proposed by USFWS or the HCP permittee. The party proposing a revision to the HCP will circulate the proposed revision along with an explanation of why the revision is

necessary or desirable, and a description of why the party believes the effects of the proposed revision are more beneficial than adverse and are not significantly different from those described or anticipated under the HCP as originally adopted. If Shiloh IV and USFWS agree to the proposed revision, Shiloh IV will process the revision to the HCP. USFWS will respond in writing to a proposed revision within 60 calendar days of receipt of the request. The responses will (1) concur with the proposed revision; (2) identify additional information necessary to enable USFWS to approve or disapprove the revision; or (3) disapprove the revision. If USFWS disapproves the revision, it must be processed as an amendment to the HCP and Section 10(a)(1)(B) permit. If USFWS disapproves the revision, it will include in its written response an explanation of its determination.

9.2 Standard Amendments

A standard amendment involves amendment(s) to the HCP, the ITP, and/or NEPA document(s). The following summarizes the types of changes that may require an HCP amendment and the procedures for approval.

Standard amendments may include any of the following types of changes to the HCP.

1. Significant changes to the HCP that were not addressed in the HCP, including the following.
    a. Changes to the method for calculating compensation for incidental take, which would increase the levels of incidental take permitted for the HCP.
    b. Changes to funding except as otherwise provided for in the HCP to account for all adjustments for inflation, adaptive management, and changed circumstances.
2. Changes to the covered activities that were not addressed in the HCP as originally adopted, and that do not otherwise meet the revision provisions above.
3. Extending the term of the HCP permits past the 36-year term.

Specific procedures for requesting amendments to Section 10(a)(1)(B) permits are described below.

9.2.1 Amendments to the Section 10(a)(1)(B) Permit

Standard amendments to the HCP will require amendment of the Section 10(a)(1)(B) permit. Following receipt of a complete application package for a proposed amendment to a Section 10(a)(1)(B) permit, USFWS will publish a notice of the proposed amendment in the Federal Register as required by ESA. USFWS will use its reasonable efforts to process the proposed amendment within 180 calendar days of publication, except where longer periods are required by law. The amendment of a Section 10(a)(1)(B) permit will be treated as an original permit application. Such applications typically will require submittal of a revised HCP, a completed permit application form with appropriate fees, and preparation of an environmental review document prepared in accordance with NEPA. However, specific document requirements may vary based on the nature of the amendment.

9.2.2 Suspension/Revocation

USFWS may suspend or revoke the ITP if Shiloh IV fails to implement the HCP in accordance with the terms and conditions of the permits or if suspension or revocation is otherwise required by law.

Suspension or revocation of the Section 10(a)(1)(B) permit, in whole or in part, by USFWS will be in accordance with 50 CFR 13.27-29, 17.32 (b)(8).

9.2.3 Permit Renewal

Although the proposed project could be completed within the 36-year permit term, if the wind lease is renewed, ITP renewal may also be necessary. Upon expiration, the Section 10(a)(l)(B) permit may be renewed without the issuance of a new permit, provided that the permit is renewable, and that biological circumstances and other pertinent factors affecting covered species are not significantly different than those described in the original HCP. To renew the permit, Shiloh IV will submit to USFWS the items listed below.

- A request to renew the permit, referencing the original permit number.
- Certification that all statements and information provided in the original HCP and permit application, together with any approved HCP amendments, are still true and correct; a list of changes must be included.
- A description of any take that has occurred under the existing permit.
- A description of any portions of the project still to be completed, if applicable, or what activities will be covered under the original permit the renewal is intended to cover.

If USFWS concurs with the information provided in the request, it will renew the permit consistent with permit renewal procedures required by federal regulation (50 CFR 13.22). If Shiloh IV files a renewal request, and the request is on file with the issuing USFWS office at least 30 days prior to the permit's expiration date, the permit will remain valid while the renewal is being processed, provided the existing permit is renewable. However, Shiloh IV may not take listed species habitat beyond the quantity authorized by the original permit. If Shiloh IV fails to file a renewal request within 30 days prior to permit expiration, the permit will become invalid upon expiration. Shiloh IV must have complied with all reporting requirements to qualify for a permit renewal.

9.2.4 Permit Transfer

In the event of sale or transfer of the project during the life of the permit, a new permit application, permit fee, and an Assumption Agreement will be submitted to USFWS by the new permittee(s). The permittee(s) will commit to all requirements regarding the take authorization and conservation strategy obligations of this HCP unless otherwise specified in the Assumption Agreement and agreed to in advance with USFWS.

Chapter 10
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10.2 Personal Communication

Allen, Jim. Solano County Agricultural Commissioner. Telephone conversation with Brad Norton, ICF Project Manager, on August 23, 2011 regarding farming practices in the Montezuma Hills.

Appendix A

Covered Species Assessment

Table A-1. Special-Status Wildlife Species Potentially Occurring in the Montezuma Hills Region, Solano County

Common Name *Scientific Name*	Legal Status[a] Federal/State	Geographic Distribution	Habitat Requirements	Covered/Not Covered and Rationale
Insects				
Delta green ground beetle *Elaphrus viridus*	T/—	Restricted to Olcott Lake and other vernal pools at Jepson Prairie Preserve, Solano County	Sparsely vegetated edges of vernal lakes and pools; occurs up to 250 ft from pools	Not covered; not likely to occur in Plan Area; no suitable habitat present; species occurs only at Jepson Prairie
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T/–	Streamside habitats below 3,000 ft throughout the Central Valley	Riparian and oak savanna habitats with elderberry shrubs; elderberry is the host plant	Not covered; not likely to occur in the Plan Area; no suitable habitat (i.e., elderberry shrubs) present
Callippe silverspot butterfly *Speyeria callippe callippe*	E/—	Occurs at only several locations: near Oakland, San Bruno Mountain, and west of I-680 in Solano County	Annual grassland habitats around northern San Francisco Bay; larvae feed on host plant (*Viola pedunculata*); adults feed on floral nectar	Not covered; not likely to occur in Plan Area; no suitable habitat present
Crustaceans				
Conservancy fairy shrimp *Branchinecta conservatio*	E/–	Disjunct occurrences in Solano, Merced, Tehama, Ventura, Butte, and Glenn Counties	Large, deep vernal pools in annual grasslands	Not covered; not likely to occur in Plan Area; no suitable habitat (i.e., vernal pools) present
Vernal pool fairy shrimp *Branchinecta lynchi*	T/–	Central Valley, central and south Coast Ranges from Tehama to Santa Barbara Counties; isolated populations in Riverside County	Common in vernal pools; also found in sandstone rock outcrop pools	Not covered; not likely to occur in Plan Area; no suitable habitat (i.e., vernal pools) present
Vernal pool tadpole shrimp *Lepidurus packardi*	E/–	Shasta to Merced Counties	Vernal pools and ephemeral stock ponds	Not covered; not likely to occur in Plan Area; no suitable habitat (i.e., vernal pools) present
Reptiles and Amphibians				
California tiger salamander *Ambystoma californiense* (= A. tigrinum c.)	T/SSC	Central Valley, including Sierra Nevada foothills to approximately 1,000 ft, and coastal region from Butte to northeastern San Luis Obispo Counties	Small ponds, lakes, or vernal pools in grasslands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy	Covered; species potentially occurs in Plan Area; potential dispersal habitat present

Common Name *Scientific Name*	Legal Status[a] Federal/State	Geographic Distribution	Habitat Requirements	Covered/Not Covered and Rationale
California red-legged frog *Rana draytonii*	T/SSC	Along the coast and coastal mountain ranges of California from Marin to San Diego Counties and in the Sierra Nevada from Tehama to Fresno Counties	Permanent and semipermanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation; may aestivate in rodent burrows or cracks during dry periods	Not covered; Plan Area is outside species' range
Giant garter snake *Thamnophis gigas*	T/T	Central Valley from the vicinity of Burrel in Fresno County north to near Chico in Butte County; has been extirpated from areas south of Fresno	Sloughs, canals, low-gradient streams and freshwater marsh habitats with prey base of small fish and amphibians; irrigation ditches and rice fields; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter	Not covered; Plan Area is outside species' range
Birds				
Bank swallow *Riparia riparia*	–/T	Much of the state, less common in mountainous areas of the north coast and in coniferous or chaparral habitats	Nests in bluffs or banks, usually adjacent to water, where soil consists of sand or sandy loam	Not covered; no suitable habitat present; species not observed during at least 4 years of monitoring in Montezuma Hills
California clapper rail *Rallus longirostris obsoletus*	E/E, FP	Marshes around San Francisco Bay and east through Sacramento–San Joaquin River Delta to Suisun Marsh	Restricted to salt marshes and tidal sloughs; usually associated with heavy growth of pickleweed; feeds on mollusks in sloughs	Not covered; no suitable habitat present; species not observed during at least 4 years of monitoring in Montezuma Hills
California black rail *Laterallus jamaicensis coturniculus*	–/T, FP	Permanent resident in San Francisco Bay and east through Delta into Sacramento and San Joaquin Counties; small populations in Marin, Santa Cruz, San Luis Obispo, Orange, Riverside, and Imperial Counties	Tidal salt marshes associated with heavy growth of pickleweed; also brackish marshes or freshwater marshes at low elevations	Not covered; no suitable habitat present; species not observed during at least 4 years of monitoring in Montezuma Hills however some mortalities reported on nearby project

Common Name *Scientific Name*	Legal Status[a] Federal/State	Geographic Distribution	Habitat Requirements	Covered/Not Covered and Rationale
Swainson's hawk *Buteo swainsoni*	–/T	Lower Sacramento and San Joaquin Valleys, Klamath Basin, and Butte Valley; highest nesting densities near Davis and Woodland, Yolo County	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grainfields	Not covered; foraging habitat is present in Plan Area and species has been observed in Plan Area, but nesting habitat will not be affected and no take of this species has been documented during several years of monitoring in WRA
Mammals				
Salt marsh harvest mouse *Reithrodontomys raviventris*	E/E, FP	San Francisco, San Pablo, and Suisun Bays; Sacramento–San Joaquin River Delta	Salt marsh with a dense plant cover of pickleweed and fat hen; adjacent to an upland site	Not covered; not likely to occur in Plan Area; no suitable habitat present or nearby

[a] Legal status explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.

T = listed as threatened under the federal Endangered Species Act.

– = no listing.

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

FP = fully protected under the California Fish and Game Code.

SSC = species of special concern in California.

– = no listing.

Table A-2. Special-Status Plants Potentially Occurring in the Montezuma Hills Region, Solano County

Common Name *Scientific Name*	Legal Status[a] Fed/State/CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Covered/Not Covered, and Rationale
Pappose spikeweed *Centromadia parryi* ssp. *Parryi*	–/–/1B.2	Solano County	Meadows and seeps, marshes and swamps, coastal prairie, grassland; moist, alkaline; below 1,000 ft	May–Nov	Not covered; one location has been documented in the Plan Area, but habitat will not be affected
Suisun thistle *Cirsium hydrophilum* var. *hydrophilum*	E/–/1B.1	Known only from the Suisun Marsh in Solano County	Salt marshes and swamps; below 3 ft	Jul–Sep	Not covered; no habitat present in Plan Area
Soft bird's-beak *Cordylanthus mollis* ssp. *mollis*	E/R/1B.2	San Francisco Bay region; Suisun Marsh; Contra Costa, Marin*, Napa, Solano, Sacramento*, and Sonoma* Counties	Tidal salt marsh	Jul–Sep	Not covered; no habitat present in Plan Area
Contra Costa wallflower *Erysimum capitatum* ssp. *angustatum*	E/E/1B.1	Contra Costa County	Inland dunes	Mar–Jul	Not covered; no habitat present in Plan Area
Contra Costa goldfields *Lasthenia conjugens*	E/–/1B.1	Scattered occurrences in Coast Range valleys and southwest edge of Sacramento Valley; Alameda, Contra Costa, Mendocino, Napa, Santa Barbara*, Santa Clara*, and Solano Counties; historically distributed through the north coast, southern Sacramento Valley, San Francisco Bay region, and south coast	Alkaline or saline vernal pools and swales; below 700 ft	Mar–Jun	Not covered; no habitat present in Plan Area
Mason's lilaeopsis *Lilaeopsis masonii*	–/R/1B.1	Southern Sacramento Valley; Sacramento–San Joaquin Delta; northeast San Francisco Bay area; Alameda, Contra Costa, Marin*, Napa, Sacramento, San Joaquin, and Solano Counties	Freshwater and intertidal marshes, streambanks in riparian scrub; generally at sea level	Apr–Nov	Not covered; no habitat present in Plan Area
Colusa grass *Neostapfia colusana*	T/–/1B	Central Valley: Colusa, Glenn, Merced, Solano, Stanislaus, and Yolo Counties	Adobe soils of vernal pools, generally below 650 ft	May-Sep	Not covered; no habitat present in project area
Antioch Dunes evening-primrose *Oenothera deltoides* ssp. *howellii*	E/E/1B.1	Northeast San Francisco Bay region, known from three native occurrences; Contra Costa and Sacramento Counties	Inland dunes; generally below 330 ft	Mar–Sep	Not covered; no habitat present in Plan Area

Common Name *Scientific Name*	Legal Status[a] Fed/State/CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Covered/Not Covered, and Rationale
Solano grass *Tuctoria mucronata*	E/–/1B	Southwestern Sacramento Valley: Solano and Yolo Counties	Vernal pools, mesic grassland, below 500 ft	Apr-Jul	Not covered; no habitat present in Plan Area
Gairdner's yampah *Perideridia gairdneri* ssp. *gairdneri*	–/–/4.2	Kern, Los Angeles, Mendocino, Monterey, Marin, Napa, Orange, San Benito, Santa Clara, Santa Cruz, San Diego, San Luis Obispo, San Mateo, Solano, and Sonoma Counties	Broadleaved upland forest, chaparral, coastal prairie, valley and foothill grassland, vernal pools, in mesic areas	Jun-Oct	Not covered; one location documented in the Plan Area, but habitat will not be affected

Status explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.

– = no listing.

State

R = Listed as Rare under the Native Plant Protection Act

E = listed as endangered under the California Endangered Species Act

– = no listing.

California Native Plant Society

1A = List 1A species: presumed extinct in California.

1B = List 1B species: rare, threatened, or endangered in California and elsewhere.

2 = List 2 species: rare, threatened, or endangered in California but more common elsewhere.

3 = List 3 species: plants about which more information is needed to determine their status.

4 = List 4 species: plants of limited distribution, a watch list.

– = no listing.

* = known populations believed extirpated from county.

CNPS Listing Extensions:

0.1 = seriously threatened in California
0.2 = fairly threatened in California
0.3 = not very threatened in California