3.4 Biological Resources

For the purpose of this EIR, biological resources comprise vegetation, wildlife, natural communities, and wetlands and other waters. Potential biological resource impacts associated with the Initial Repower are analyzed at a project level and subsequent repowering under the Full Repower phase is analyzed at a programmatic level. Potential impacts are described quantitatively and qualitatively in Section 3.4.2, *Environmental Impacts*. This section also identifies specific and detailed measures from the East Alameda County Conservation Strategy (EACCS) to avoid, minimize, or compensate for potentially significant impacts on biological resources, where necessary.

3.4.1 Existing Conditions

Regulatory Setting

Federal

Federal Endangered Species Act

Pursuant to the federal Endangered Species Act (ESA), USFWS and the National Marine Fisheries Service (NMFS) have authority over projects that may result in take of a species listed as threatened or endangered under the act. *Take* is defined under ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Under federal regulations, take is further defined to include habitat modification or degradation that results, or is reasonably expected to result, in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. If a likelihood exists that a project would result in take of a federally listed species, either an incidental take permit, under Section 10(a)(1)(B), or a federal interagency consultation, under Section 7, is required.

Several federally listed species—vernal pool fairy shrimp (*Branchinecta lynchi*), longhorn fairy shrimp (*Branchinecta longiantenna*), vernal pool tadpole shrimp (*Lepidurus packardi*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), and San Joaquin kit fox (*Vulpes macrotis mutica*)—have the potential to be affected by activities associated with the Initial and Full Repower phases. Accordingly, such effects would require consultations with USFWS.

For San Joaquin kit fox, USFWS has developed standardized protection measures for avoiding and minimizing construction and operational impacts on the species. This guidance is published in the *U.S. Fish and Wildlife Service Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox* (U.S. Fish and Wildlife Service 2011).

Additionally, USFWS has published several recovery plans and draft recovery plans that identify reasonable actions that are believed to be required to recover and/or protect listed species. These plans include information on the status of the species within its current range, long-term conservation strategies, and priority locations for recovery efforts. Recovery plans that pertain to listed species within the project area include the following.

- Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*) (U.S. Fish and Wildlife Service 2002a)

- Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California (U.S. Fish and Wildlife Service 2002b)
- Recovery Plan for Upland Species of the San Joaquin Valley, California (U.S. Fish and Wildlife Service 1998)
- Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Portland (U.S. Fish and Wildlife Service 2005a)

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act, as amended in 1964, was enacted to protect fish and wildlife when federal actions result in the control or modification of a natural stream or body of water. The statute requires federal agencies to take into consideration the effect that water-related projects would have on fish and wildlife resources. Consultation and coordination with USFWS and CDFW are required to address ways to prevent loss of and damage to fish and wildlife resources, and to further develop and improve these resources.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) domestically implements a series of international treaties that provide for migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds. The act further provides that it is unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird…" (16 USC 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA can be found in the March 1, 2010 *Federal Register* (75 FR 9281). This list comprises several hundred species, including essentially all native birds. Permits for take of nongame migratory birds can be issued only for specific activities, such as scientific collecting, rehabilitation, propagation, education, taxidermy, and protection of human health and safety and of personal property. USFWS publishes a list of birds of conservation concern (BCC) to identify migratory nongame birds that are likely to become candidates for listing under ESA without additional conservation actions. The BCC list is intended to stimulate coordinated and collaborative conservation efforts among federal, state, tribal, and private parties. The Initial and Full Repower phases have the potential to affect migratory birds regulated by the MBTA.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) (16 USC 668) prohibits take and disturbance of individuals and nests. Take permits for birds or body parts are limited to religious, scientific, or falconry pursuits. However, BGEPA was amended in 1978 to allow mining developers to apply to USFWS for permits to remove inactive golden eagle (*Aquila chrysaetos*) nests in the course of *resource development or recovery* operations. With the 2007 removal of bald eagle from the ESA list of threatened and endangered species, USFWS issued new regulations to authorize the limited take of bald eagles and golden eagles under the BGEPA, where the take to be authorized is associated with otherwise lawful activities. A final Eagle Permit Rule was published on September 11, 2009 (74 FR 46836–46879; 50 CFR 22.26).

A permit authorizes limited, non-purposeful take of bald eagles and golden eagles. Individuals, companies, government agencies (including tribal governments), and other organizations can apply for permits to allow disturbance or otherwise take eagles in the course of conducting lawful activities,

such as operating utilities and airports. Under BGEPA, *take* is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest or disturb." *Disturb* is defined in the regulations as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." Most permits issued under the regulations authorize disturbance. In limited cases, a permit may authorize the physical take of eagles, but only if every precaution is first taken to avoid physical take.

USFWS issued the *Eagle Conservation Plan Guidance* (Eagle Guidance) to assist parties to avoid, minimize, and mitigate adverse effects on bald and golden eagles (U.S. Fish and Wildlife Service 2013). The Eagle Guidance calls for scientifically rigorous surveys, monitoring, assessment, and research designs proportionate to the risk to eagles. The Eagle Guidance describes a process by which wind energy developers can collect and analyze information that, if necessary, could lead to a programmatic permit to authorize unintentional take of eagles at wind energy facilities. USFWS recommends that eagle conservation plans be developed in five stages. Each stage builds on the prior stage, such that together the process is a progressive, increasingly intensive look at likely effects on eagles of the development and operation of a particular site and configuration. Additional refinements to the Eagle Guidance are expected at some point in the future. To date, USFWS has not issued any programmatic eagle take permits. The Initial and Full Repower phases have the potential to affect bald and golden eagles.

Clean Water Act

The Clean Water Act (CWA) was passed by Congress in 1972 with a broad mandate "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The chief purpose of the CWA is to establish the basic structure for regulating discharges of pollutants into the waters of the United States. CWA authorizes EPA to set national water quality standards and effluent limitations and includes programs addressing both point-source and nonpoint-source pollution. Point-source pollution is pollution that originates or enters surface waters at a single, discrete location, such as an outfall structure or an excavation or construction site. Nonpoint-source pollution originates over a broader area and includes urban contaminants in stormwater runoff and sediment loading from upstream areas. CWA operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit; permit review is the CWA's primary regulatory tool. During permit review, the permitting agency is required (under ESA) to evaluate the impact of the discharge on species federally listed as threatened or endangered. Aquatic resources (i.e., streams, wetlands, ponds) are present in the project area and could be regulated under CWA Section 404 (described below).

Water Quality Certification (Section 401)

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must apply for certification from the state. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval such as a Section 404 permit) must comply with CWA Section 401. Aquatic resources that would qualify as waters of the United States are present in the project area. Construction and foundation removal activities have the potential to result in a discharge of pollutants into waters of the United States; therefore, a Section 401 Water Quality Certification may be required for the Initial and Full Repower phases.

Permits for Fill Placement in Waters and Wetlands (Section 404)

Wetlands and other waters of the United States are protected under Section 404 of the CWA. Any activity that involves any discharge of dredged or fill material into waters of the United States, including wetlands, is subject to regulation by the U.S. Army Corps of Engineers (USACE). *Waters of the United States* is defined to encompass navigable waters of the United States; interstate waters; all other waters where their use, degradation, or destruction could affect interstate or foreign commerce; tributaries of any of these waters; and wetlands that meet any of these criteria or are adjacent to any of these waters or their tributaries. Wetlands are defined under Section 404 as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Jurisdictional wetlands must meet three wetland delineation criteria.

- They support hydrophytic vegetation (i.e., plants that grow in saturated soil).
- They have hydric soil types (i.e., soils that are wet or moist enough to develop anaerobic conditions).
- They have wetland hydrology.

Construction and foundation removal activities have the potential to result in a discharge of fill material into waters of the United States; therefore, a Section 404 CWA permit may be required for the Initial and Full Repower phases.

Executive Order 11990: Protection of Wetlands

Executive Order 11990 (May 24, 1977) established the protection of wetlands and riparian systems as the official policy of the federal government. The executive order requires all federal agencies to consider wetland protection as an important part of their policies; take action to minimize the destruction, loss, or degradation of wetlands; and preserve and enhance the natural and beneficial values of wetlands. The proposed project may impact wetlands and thus federal agencies would be required to consider this Executive Order prior to issuing permits.

Executive Order 11312: Invasive Species

Executive Order 11312 (February 3, 1999) directs all federal agencies to prevent and control the introduction and spread of invasive nonnative species in a cost-effective and environmentally sound manner to minimize their effects on economic, ecological, and human health. The executive order was intended to build upon existing laws, such as the National Environmental Policy Act (NEPA), the Nonindigenous Aquatic Nuisance Prevention and Control Act, the Lacey Act, the Plant Pest Act, the Federal Noxious Weed Act, and ESA. The executive order established a national Invasive Species Council composed of federal agencies and departments, as well as a supporting Invasive Species Advisory Committee composed of state, local, and private entities. The council and advisory committee oversee and facilitate implementation of the executive order, including preparation of the National Invasive Species Management Plan. Federal activities addressing invasive aquatic species are now coordinated through this council and through the National Aquatic Nuisance Species Task Force. The proposed project may introduce invasive species and thus federal agencies would be required to consider this Executive Order prior to issuing permits.

State

California Environmental Quality Act

CEQA requires California public agencies to identify and mitigate the significant environmental impacts of projects that they are considering for approval. A project normally has a significant environmental impact on biological resources if it substantially affects a rare or endangered species or the habitat of that species, substantially interferes with the movement of resident or migratory fish or wildlife, or substantially diminishes habitat for fish, wildlife, or plants. The State CEQA Guidelines define rare, threatened, and endangered species as those listed under ESA or the California Endangered Species Act (CESA) or any other species that meet the criteria of the resource agencies or local agencies (e.g., species of special concern, as designated by CDFW). The State CEQA Guidelines state that the lead agency preparing an EIR must confer with CDFW concerning project impacts on species listed as endangered or threatened. The effects of a proposed project on these resources are important in determining whether the project has significant environmental impacts under CEQA. CEQA ultimately authorizes the lead agency to require mitigation measures that avoid, minimize, or mitigate potentially significant impacts.

California Endangered Species Act

CESA (California Fish and Game Code Sections 2050–2116) was implemented in 1984 to prohibit the take of species that are listed as endangered or threatened. Section 86 of the California Department of Fish and Game Code defines *take* as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CDFW administers CESA and authorizes incidental take through either California Fish and Game Code Section 2080.1 (consistency determination) or Section 2081 (Incidental Take Permit). Several state-listed species—California tiger salamander, California red-legged frog, Alameda whipsnake, and San Joaquin kit fox—have the potential to be affected by the Initial and Full Repower phases, and would require consultation with CDFW under CESA.

For Swainson's hawks, CDFW has developed survey guidance, conservation strategies, and best practices for avoiding, minimizing, and mitigating project impacts on the species. This guidance is published in CDFW's *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (California Department of Fish and Game 1994).

Fully Protected Species

Sections 3511, 3513, 4700, and 5050 of the California Fish and Game Code pertain to fully protected wildlife species (birds in Sections 3511 and 3513, mammals in Section 4700, and reptiles and amphibians in Section 5050) and strictly prohibit the take of these species. CDFW cannot issue a take permit for fully protected species, except under narrow conditions for scientific research or the protection of livestock, or if an NCCP has been adopted. Specifically, Section 3513 prohibits any take or possession of birds designated by the MBTA as migratory nongame birds except as allowed by federal rules and regulations pursuant to the MBTA. Based on monitoring conducted within the overall APWRA, the Initial and Full Repower phases have the potential to affect golden eagle and white-tailed kite, both fully protected species.

Protection of Birds and Raptors

Section 3503 of the Fish and Game Code prohibits the killing of birds and/or the destruction of bird nests. Section 3503.5 prohibits the killing of raptor species and/or the destruction of raptor nests. Typical violations include destruction of active bird and raptor nests as a result of tree removal, and failure of nesting attempts (loss of eggs and/or young) as a result of disturbance of nesting pairs caused by nearby human activity. The Initial and Full Repower phases have the potential to adversely affect birds and raptors protected under Sections 3503 and 3503.5 of the Fish and Game Code. For burrowing owls, CDFW has developed survey guidance, conservation strategies, and best practices for avoiding, minimizing, and mitigating project impacts on the species. This guidance has been recently revised in their *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Wildlife 2012).

Lake and Streambed Alteration

CDFW regulates activities that would interfere with the natural flow of, or substantially alter the channel, bed, or bank of, a lake, river, or stream, including disturbance of riparian vegetation under Fish and Game Code Sections 1600–1616. CDFW requires a Lake and Streambed Alteration Agreement (LSAA) permit for these activities. Requirements to protect the integrity of biological resources and water quality are often conditions of streambed alteration agreements. CDFW may establish conditions that include avoiding or minimizing vegetation removal, use of standard erosion control measures, limitations on the use of heavy equipment, limitations on work periods to avoid impacts on fisheries and wildlife resources, and requirements to restore degraded sites or compensate for permanent habitat losses. Aquatic resources (e.g., streams and ponds) that would be regulated by CDFW are present in the project area. The Initial and Full Repower phases may involve modifications or improvements to stream crossings and could modify the bed, bank, or channel of a stream; therefore, an LSAA could be required.

California Native Plant Protection Act

The California Native Plant Protection Act (CNPPA) of 1977 prohibits importation of rare and endangered plants into California, take of rare and endangered plants, or sale of rare and endangered plants. CESA defers to the CNPPA, which ensures that state-listed plant species are protected when state agencies are involved in projects subject to CEQA. For the Initial and Full Repower, plants listed as rare under the CNPPA are not protected under CESA but rather under CEQA. Several rare and endangered plants have potential to occur in the project area and could be adversely affected by the Initial and Full Repower phases.

Porter-Cologne Water Quality Control Act

The California Water Code addresses the full range of water issues in the state, and includes Division 7, known as the Porter-Cologne Water Quality Control Act (Porter-Cologne Act) (Sections 13000–16104 of the California Water Code). Section 13260 requires "any person discharging waste, or proposing to discharge waste, in any region that could affect the waters of the State to file a report of discharge (an application for waste discharge requirements [WDRs])" with the appropriate Regional Water Quality Control Board (Regional Water Board). Under this act, each of the nine Regional Water Boards must prepare and periodically update water quality control basin plans (basin plans). Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution. Projects that affect wetlands or waters must meet the waste discharge requirements of the Regional Water Board. Pursuant to CWA

Section 401, an applicant for a Section 404 permit to conduct any activity that may result in discharge into navigable waters must provide a certification from the Regional Water Board that such discharge will comply with state water quality standards. As part of the wetlands permitting process under Section 404, a project applicant would be required to apply for a water quality certification from the applicable Regional Water Board.

Section 13050 of the Porter-Cologne Act authorizes the State Water Resources Control Board (State Water Board) and the relevant Regional Water Board to regulate biological pollutants. The California Water Code generally regulates more substances contained in discharges, and defines *discharges to receiving waters* more broadly than the CWA does. Waters of the State could be directly or indirectly affected during activities associated with the Initial and Full Repower phases.

California Wetlands Conservation Policy

The goals of the California Wetlands Conservation Policy, adopted in 1993 (Executive Order W-59-93), are "to ensure no overall net loss, and achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California, in a manner that fosters creativity, stewardship, and respect for private property;" to reduce procedural complexity in the administration of state and federal wetlands conservation programs; and to make restoration, landowner incentive programs, and cooperative planning efforts the primary focus of wetlands conservation.

Local

East County Area Plan

Land use planning in the eastern portion of Alameda County is governed by the ECAP. In November 2000, the Alameda County electorate approved Measure D, the Save Agriculture and Open Space Lands Initiative, which amended portions of the County's General Plan, including the ECAP, to limit urban development on agricultural lands (Alameda County 2000). The Open Space Element of the ECAP addresses sensitive lands and regionally significant open space, including biological resources.

East Alameda County Conservation Strategy

The EACCS is a collaborative effort among several local, state, and federal agencies intended to provide an effective voluntary framework to protect, enhance, and restore natural resources in eastern Alameda County, while improving and streamlining the environmental permitting process for impacts resulting from infrastructure and development projects (ICF International 2010). The EACCS is intended to identify and provide a means to avoid, minimize and compensate for impacts on biological resources such as endangered and other special-status species, and sensitive habitat types (e.g., wetlands, riparian corridors, rare upland communities). The EACCS provides a framework of comprehensive conservation goals and objectives, and facilitates implementation using consistent and standardized mitigation requirements. By implementing the EACCS, local agencies will be able to more easily address the legal requirements relevant to these species.

The EACCS study area encompasses 271,485 acres, or approximately 52 percent of Alameda County, including the cities of Dublin, Livermore, and Pleasanton. The western boundary of the EACCS study area runs along the Alameda Creek watershed, and the northern, southern, and eastern boundaries follow the Alameda County line with its adjacent counties. The EACCS study area includes the project area. Within the EACCS study area, Area 1 (west parcels) and Area 2 (northeast parcels) of the project area are within Conservation Zone 6 and Area 3 (southeast parcels) of the project area is within Conservation Zone 10.

EACCS development included input and review by CDFW to address impacts on state-listed species. Consistency with the EACCS also aids in streamlining CESA permit compliance for project impacts on state-listed species. A final draft of the EACCS was completed in October 2010 and released to the public in March 2011.

2007 Settlement Agreement

In 2007, Audubon, CARE, and three wind-energy companies (AES, NextEra, and EnXco) entered into a Settlement Agreement to resolve litigation regarding the County's issuance of CUP approvals. The 2007 Settlement Agreement, including Exhibit G-1 (modified from the 2005 CUPs,) requires participants to develop an NCCP or a similar agreement to "address the long-term operation of wind turbines at the APWRA and the conservation of impacted species of concern and their natural communities." In particular, the 2007 Settlement Agreement committed the wind companies to achieve a 50 percent reduction in avian fatalities from estimated annual fatalities of four focal raptor species (golden eagle, burrowing owl [*Athene cunicularia*], American kestrel [*Falco sparverius*], and red-tailed hawk [*Buteo jamaicensis*]). Companies that could not demonstrate that these requirements were being met were required by the 2007 Settlement Agreement to institute an adaptive management plan. The adaptive management plan and other components of the Settlement Agreement require strategies to provide protection and enhancement of habitat for raptors and other wildlife.

Environmental Setting

The 1,000-acre project area is located entirely within the APWRA, which encompasses approximately 50,000 acres in eastern Alameda and Contra Costa Counties. The project area is characterized by rolling hills with elevations ranging from approximately 150 to 600 feet above mean sea level. Wind farm operations and livestock grazing are the primary land uses in the project area.

The following descriptions of biological resources are derived from existing data and reports prepared for the Initial and Full Repower and other projects in the surrounding area.

Study Area

The study area for biological resources covers the approximately 1,000-acre project area where existing FloDesign project facilities are located (Figures 2-1 and 2-2). The project area comprises eight parcels in three proximate, but geographically separated areas (herein referred to as Area 1, Area 2, and Area 3 [Figure 3.4-1]). The study area also encompasses a 1.24-mile radius around the project area to assess habitat for California red-legged frog and California tiger salamander and determine the likelihood of upland habitat use in the project area.

Field Surveys

ICF biologists conducted surveys to identify vegetation communities, including special-status plant surveys; wetlands and other waters; and terrestrial wildlife habitat in the study area. In addition, numerous avian surveys have been completed and records on bat fatalities compiled.

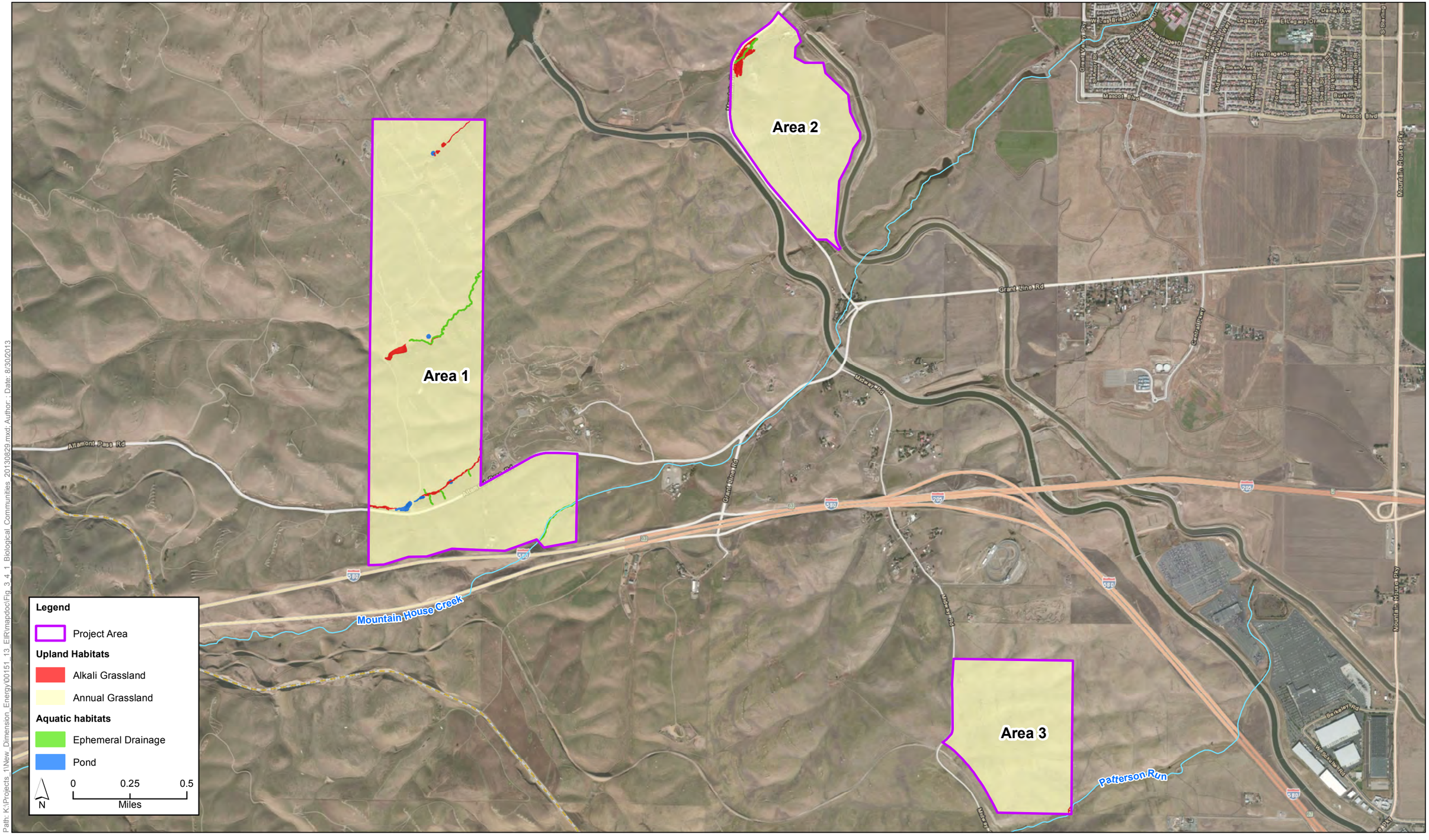

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Figure 3.4-1
Biological Communities

Vegetation Communities Mapping

ICF biologists identified and mapped general vegetation community types (land cover types) in the study area on August 7 and 8, and September 21, 2012. ICF biologists also mapped vegetation communities deemed by CDFW to be rare or sensitive (i.e., sensitive natural communities).

Wetlands and Other Waters Survey

Concurrent with the vegetation surveys, ICF biologists conducted a reconnaissance-level wetland survey to document potentially jurisdictional features in accordance with the *Corps of Engineers Wetlands Delineation Manual* (1987 Manual) (Environmental Laboratory 1987) and, where applicable, the *Interim Regional Supplement to the Corps of Engineers Manual: Arid West Region* (2008 Supplement) (U.S. Army Corps of Engineers 2008). Other waters of the United States were mapped in accordance with the guidelines in USACE Regulatory Guidance Letter No. 05-05, dated December 7, 2005.

These surveys differed from a formal delineation in that hydric soils were not examined, and the presence and boundaries of each wetland feature were determined on the basis of the presence or inference of positive indicators of hydrophytic vegetation and wetland hydrology. Information on vegetation and hydrology was collected in and adjacent to the features. A resource-grade global positioning system (GPS) unit, typically accurate to less than 1 horizontal meter, was used to record the location of representative wetland boundaries and other pertinent features.

Botanical Surveys

ICF botanists conducted botanical surveys for late summer-blooming special-status plants on August 7 and 8, and September 21, 2012. Based on the large size of the study area (approximately 1,000 acres), botanical surveys were focused in areas proposed for ground disturbance as part of the Initial Repower. The botanical surveys generally followed *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (California Department of Fish and Game 2009), which is the currently generally accepted protocol outlining the requirements for conducting surveys for special-status plants. During the surveys, and as required in the CDFW protocol, all plants were identified to the taxonomic level necessary to determine if they were special-status plants or were species with unusual or significant range extensions. Surveys for spring-blooming special-status plants were conducted May 2 through 4, 2013 by Alphabiota Environmental Consulting (AEC), on behalf of the Applicant (Appendix D). Surveys were conducted using meandering pedestrian transects to search for target spring-flowering special-status plant species. Transects were spaced to allow for full visual coverage of the site and areas that exhibited appropriate conditions to support special-status plants were given additional focus and attention (Appendix D).

Terrestrial Wildlife Surveys

ICF biologists conducted a reconnaissance-level field survey and habitat assessment for special-status wildlife by walking and driving throughout the project area. In addition to the reconnaissance-level field survey, ICF conducted a formal site assessment for California red-legged frog and California tiger salamander (ICF International 2012) in accordance with USFWS's (2005a) *Revised Guidance on Site Assessment and Field Surveys for the California Red-legged Frog* and CDFG's (2003) *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander*. The site assessment evaluated the entire project area and included an assessment of aquatic habitat within a 1.24-mile radius surrounding the project area.

Avian Surveys

Avian use surveys, fatality monitoring, and/or avian behavior surveys have been conducted within the APWRA for more than 20 years. Numerous studies have evaluated avian fatality risks within the APWRA (Howell and DiDonato 1991; Orloff and Flannery 1992, 1996; Hunt 2002; Smallwood and Thelander 2004, 2005, 2008; West 2008; Smallwood and Karas 2009, Smallwood et al. 2009; ICF International 2013a). Most recently, Alameda County's Monitoring Team (MT) under the direction of a Scientific Review Committee (SRC) has been monitoring fatalities at turbines and collecting bird use information throughout the APWRA since 2005 (ICF International 2013a). The most recent report includes bird years 2005–2011 (ICF International 2013a). This monitoring data provides estimates of annual fatality rates and estimates of bird use for birds throughout the APWRA.

Additionally, as a central component of the Initial Repower phase, the Applicant is collaborating with Shawn Smallwood on a CEC/PIER funded grant, titled *Test of Avian Collision of a Closed Bladed Wind Turbine* (referred to as the Avian Validation Study) at the Sand Hill project parcels to, in part, evaluate the effectiveness of the shrouded turbine design. The study uses a before-after-control-impact (BACI) design to evaluate the effects of the shrouded turbines on avian collisions (Appendix E). The primary objective of the study is to estimate fatality rates before the installation of the shrouded turbines (the *before* phase of the BACI study design), and to provide a project-wide baseline of fatalities which would be used to measure the project's impacts (Smallwood 2013). To date, the first year of monitoring—the *before* phase—has been completed. The results were reported in Smallwood (2013) and are summarized in Appendix E. To test this research hypothesis, the BACI design involves estimating fatality rates at the "control" sites and "impact" sites before and after installation of the shrouded turbines. Based on the first year of monitoring, the study has estimated an avian mortality rate of 3.88 bird deaths (among the four focal species) per year per MW for the specific high risk turbines involved in this study. The control sites are where existing turbines will remain as part of the experiment after the new turbines are installed. The impact sites are where the 40 Initial Repower shrouded turbines will be installed. Thus, changes in fatality rates caused by the shrouded turbine will be isolated from changes caused by other factors, such as natural changes in relative abundance (Smallwood 2013).

Lastly, ICF and Smallwood have both reported incidental observations of avian species (e.g., burrowing owl, loggerhead shrike) during field surveys in the project area (ICF International 2013b; Smallwood 2013).

Bat Surveys

The APWRA supports resident and migratory bat species, although specific surveys within the APWRA are limited. Bat fatalities are recorded by the MT when found, and reported each year in the annual avian study reports. The most recently available report includes data collected from 2005–2011 (ICF International 2013a), which identified a total of 22 fatalities over a 7 year period within the APWRA, resulting in an average rate of between zero and six bat fatalities per year. Species detected during these survey included hoary bat, little brown bat, Mexican free-tailed bat, and western red bat. During 2012 surveys conducted by Smallwood (2013) for the Avian Validation Study, only one bat fatality, a Mexican free-tailed bat, was detected within the project area. Additionally, recent acoustical monitoring (identification of bat use by recording their calls) in support of the recent Vasco Winds Repowering Project provides additional information on bat use of the APWRA.

Biological Communities

The biological communities and general land cover types that occur in the study area—nonnative annual grassland, alkali grassland, stock ponds, and ephemeral drainages—are described below and depicted in Figure 3.4-1. Representative photographs of biological communities in the study area are provided in Appendix F.

California Annual Grassland

California annual grassland is the most common biological community in the study area. California annual grassland is an herbaceous community dominated by nonnative annual grasses with intermixed perennial and annual forbs. Annual grassland in the study area commonly exhibits low levels of diversity and is dominated by ripgut brome (*Bromus diandrus*), soft chess brome (*Bromus hordeaceous*), yellow star-thistle (*Centaurea solstitialis*), Italian ryegrass (*Lolium multiflorum*), and wild oat (*Avena fatua*).

Annual grasslands support a diversity of insects, amphibians, reptiles, mammals, and birds. This community type is common both regionally and statewide and is not considered a sensitive natural community by CDFW, although it can support special-status species. Burrowing owls and northern harriers use grasslands for foraging and nesting; California tiger salamanders spends a majority of their lifecycle in underground burrows within grassland communities. California red-legged frogs use grassland habitats for refuge and dispersal. San Joaquin whipsnakes and Blainville's (Coast) horned lizards also occur in grassland habitats. Many species of special-status plants occur in grasslands when suitable microhabitat conditions are present.

Alkali Grassland

Alkali grassland is relatively common in the study area, occurring in low-lying areas and valleys, often associated with drainages. Portions of this habitat type are intermittently flooded and saturated by alkaline water and are dominated almost entirely by saltgrass (*Distichlis spicata*) with Baltic rush (*Juncus balticus*) and alkali heath (*Frankenia salina*). Nonnative annual grasses, such as sea barley (*Hordeum marinum*) and soft chess brome, are also common associates within this community type. The grasses that occupy this habitat are typically short, growing less than 1 meter high. CDFW considers alkali grassland a sensitive natural community because of its rarity and the pressing threats to the remnant communities from overgrazing and land use conversion (California Department of Fish and Wildlife 2013a), and it is listed in the EACCS as a conservation priority. In addition to its status as a sensitive natural community, alkali grassland provides potential habitat for special-status plants, and all or portions of this habitat in the study area may qualify as waters of the United States (wetlands) under Section 404 of the CWA.

Stock Ponds

Several stock ponds were mapped throughout the study area within low-lying drainages and valley bottoms. These stock ponds are small permanent or semi-permanent bodies of water constructed for retaining runoff water for livestock use. The surface area of these features varies widely depending on the time of year and annual rainfall. Stock ponds in the study area are predominantly unvegetated, but where vegetation is present it generally occurs around the perimeter of the pond and is typically dominated by the alkali grassland species described above. The locations of the stock ponds in the study area are shown on Figure 3.4-1. Stock ponds can attract many birds that are normally found in the adjacent grasslands; for example, California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), and barn and cliff swallows (*Hirundo rustica* and *H. pyrrhonota*)

are known to use ponds as water sources. Ponds that contain either submerged or emergent vegetation are of particular importance to native amphibians as breeding habitat. In perennial ponds, nonnative bass (*Micropterus* ssp.) and bullfrog (*Lithobates catesbeianus*) are common and often prevalent wildlife species. Raccoons forage along the edges of ponds for adult and larval amphibians, fish, and crayfish. Stock ponds also provide important breeding habitat for special-status amphibians including California red-legged frog and California tiger salamander.

Ephemeral Drainages

Drainages, though uncommon in the study area, occur in low-lying areas and valley bottoms. Two named drainages flow through the study area: Mountain House Creek and Patterson Run (Figure 3.4-1). Drainages in the study area are ephemeral. During the summer and fall months when these drainages are dry, wildlife habitat use is similar to that described above for annual grasslands. When water is present, ephemeral drainages in the project area often contain deeper areas of ponded water that can provide foraging and breeding habitat for California red-legged frog, California tiger salamander, and northern Pacific pond turtle.

Developed Lands

In the study area, developed areas are primarily restricted to existing paved roadways, the wind turbine sites, and residential/farm facilities. While developed landscapes do not provide high-quality habitat for wildlife species, some developed areas may be used for foraging and movement.

Special-Status Species

Special-status species are plants, animals, and fish that are legally protected under ESA, CESA, or other regulations; and species that are considered sufficiently rare by the scientific community to qualify for such listing. Special-status plants, animals, and fish fall into the following categories.

- Species that are listed or proposed for listing as threatened or endangered under ESA (50 CFR 17.11 [listed animals]; 50 CFR 17.12 [listed plants]; and various notices in the Federal Register [FR]).
- Species that are candidates for possible future listing as threatened or endangered under ESA (75 FR 69222, November 10, 2010).
- Species that are listed or proposed for listing by the State of California as threatened or endangered under CESA (14 CCR 670.5).
- Species that meet the definitions of rare or endangered under CEQA (State CEQA Guidelines Section 15380).
- Plants listed as rare under CNPPA (California Department of Fish and Wildlife Commission 1900 et seq.).
- Plants listed by CNPS as plants about which more information is needed to determine their status and plants of limited distribution, which may be included as special-status species on the basis of local significance or recent biological information (California Native Plant Society 2012).
- Animals listed as California species of special concern to the CDFW (Shuford 2008 [birds]; Williams 1986 [mammals]; and Jennings and Hayes 1994 [amphibians and reptiles]).
- Animals that are fully protected in California (California Department of Fish and Wildlife Commission 3511 [birds], 4700 [mammals], 5050 [amphibians and reptiles], and 5515 [fish]).

- Bats identified as medium or high priority on the Western Bat Working Group regional priority species matrix (Western Bat Working Group 2007).

Special-Status Plants

A review of available information resulted in the identification of 25 special-status plants that have potential to occur in the study area based on the presence of suitable habitat (ICF International 2013b) (Table 3.4-1).

The surveys conducted in 2012 and 2013 resulted in the detection of one special-status plant species, heartscale (*Atriplex cordulata* var. *cordulata*) (Appendix D). Several other species, such as San Joaquin spearscale (*Atriplex joaquinana*), diamond-petaled California poppy (*Eschscholzia rhombipetala*), round-leaved filaree (*California macrophyllum*), and big tarweed (*Blepharizonia plumosa*) have been reported by CDFW (2013) as occurring in or near the project area. No critical habitat for special-status plants has been designated in the study area.

While one special-status plant was detected, AEC reported that spring survey site conditions (precipitation and climate) were insufficient in 2013 to thoroughly assess the presence or absence of the target special-status plants (Appendix D). Most potentially occurring species are annuals (they complete their life cycle in a single year), and often will not germinate in years with below-average annual rainfall, or insufficiently timed rainfall. Adverse conditions such as drought may prevent surveyors from determining the presence of some species in potential habitat (California Department of Fish and Game 2009). Considering this context, several species still have a high potential to occur in the project area (Table 3.4-1). The following discussion focuses on the 13 species identified as occurring or having a high potential to occur in the study area.

Large-Flowered Fiddleneck

Large-flowered fiddleneck is state- and federally listed as endangered, with a California Rare Plant Rank of 1B.1. Historically, it was known from the Mount Diablo foothills in Contra Costa, Alameda, and San Joaquin Counties, but it is currently known only from two natural occurrences near Corral Hollow Road in San Joaquin County (Kelley and Ganders 2012:454; California Department of Fish and Wildlife 2013b). Large-flowered fiddleneck grows in grasslands, generally on north-facing slopes. A single population was known from the project area, located on Lawrence Livermore Laboratory's Site 300 test area (California Department of Fish and Wildlife 2013b). This occurrence has not been observed since 1997 and appears to have been extirpated by erosion (Carlsen et al. 1999). California annual grasslands in the project area are potential habitat for this species.

Heartscale

Heartscale has no federal or state listing status but has a California Rare Plant Rank of 1B.2. It is present along the western side of the Great Valley from Butte to Fresno Counties and in the small valleys of the inner Coast Ranges, including the Livermore Valley (Zacharias 2012:633–634; California Department of Fish and Wildlife 2013b). Heartscale grows in alkali grasslands and on the margins of vernal pools, swales, slickspots, and scalds (California Department of Fish and Wildlife 2013b). It is generally found at low elevations but has been collected at up to 1,500 feet above sea level. In the project area, heartscale was identified in one location (Appendix D).

Brittlescale

Brittlescale has no federal or state listing status but has a California Rare Plant Rank of 1B.2. It is present along the western side of the Great Valley from Glenn to Merced Counties and in the small valleys of the inner Coast Ranges, including the Livermore Valley (Zacharias 2012:633–634; California Department of Fish and Wildlife 2013b). At the landscape level, brittlescale occurs in the broad flood basins of the valley floor and on alluvial fans associated with the major streams draining from the inner Coast Ranges foothills. It grows in iodine bush scrub and alkali grasslands on the margins of vernal pools, swales, slickspots, and scalds. It is generally found at low elevations but has been collected at up to 1,055 feet above sea level. In the project area, brittlescale has been reported from scalds in the vicinity of Altamont Pass Road (California Department of Fish and Wildlife 2013b). Alkali wetlands in the project area are potential habitat for this species.

San Joaquin Spearscale

San Joaquin spearscale has no federal or state listing status but has a California Rare Plant Rank of 1B.2. It occurs along the western side of the Great Valley from Glenn to Fresno Counties and in the small valleys of the inner Coast Ranges, including the Livermore Valley (Zacharias 2012:634; California Department of Fish and Wildlife 2013b). It occurs in the broad flood basins of the valley floor and on alluvial fans associated with the major streams draining from the inner Coast Ranges foothills. It grows in iodine bush scrub, alkali meadow, and alkali grasslands. It is generally found at low elevations, but has been collected at up to 820 feet above sea level. In the project area, San Joaquin spearscale has been recorded in alkali wetlands along Altamont Pass Road, Bruns Road, and Mountain House Road (California Department of Fish and Wildlife 2013b). Alkali wetlands in the project area are potential habitat for this species.

Lesser Saltscale

Lesser saltscale has no federal or state listing status but has a California Rare Plant Rank of 1B.1. It is known primarily from the San Joaquin Valley and the Livermore Valley, although other disjunct occurrences have been reported in Butte and western Alameda Counties (Zacharias 2012:634–636; California Department of Fish and Wildlife 2013b). Lesser saltscale occurs in valley sink scrub and alkali grassland habitats on sandy, alkali soils, often on the margins of slickspots or alkaline rain pools. In the project area, lesser saltscale has been reported from alkali wetlands along Dyer Road (California Department of Fish and Wildlife 2013b). Alkali wetlands in the project area are potential habitat for this species.

Big Tarplant

Big tarplant has no state or federal listing status but has a California Rare Plant Rank of 1B.1. It is known from the eastern San Francisco Bay Area and the northwestern San Joaquin Valley (Baldwin 2012). Big tarplant occurs in annual grassland on clay to clay-loam soils, usually on slopes and often in burned areas, below 1,500 feet. In the project area, big tarplant occurs in the vicinity of Corral Hollow Road and the Midway Substation (California Department of Fish and Wildlife 2013b). California annual grassland in the project area is potential habitat for this species.

Round-Leaved Filaree

Round-leaved filaree has no state or federal listing status but has a California Rare Plant Rank of 1B.1. It is known from scattered occurrences in the Central Valley, southern North Coast Ranges, San Francisco Bay Area, South Coast Ranges, Channel Islands, Transverse Ranges, and Peninsular Ranges

Table 3.4-1. Special-Status Plants Known to Occur or that May Occur in the Sand Hill Wind Study Area

Species	Status[a] Federal/State/CRPR	California Distribution	Habitats	Blooming Period	Likelihood to Occur in Study Area
Amsinckia grandiflora Large-flowered fiddleneck	E/E/1B.1	Foothills of Mount Diablo in Alameda, Contra Costa, and San Joaquin Counties; currently known from only three natural occurrences	Open grassy slopes in annual grasslands and cismontane woodlands	April–May	Low—suitable annual grassland habitat is present throughout the study area; however, the species is not known to occur in the study area and is only known from three localities in California. Designated critical habitat for the species occurs approximately 2 miles southeast from the study area (Figure 3.2-2)
Amsinckia lunaris Bent-flowered fiddleneck	–/–/1B.2	Alameda, Contra Costa, Lake, Marin, Santa Cruz, Shasta, and Siskiyou Counties	Cismontane woodland, valley and foothill grassland	March–June	Moderate—suitable annual grassland habitat is present throughout the study area
Astragalus tener var. *tener* Alkali milk-vetch	–/–/1B.2	Historically found in western San Joaquin Valley, San Francisco Bay Area, and Monterey County; likely extirpated from all historical occurrences except those in Merced, Solano, and Yolo Counties	Playas and grasslands with adobe clay soils and alkaline vernal pools	March–June	High—suitable annual grassland and alkali habitats are present throughout the study area
Atriplex cordulata Heartscale	–/–/1B.2	Western Central Valley and valleys of adjacent foothills	Alkali grasslands, alkali meadows, alkali scrublands	May–October	High—suitable annual grassland and alkali habitats are present throughout the study area
Atriplex depressa Brittlescale	–/–/1B.2	Western Central Valley and valleys in foothills on west side of Central Valley	Alkali grasslands, alkali meadows, alkali scrublands, chenopod scrublands, playas, valley and foothill grasslands; on alkaline or clay soils	May–October	High—suitable annual grassland and alkali habitats are present throughout the study area

Species	Status[a] Federal/State/CRPR	California Distribution	Habitats	Blooming Period	Likelihood to Occur in Study Area
Atriplex joaquiniana San Joaquin spearscale (saltbush)	–/–/1B.2	West margin of Central Valley from Glenn to Tulare Counties	Alkali grasslands, alkali scrublands, alkali meadows, saltbush scrublands	April–September	High—suitable annual grassland and alkali habitats are present throughout the study area; species is known to occur within alkali grassland along the northern boundary of Area 2 in the study area
Atriplex minuscula Lesser saltscale	–/–/1B.1	Sacramento and San Joaquin Valley, Butte County to Kern County	Alkali sink and sandy alkaline soils in grasslands, chenopod scrub, between 65 and 325 feet above msl	May–October	High—suitable annual grassland and alkali habitats are present throughout the study area
Balsamorhiza macrolepis var. *macrolepis* Big-scale balsamroot	–/–/1B.2	Scattered occurrences in Coast Ranges and Sierra Nevada foothills.	Chaparral, cismontane woodland, valley and foothill grassland, sometimes on serpentine soils, at 295–4,593 feet.	March–June	Moderate—suitable annual grassland habitat within study area
Blepharizonia plumosa ssp. *plumosa* Big tarplant	–/–/1B.1	Interior Coast Range foothills in Alameda, Contra Costa, San Joaquin, Stanislaus[b], and Solano[b] Counties	Dry hills and plains in annual grasslands	July–October	High—suitable annual grassland habitat in the study area and nearby occurrences along Midway Road south of Area 3 of the study area
California macrophylla Round-leaved filaree	–/–/1B.1	Scattered occurrences in the Great Valley, southern North Coast Ranges, San Francisco Bay Area, South Coast Ranges, Channel Islands, Transverse Ranges, and Peninsular Ranges	Cismontane woodland, valley and foothill grassland on clay soils	March–May	High—suitable annual grassland habitat in the study area; species is known to occur along Grant Line Road just south of the study area
Caulanthus lemmonii Lemmon's jewel-flower	–/–/1B.2	Southeast San Francisco Bay Area, south through the South Coast Ranges and adjacent San Joaquin Valley to Ventura County	Dry, exposed slopes in grasslands and pinyon-juniper woodland	March—May	Low—limited habitat is present in the study area

Species	Status[a] Federal/State/CRPR	California Distribution	Habitats	Blooming Period	Likelihood to Occur in Study Area
Centromadia parryi ssp. *congdonii* Congdon's tarplant	–/–/1B.2	Eastern San Francisco Bay Area, Salinas Valley, and Los Osos Valley	Lower slopes, flats, and swales in annual grasslands; locally on alkaline or saline soils	June–November	High—suitable annual grassland habitat and alkaline soils are present in the study area; species is known to occur along Altamont Pass Road near the study area
Chloropyron mollis ssp. *hispidus* Hispid bird's-beak	–/–/1B.1	Central Valley (Kern, Fresno, Merced, Placer, and Solano Counties) and Alameda County	Meadows, grasslands, and playas; on alkaline soils	June–September	Moderate— suitable annual grassland habitat and alkaline soils are present in the study area
Chloropyron palmatus Palmate-bracted bird's-beak	E/E/1B.1	Known from seven populations in Livermore Valley and Central Valley from Colusa County to Fresno County	Alkali grasslands, alkali meadows, and chenopod scrublands	May–October	Low—suitable alkali grassland habitat within study area, but species has a very limited distribution
Deinandra bacigalupii Livermore tarplant	–/–/1B.2	Endemic to Alameda County (Livermore Valley)	Alkaline meadows and seeps, not in Jepson Manual	June–October	Moderate—moist alkali soils are present in the study area
Delphinium recurvatum Recurved larkspur	–/–/1B.2	San Joaquin Valley and interior valleys of the south Coast Ranges, Contra Costa County to Kern County	Subalkaline soils in annual grassland, saltbush scrub, cismontane woodland, vernal pools	March–May	High—suitable annual grassland habitat and alkaline soils are present in the study area
Eschscholzia rhombipetala Diamond-petaled poppy	–/–/1B.1	Interior foothills of south Coast Ranges from Contra Costa County to Stanislaus County, Carrizo Plain in San Luis Obispo County	Grassland, chenopod scrub, on clay soils, where grass cover is sparse enough to allow growth of low annuals	March–April	Moderate—suitable annual grassland habitat within study area
Lasthenia conjugens Contra Costa goldfields	E/–/1B.1	Scattered occurrences in Coast Range valleys and southwest edge of Sacramento Valley, Alameda, Contra Costa, Mendocino, Monterey, Napa, Santa Barbara, Santa Clara, and Solano Counties	Alkaline or saline vernal pools and swales, below 1,542 feet	March–June	Low—suitable alkali soils and swales may be present but no nearby occurrences

Species	Status[a] Federal/State/CRPR	California Distribution	Habitats	Blooming Period	Likelihood to Occur in Study Area
Madia radiata Showy golden madia	–/–/1B.1	Scattered populations in the interior foothills of the South Coast Ranges: Contra Costa[b], Fresno, Kings[b], Kern, Monterey[b], Santa Barbara[b], San Benito, Santa Clara, San Joaquin[b], San Luis Obispo, and Stanislaus Counties	Oak woodland, valley and foothill grassland, slopes	March–May	Moderate—suitable annual grassland habitat within study area
Plagiobothrys glaber Hairless popcorn-flower	–/–/1A	Coastal valleys from Marin County to San Benito County	Alkaline meadows, coastal salt marsh	April–May	Low— suitable alkali soils are present in the study area but no nearby occurrences
Trifolium depauperatum var. *hydrophilum* Saline clover	–/–/1B.2	Alameda, Colusa, Monterey, Napa, San Benito, Santa Clara, San Luis Obispo, San Mateo, Solano, and Sonoma Counties	Marshes and swamps, valley and foothill grassland (mesic, alkaline), and vernal pools	April–June	Low—suitable annual grassland habitat within study area but no nearby occurrences
Tropidocarpum capparideum Caper-fruited tropidocarpum	–/–/1B.1	Historically known from the northwest San Joaquin Valley and adjacent Coast Range foothills	Grasslands in alkaline hills	March–April	High—suitable grassland and alkaline soils in the study area; species is known to occur along Grant Line Road just south of Area 2 of the study area

[a] Status explanations:

Federal

E = listed as endangered under the ESA.

– = no listing.

State

E = listed as endangered under the CESA.

– = no listing.

California Rare Plant Rank (CRPR)

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.

CRPR Code Extensions:

0.1 = seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat.

0.2 = fairly endangered in California (20–80% of occurrences threatened).

[b] Populations uncertain or extirpated in the county.

(Alarcón et al. 2012; California Department of Fish and Wildlife 2013b). It occurs in grasslands and open, grassy areas in oak woodland. In the project area, round-leaved filaree is known from six occurrences along Corral Hollow Road, at Lawrence Livermore Laboratory's Site 300 test area, along Altamont Pass Road, at Mountain House, and in the hills east of Altamont Pass Road and Dyer Road (California Department of Fish and Wildlife 2013b). California annual grassland in the project area is potential habitat for this species.

Lemmon's Jewelflower

Lemmon's jewelflower has no state or federal listing status but has a California Rare Plant Rank of 1B.1. It ranges from the southeastern San Francisco Bay Area south into the South Coast Ranges and adjacent San Joaquin Valley, from Alameda to Ventura Counties (Al-Shehbaz 2012:538; California Department of Fish and Wildlife 2013b). Lemmon's jewelflower grows on dry exposed slopes in grasslands and pinyon-juniper woodlands, generally between 260 and 4,000 feet above sea level. In the project area, one occurrence is known from the vicinity of Corral Hollow Road (California Department of Fish and Wildlife 2013b). California annual grassland in the project area is potential habitat for this species.

Recurved Larkspur

Recurved larkspur has no state or federal listing status but has a California Rare Plant Rank of 1B.2. Recurved larkspur was formerly widespread in the Central Valley from Colusa to Kern Counties, although it has been extirpated from the Sacramento Valley (Koontz and Warnock 2012:1411; California Department of Fish and Wildlife 2013b). It occurs in chenopod scrub and grasslands on poorly drained, fine, alkaline soils (Koontz and Warnock 2012:1411). In the project area, one occurrence of recurved larkspur is known from alkali grasslands along Bruns Road (California Department of Fish and Wildlife 2013b). Plant communities in the project area that may provide habitat for recurved larkspur are alkali grassland and alkali wetlands.

Diamond-Petaled California Poppy

Diamond-petaled California poppy has no state or federal listing status but has a California Rare Plant Rank of 1B.1. This species was known historically from the interior foothills of the North and South Coast Ranges but is currently known from only three locations in Alameda and San Luis Obispo Counties (Hannan and Clark 2012:984; California Department of Fish and Wildlife 2013b). Diamond-petaled California poppy grows in clay soils within California annual grassland. In the project area, diamond-petaled California poppy is known from two locations at Lawrence Livermore Laboratory's Site 300 test area, north of Corral Hollow Road (California Department of Fish and Wildlife 2013b). California annual grassland in the project area may provide habitat for diamond-petaled California poppy.

Shining Navarretia

Shining navarretia has no state or federal listing status but has a California Rare Plant Rank of 1B.2. This species ranges throughout the South Coast Ranges, although additional occurrences are reported from the central San Joaquin Valley (Johnson 2012:1066; California Department of Fish and Wildlife 2013b). Shining navarretia grows on clay soils in grasslands and oak woodland, sometime in association with drying depressions. In the project area, shining navarretia is known from a single occurrence at Lawrence Livermore Laboratory's Site 300 test area (California Department of Fish and Wildlife 2013b). California annual grassland in the project area is potential habitat for this species.

Rayless Ragwort

Rayless ragwort has no state or federal listing status but has a California Rare Plant Rank of 2.2. It is known from scattered locations in the California Coast Ranges south of San Francisco Bay, the Transverse Ranges, southwest California (including Santa Cruz Island), and Baja California (Preston 2000). It is found in areas with low vegetation cover in grassland and coastal scrub, and on various substrates: clay, coarse sand, rock outcrops (including serpentinite), and soils with high gypsum content or high alkalinity (Preston 2000). In the project area, rayless ragwort is known from a single occurrence in the vicinity of Corral Hollow Road (California Department of Fish and Wildlife 2013b). Rock outcrops in the project vicinity are potential habitat for this species.

Caper-Fruited Tropidocarpum

Caper-fruited tropidocarpum has no state or federal listing status but has a California Rare Plant Rank of 1B.1. It was historically known from the northwest San Joaquin Valley and adjacent Diablo Range foothills, but all of these occurrences are believed to be extirpated. It has recently been reported to occur in Fresno, Monterey, and San Luis Obispo Counties. It grows on clay soils in grasslands. In the project area, caper-fruited tropidocarpum is known from a single occurrence near Mountain House (California Department of Fish and Wildlife 2013b). California annual grassland in the project area may provide habitat for this species.

Special-Status Wildlife

A review of existing information, including the CDFW CNDDB, USFWS species lists for the geographic region, and previously prepared environmental documents for the Initial and Full Repower and nearby projects, resulted in the identification of 32 special-status wildlife species with potential to occur in the study area (Table 3.4-2). Following the reconnaissance-level field surveys and California tiger salamander and California red-legged frog site assessment survey, it was determined that the study area contains suitable habitat for 23 of the 32 species. Three special-status wildlife species (California red-legged frog, burrowing owl, and loggerhead shrike) were observed in the project area during the 2012 reconnaissance-level surveys conducted for the Initial and Full Repower (Figure 3.4-2). The project area also overlaps with designated critical habitat for one species, California red-legged frog (Figure 3.4-3).

A brief discussion of special-status terrestrial wildlife species that could be affected by ground disturbance associated with construction of the Initial Repower is provided below. Special-status and non-special-status avian and bat species that could be affected by turbine operation are discussed separately.

California Tiger Salamander

California tiger salamander is state- and federally listed as a threatened species under the CESA and ESA. California tiger salamander is endemic to the San Joaquin–Sacramento River valleys, bordering foothills, and coastal valleys of central California (Barry and Shaffer 1994).

California tiger salamander is a lowland species restricted to annual grasslands and foothill oak savanna regions where its breeding habitat occurs. Breeding habitat consists of temporary ponds or pools, some permanent waters, and, rarely, slower portions of streams. Permanent aquatic habitats are unlikely to be successful breeding sites unless they lack aquatic predators. Adult and juvenile California tiger salamanders spend most of their life in subterranean burrows (especially ground squirrel burrows) in the vicinity of breeding sites. The species also utilizes other types of small mammal burrows, logs, and shrink-swell cracks (Jennings and Hayes 1994).

Table 3.4-2. Special-Status Wildlife Species Known to Occur or that May Occur in the Project Area

Scientific and Common Names	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area
Invertebrates				
Branchinecta conservatio Conservancy fairy shrimp	E/–	Disjunct occurrences in Solano, Merced, Tehama, Ventura, Butte, and Glenn Counties	Large, deep vernal pools in annual grasslands	None—No suitable vernal pool habitat is present in the study area
Branchinecta longiantenna Longhorn fairy shrimp	E/–	Eastern margin of central Coast Ranges from Contra Costa County to San Luis Obispo County; disjunct population in Madera County	Small, clear pools in sandstone rock outcrops of clear to moderately turbid clay- or grass-bottomed pools	None—No suitable vernal pool habitat is present in the study area
Branchinecta lynchi Vernal pool fairy shrimp	T/–	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County; isolated populations also in Riverside County	Common in vernal pools; also found in sandstone rock outcrop pools	None—No suitable vernal pool habitat is present in the study area
Lepidurus packardi Vernal pool tadpole shrimp	T/–	Shasta County south to Merced County	Vernal pools and ephemeral stock ponds	Low—stock ponds and alkali wetlands in the study area provide potential habitat for the species; however, no known occurrences of vernal pool tadpole shrimp occur in or near the study area (CNDDB 2012)
Desmocerus californicus Valley elderberry longhorn beetle	T/–	Streamside habitats below 3,000 feet above sea level throughout the Central Valley	Riparian and oak savanna habitats with elderberry shrubs and streamside habitats below 3,000 feet above sea level. Elderberry shrub is the host plant.	None—study area drains to the San Francisco Bay and is not within the current range of the species
Fish				
Acipenser medirostris Green sturgeon	T/SSC	In marine waters of the Pacific Ocean from the Bering Sea to Ensenada, Mexico. In rivers from British Columbia south to the Sacramento River, primarily in the Klamath/Trinity and Sacramento Rivers	Primarily marine, using large anadromous freshwater rivers and associated estuaries for spawning and rearing	None—outside of species known range and there is no suitable habitat in the study area

Scientific and Common Names	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area
Hypomesus transpacificus Delta smelt	T/T	Primarily in the Sacramento–San Joaquin Estuary, but has been found as far upstream as the mouth of the American River on the Sacramento River and Mossdale on the San Joaquin River; range extends downstream to San Pablo Bay	Occurs in estuary habitat in the Delta where fresh and brackish water mix in the salinity range of 2–7 parts per thousand (Moyle 2002)	None—No suitable habitat (estuary) in the study area
Oncorrhynchus mykiss Central California Coastal steelhead Distinct Population Segement (DPS)	T/-	Coastal drainages along the central California coast	An anadromous fish that spawns and spends a portion of its life in inland streams, typically maturing in the open ocean	None—no perennial streams suitable for anadromous fish are present in the study area
Oncorrhynchus mykiss Central Valley steelhead DPS	T/–	Sacramento and San Joaquin River and their tributaries	An anadromous fish that spawns and spends a portion of its life in inland streams, typically maturing in the open ocean	None—no perennial streams suitable for anadromous fish are present in the study area
Amphibians				
Rana boylii Foothill yellow-legged frog	–/SSC	Occurs in the Klamath, Cascade, north Coast, south Coast, Transverse, and Sierra Nevada Ranges up to approximately1,800 meters (6,000 feet)	Creeks or rivers in woodland, forest, mixed chaparral, and wet meadow habitats with rock and gravel substrate and low overhanging vegetation along the edge. Usually found near riffles with rocks and sunny banks nearby	None—no suitable streams with rocky, gravel substrate and overhanging vegetation are present within the study area
Rana draytoni California red-legged frog	T/SSC	Found along the coast and coastal mountain ranges of California from Mendocino County to San Diego County and in the Sierra Nevada from Butte County to Stanislaus County	Permanent and semipermanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation; may estivate in rodent burrows or cracks during dry periods	High—species was observed within a stock pond in the study area; 18 known occurrences within 1 mile of the study area (CNDDB 2013). Based on the proximity of known occurrences and presence of suitable aquatic and upland habitat throughout the study area, all upland and aquatic habitats within the study area are considered potentially occupied. The study area overlaps with designated critical habitat for the species (Figure 3.4-3).

Table 3.4-2. Continued

Scientific and Common Names	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area
Ambystoma californiense California tiger salamander	T/T	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet, and coastal region from Sonoma County south to Santa Barbara County	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	High—suitable aquatic and upland habitat is present throughout the study area. Two known occurrence within 1.2 miles (CNDDB 2013) of study area but 15+ occurrences have been previously documented within 3 miles of the project.
Reptiles				
Phyrnosoma blainvillii Blainville's (Coast) horned lizard	–/SSC	Sacramento Valley, including foothills, south to southern California; Coast Ranges south of Sonoma County; below 1,200 meters (4,000 feet) in northern California	Grasslands, brushlands, woodlands, and open coniferous forest with sandy or loose soil; requires abundant ant colonies for foraging	Moderate—suitable grassland habitat is present throughout the study area but not all areas would support suitable substrate conditions; known occurrences from Lawrence Livermore Laboratory's Site 300 south and southeast of the study area (CNDDB 2013)
Masticophis flagellum ruddocki San Joaquin whipsnake	–/SSC	From Colusa county in the Sacramento Valley southward to the grapevine in the San Joaquin Valley and westward into the inner coast ranges. An isolated population occurs at Sutter Buttes. Known elevational range from 20–900 meters (66–2,953 feet).	Occurs in open, dry, vegetative associations with little or no tree cover; in valley grassland and saltbush scrub associations; and often occurs in association with mammal burrows	Moderate—suitable grassland habitat is present within the study area; known occurrences just southwest of Area 3 of the study area (CNDDB 2013)
Masticophis lateralis euryxanthus Alameda whipsnake	T/T	Restricted to Alameda and Contra Costa Counties; fragmented into five disjunct populations throughout its range	Valleys, foothills, and low mountains associated with northern coastal scrub or chaparral habitat; requires rock outcrops for cover and foraging	None—suitable grassland habitat is present throughout the study area but vegetation associations (scrub and chaparral) and rock outcrops used for cover are not present in or near the study area; accordingly, the species is not expected to occur in the study area

Scientific and Common Names	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area
Actinemys marmorata Pacific pond turtle	–/SSC	Uncommon to common in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest and absent from desert regions, except in the Mojave Desert along the Mojave River and its tributaries	Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests. Nests are typically constructed in upland habitat within 0.25 mile of aquatic habitat.	Moderate—where water is present, alkali grasslands, stock ponds, and ephemeral drainages in the study area provide potential aquatic habitat for pond turtles. Annual grasslands adjacent to aquatic habitats provide potential nesting areas for pond turtles.
Thamnophis gigas Giant garter snake	T/T	Central Valley from the vicinity of Burrel in Fresno County to near Chico in Butte County; extirpated from areas south of Fresno	Sloughs, canals, low-gradient streams, and freshwater marshes where there is a prey base of small fish and amphibians. Also irrigation ditches and rice fields. Requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter.	None—no suitable habitat is present in the study area and no nearby occurrences (CNDDB 2013)
Mammals				
Antrozous pallidus Pallid bat	–/SSC	Low elevations throughout California	Occurs in a variety of habitats from desert to coniferous forest; most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California. Prefers rocky outcrops, cliffs, and crevices with access to open habitats for foraging. Uses caves, crevices, mines, and hollow trees for roosting.	Low—may forage in the study area but no suitable roosting habitat is present
Corynorhinus townsendii Townsend's big-eared bat	–/SSC	Widespread throughout California	Roosts in caves, tunnels, mines, crevices, hollow trees, and buildings; usually near water	Low—may forage in the study area and limited roosting habitat is present in an existing farm building within Area 2 of the study area

Scientific and Common Names	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area
Taxidea taxus American badger	–/SSC	In California, badgers occur throughout the state except in humid coastal forests of northwestern California in Del Norte and Humboldt Counties	Badgers occur in a wide variety of open, arid habitats but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub; the principal habitat requirements for the species appear to be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground.	High—suitable grassland habitat is present in the study area and known occurrences (CNDDB 2013) are present near the study area
Vulpes macrotis mutica San Joaquin kit fox	E/T	Principally occurs in the San Joaquin Valley and adjacent open foothills to the west; recent records from 17 counties extending from Kern County north to Contra Costa County	Saltbush scrub, grassland, oak, savanna, and freshwater scrub	Low—suitable grassland habitat is present throughout the study area; 1986 sighting within Area 3 of the study area and several historic sightings near Area 2 of the study area (CNDDB 2013) but no recent sightings within the northern extent of the range in Alameda County
Birds				
Laterallus jamaicensis coturniculus California black rail	–/T	Found along San Francisco Bay, the Delta, coastal southern California, the Salton Sea, lower Colorado River, and some in land areas in the northern Sacramento Valley and adjacent foothills	Found in brackish and freshwater emergent marshes, typically in high wetland zone near the upper limit of flooding	Low—could migrate through the study area but no suitable nesting habitat is present

Scientific and Common Names	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area
Haliaeetus leucocephalus Bald eagle	D/E	Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino Counties and in the Lake Tahoe Basin; reintroduced into central coast; winter range includes the rest of California, except the southeastern deserts, very high altitudes in the Sierra Nevada, and east of the Sierra Nevada south of Mono County	In western North America, nests and roosts in coniferous forests within 1 mile of a lake, reservoir, or stream, or the ocean	High—species winters in the APWRA and may forage adjacent to the study area; however, no suitable foraging habitat (large lakes, reservoirs, or rivers) is present in the study area
Aquila chrysaetos Golden eagle	–/FP	Foothills and mountains throughout California; uncommon nonbreeding visitor to lowlands such as the Central Valley	Nests in cliffs and escarpments or tall trees; forages in annual grasslands, chaparral, or oak woodlands that provide abundant medium and large-sized mammals for prey	High—species is known to occur in the APWRA and suitable foraging habitat is present within the study area; the study area does not provide suitable nesting habitat
Buteo swainsoni Swainson's hawk	–/T	Lower Sacramento and San Joaquin Valleys, Klamath Basin, and Butte Valley; highest nesting densities occur near Davis and Woodland, Yolo County	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grain fields	High—species is known to occur in the APWRA and is likely to forage in the study area; no suitable nesting habitat is present in the study area
Circus cyaneus Northern harrier	–/SSC	Throughout lowland California; has been recorded in fall at high elevations	Grasslands, meadows, marshes, and seasonal and agricultural wetlands providing tall cover	High—species is known to occur in the APWRA; suitable nesting and foraging habitat is present throughout the study area
Elanus leucurus White-tailed kite	–/FP	Lowland areas west of Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills to western San Diego County at the Mexico border	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands for foraging	High— species is known to occur in the APWRA and is likely to forage in the study area; no suitable nesting habitat is present in the study area

Scientific and Common Names	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area
Falco peregrinus anatum American peregrine falcon	D/D	Permanent resident of the north and south Coast Ranges; may summer on the Cascade and Klamath Ranges south through the Sierra Nevada to Madera County; winters in the Central Valley south through the Transverse and Peninsular Ranges and the plains east of the Cascade Range	Nests and roosts on protected ledges of high cliffs, usually adjacent to lakes, rivers, or marshes that support large populations of other bird species	Low—potential winter migrant; foraging areas limited and no suitable nesting habitat is present
Athene cunicularia Burrowing owl	–/SSC	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas; rare along south coast	Level, open, dry, heavily grazed or low stature grassland or desert vegetation with available burrows	High—species was observed in the study area during August 2012 surveys and suitable nesting and foraging habitat is present throughout the study area
Lanius ludovicianus Loggerhead shrike	–/SSC	Resident and winter visitor in lowlands and foothills throughout California; rare on coastal slope north of Mendocino County, occurring only in winter	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches; nests in densely foliaged trees or shrubs	High—species was observed in the study area during August 2012 surveys and suitable foraging habitat is present; nesting habitat is limited to scattered shrubs or small trees near farm areas
Melospiza melodia pusillula Alameda song sparrow	–/SSC	Species is found along the edges of San Francisco Bay	Occurs in salt marshes along San Francisco Bay	Low—potential migrant but no suitable habitat is present within the study area
Agelaius tricolor Tricolored blackbird	–/SSC	Permanent resident in the Central Valley from Butte County to Kern County; breeds at scattered coastal locations from Marin County south to San Diego County and at scattered locations in Lake, Sonoma, and Solano Counties; rare nester in Siskiyou, Modoc, and Lassen Counties	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grain fields; habitat must be large enough to support 50 pairs; probably requires water at or near the nesting colony	Moderate—species could forage in grasslands in the study area; no suitable nesting habitat is present

Sources: Moyle 2002; California Department of Fish and Game2012, 2013.

Notes:

Status explanations:

Federal

E = listed as endangered under the ESA.

T = listed as threatened under the ESA.

PT = proposed for federal listing as threatened under the ESA.

C = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.

D = delisted.

– = no listing.

State

E = listed as endangered under CESA.

T = listed as threatened under CESA.

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

SSC = species of special concern in California.

D = delisted.

– = no listing.

Potential Occurrence in the Study Area

High: Known occurrences of the species within the study area, or CNDDB, or other documents, records the occurrence of the species within a 10-mile radius of the study area; suitable habitat is present within the study area.

Moderate: CNDDB, or other documents, records the known occurrence of the species within a 10-mile radius of the study area; poor quality suitable habitat is present within the study area.

Low: CNDDB, or other documents, does not record the occurrence of the species within a 10-mile radius of the study area; suitable habitat is present within the study area.

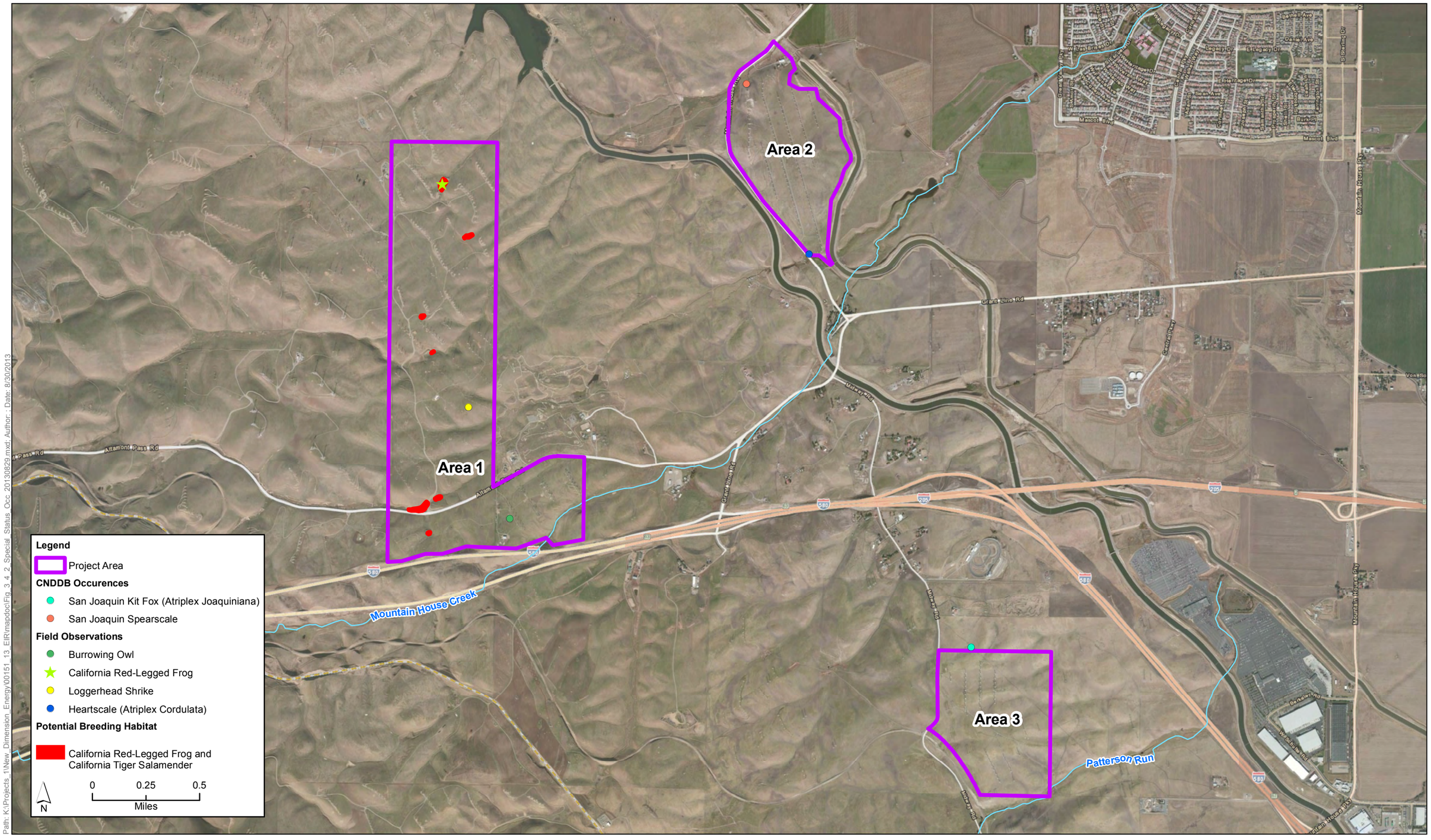

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Figure 3.4-2
Special-Status Species Occurrences and Suitable Breeding Habitat for California Red-Legged Frog and California Tiger Salamander

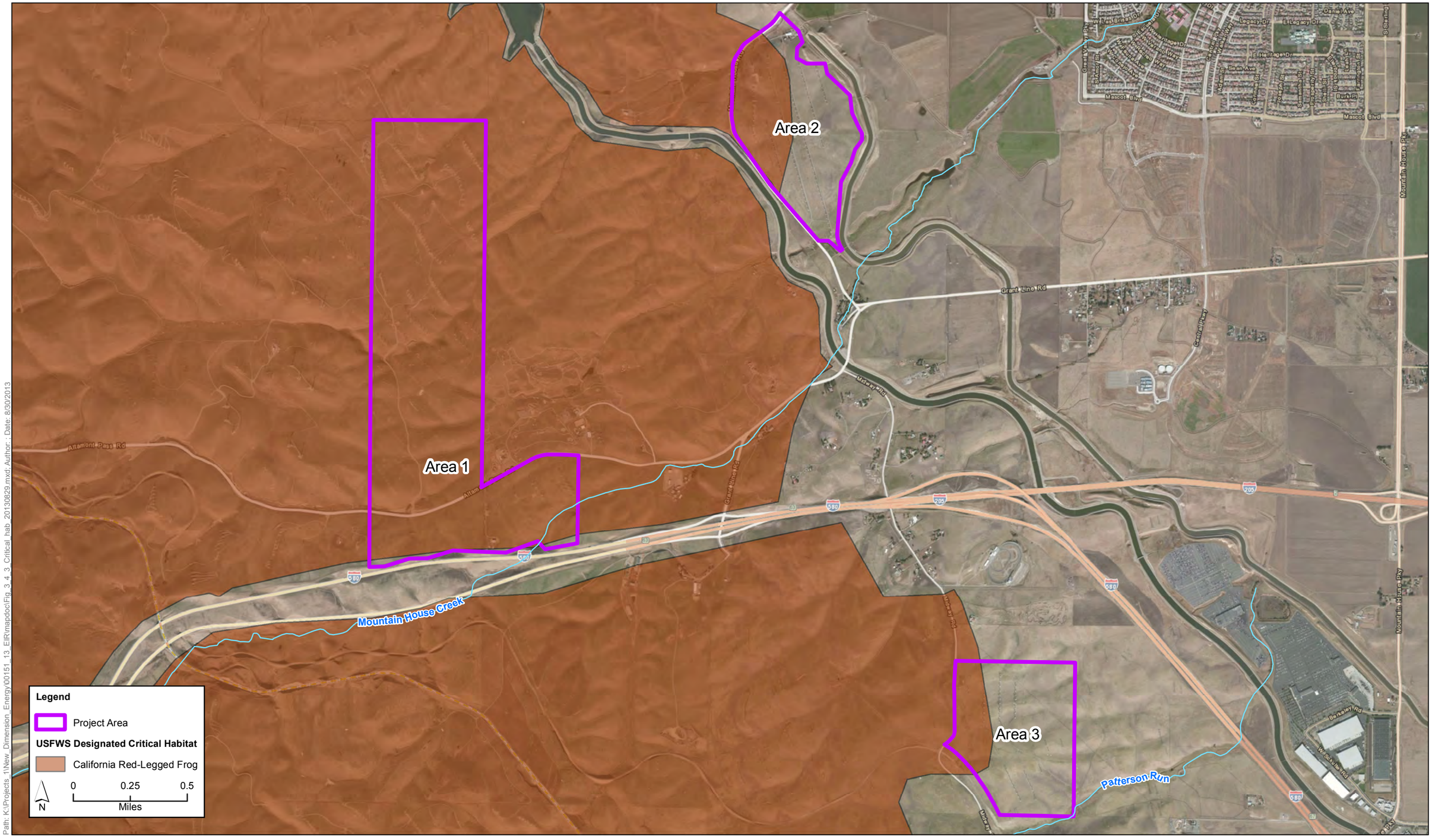

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Figure 3.4-3
Critical Habitat

Adult California tiger salamanders move from subterranean burrow sites to breeding pools during November–February after warm late fall and winter rains. Eggs are laid in January–February, at the height of the rainy season. About 9–12 weeks are needed to complete development through metamorphosis. During winter, California tiger salamanders take refuge in damp places near the surface of the ground during the day and emerge at night to forage.

Potential California tiger salamander aquatic breeding habitat in the project area is limited to several ponds within Area 1 (Figure 3.4-2) and suitable upland habitat is present throughout the project area. Additionally, there are at least 25 potential breeding ponds within 1.24 mile of the project area (ICF International 2012).

California Red-Legged Frog

California red-legged frog is a California species of special concern and is federally listed as threatened under the ESA. The current range of California red-legged frog consists of isolated locations in the Sierra Nevada, throughout the northern Coast Ranges, and in the northern Transverse Ranges.

California red-legged frogs use a variety of habitats, including various aquatic systems and riparian and upland habitats. The species inhabits marshes, streams, lakes, ponds, and other usually permanent sources of water (Stebbins 2003). Juvenile frogs seem to favor open, shallow aquatic habitats with dense submergent vegetation. As adults, California red-legged frogs are highly aquatic when active but depend less on permanent water bodies than other frog species, such as bullfrogs (*Lithobates catesbeianus*). Adults may take refuge during dry periods in rodent burrows or leaf litter in riparian habitats. Although California red-legged frogs typically remain near streams or ponds, marked and radio-tagged frogs have been observed moving more than 2 miles through upland habitat with no apparent regard to topography. These movements are typically made during wet weather and at night (U.S. Fish and Wildlife Service 2002).

California red-legged frogs typically breed from late November to late April. Female frogs lay between 2,000 and 6,000 eggs around aquatic vegetation; these hatch in 6–14 days (Jennings and Hayes 1994). Larvae require 11–20 weeks to metamorphose into adult frogs (U.S. Fish and Wildlife Service 2002). Juvenile frogs are active diurnally and nocturnally, whereas adult frogs are largely nocturnal. Feeding activity most commonly occurs along the shoreline and on the surface of the water (U.S. Fish and Wildlife Service 2002).

Potential California red-legged frog aquatic breeding habitat in the project area is limited to several ponds within Area 1 (Figure 3.4-2), and suitable upland dispersal and foraging habitat is present throughout the project area. One California red-legged frog was observed within a pond in the southern portion of Area 1 (Figure 3.4-2) at the time of the August 2012 site assessment survey. Additionally, there are at least 25 potential breeding ponds within 1.24 mile of the project area (ICF International 2012). The study area partially overlaps with designated critical habitat for California red-legged frog (75 FR 12815, March 17, 2012) (Figure 3.4-3).

Pacific Pond Turtle

Pacific pond turtle is a California species of special concern. The species occurs in a wide range of both permanent and intermittent aquatic environments (Jennings et al. 1992), inhabiting the quiet waters of ponds, reservoirs, marshes, or streams with rocky or muddy bottoms and vegetative cover (Stebbins 2003). Pacific pond turtles occasionally leave the water to bask, and females leave the

water from May through July to lay eggs. These turtles can often be found sunning on emergent logs or rocks near the water's edge but quickly retreat to the water when disturbed (Stebbins 1954). They move up to 1,300 feet or more to upland areas adjacent to watercourses to deposit eggs and in cold climates to overwinter (Jennings and Hayes 1994).

Pacific pond turtles have not been previously documented in the study area and were not observed during 2012 and 2013 field surveys conducted for the Initial and Full Repower. The closest known occurrence is approximately 0.7 mile downstream from a drainage at the south end of Area 2 of the study area (California Department of Fish and Wildlife 2013c). Suitable aquatic habitat is limited in the study area because most of the stock ponds lack emergent vegetation and potential basking sites. Where suitable habitat conditions are present (ponded water, emergent vegetation, basking areas) ephemeral drainages and associated alkali grasslands in the study area could support Pacific pond turtles. Upland grasslands adjacent to aquatic sites could also be used as nesting and overwintering sites.

San Joaquin Coachwhip

The San Joaquin coachwhip (whipsnake) is a California species of special concern and has a known range extending from Colusa County in the Sacramento Valley, south Kern County in the San Joaquin Valley, and west to the inner South Coast Ranges. An isolated population occurs in the Sutter Buttes. The taxon is known to occur from 65 to 2,950 feet above sea level. San Joaquin coachwhip lives in open, dry vegetative associations with little or no tree cover. In the western San Joaquin Valley, it inhabits grassland and saltbush scrub associations, and is known to climb bushes such as saltbush to view prey and predators. Mammal burrows are used by San Joaquin coachwhips for refuge and likely as oviposition sites. Coachwhip subspecies will not emerge from burrows until near-surface temperatures reach 28°C on either a daily or seasonal basis. For this reason, emergence tends to be late in the season (April to early May) and later in the morning (10 to 11 a.m.), although younger individuals may emerge earlier in the day. The subspecies primarily eats lizards and robs the nests of birds and mammals, but may also eat carrion. Land conversion from grassland and grassland/scrub habitat to agriculture has removed habitat and eliminated the food base and mammal burrow associations on which the coachwhip depends for refuge. Urban development and drought have also been implicated in the depletion and fragmentation of San Joaquin coachwhip populations (Jennings and Hayes 1994:162–164).

Annual grassland in the project area provides suitable habitat for San Joaquin coachwhip. There is one CNDDB occurrence of San Joaquin coachwhip along Midway Road adjacent to the southern boundary of the southern parcel (California Department of Fish and Wildlife 2013c).

Blainville's Horned Lizard

Blainville's (Coast) horned lizard is a California species of special concern. Although fragmented, the range of Blainville's horned lizard generally extends along the Pacific coast from the Baja California border west of the deserts and the Sierra Nevada, north to the Bay Area, and inland as far north as Shasta Reservoir, and south into Baja California. It also occurs on the Kern Plateau east of the crest of the Sierra Nevada (California Herps 2013). The species occurs between sea level and an elevation of 8,000 feet (Stebbins 2003:301).

Blainville's horned lizard occupies a variety of habitats, including areas with an exposed gravelly-sandy substrate supporting scattered shrubs, chamise chaparral, annual grassland (Jennings and Hayes 1994:132), broadleaf woodland, and conifer forest (Stebbins 2003:300). It is most common in lowlands along sandy washes with scattered shrubs for cover. Habitat requirements include open areas for basking, patches of fine, loose soil where it can bury itself, and ants and other insect prey

(Stebbins 2003:300–301). For extended periods of inactivity or hibernation, these lizards occupy small mammal burrows or burrow into loose soils under surface objects (Zeiner et al. 1988:148). Blainville's horned lizards have been observed to be active between April and October, and hatchlings first appear in July and August (Jennings and Hayes 1994:130).

Portions of grassland in the project area provide suitable habitat for Blainville's horned lizard. These lizards also utilize chaparral and oak woodland in the project vicinity. There are three occurrences of Blainville's horned lizard in the southeast portion of the project area, and additional occurrences outside of the project area (California Department of Fish and Wildlife 2013c).

The CNDDB lists two occurrences within 3 miles of the project area. Annual grassland in the project area represents potential habitat for Blainville's horned lizard; however, loose sandy soils are not common in the project area. Two previously documented occurrences of this species are located 0.32 and 1.70 miles northeast and southeast from the southern parcels (California Department of Fish and Wildlife 2013c).

Western Burrowing Owl

Western burrowing owl is a California species of special concern. Western burrowing owl is a year-round resident in the Central Valley, San Francisco Bay region, Carrizo Plain, and Imperial Valley. It occurs primarily in grassland habitats but may also occur in landscapes that are highly altered by human activity. Suitable habitat must contain burrows with relatively short vegetation and minimal shrubs or taller vegetation. Western burrowing owl may also occur in agricultural areas along roads, canals, ditches, and drains. They most commonly nest and roost in California ground squirrel burrows, but may also use burrows dug by other species, as well as culverts, piles of concrete rubble, and pipes. The breeding season is March to August, but can begin as early as February. During the breeding season, owls forage near their burrows but have been recorded hunting up to 1.7 miles away. Rodent populations, particularly California vole populations, may greatly influence survival and reproductive success of California burrowing owls (Shuford and Gardali 2008:219, 221). There are numerous documented occurrences of western burrowing owls in the project region, including several occurrences adjacent to the project area (California Department of Fish and Wildlife 2013c). A burrowing owl was observed during the August 2012 field surveys (ICF International 2012) south of Altamont Pass Road in the study area (Figure 3.4-2), and in several other locations within the project area during field surveys for the Avian Validation Study (Smallwood 2013).

Loggerhead Shrike

Loggerhead shrike is a California species of special concern. It is widespread in North America, occurring from the southern Canadian provinces south across most of the United States and into Mexico. In California, loggerhead shrikes occur in open habitats with scattered shrubs, trees, posts, fences, utility lines, and other perches. Habitats include valley foothill forests, pinyon-juniper, desert riparian, and Joshua tree. Loggerhead shrikes are adaptable to urban environments as long as preferred habitat characteristics and abundant prey supplies are present (Yosef 1996). Foraging habitat and limited nesting habitat is present throughout the study area. A loggerhead shrike was observed flying though the study area during field surveys conducted in August 2012 (Figure 3.4-2). The species was detected within the project area during fatality surveys between 1998 and 2009 but was not detected during 2012 fatalities surveys (Smallwood 2013).

Bald Eagle

Bald eagle is a state endangered species and is protected by the MBTA, the BGEPA, and several sections of the California Fish and Game Code. Bald eagle is a permanent resident and uncommon winter migrant in California (Zeiner et al. 1990a:122). The species breeds at coastal areas, rivers, lakes, and reservoirs with forested shorelines or cliffs in northern California. Wintering bald eagles are associated with aquatic areas containing some open water for foraging. Bald eagles nest in trees in mature and old growth forests that have some habitat edge and are somewhat close (within 1.25 miles) to water with suitable foraging opportunities. Although nests can be closer, the average distance of bald eagle nests to human development and disturbance is more than 1,640 feet (Buehler 2000:6). The breeding season is February through July (Zeiner et al. 1990a:122).

Suitable nesting habitat for bald eagle is not present in the study area, but bald eagle may forage in or fly through the area during seasonal movements. There are no CNDDB occurrences of bald eagles in the study area (California Department of Fish and Game 2013c) and no bald eagle fatalities were detected during 8 years of fatality studies conducted within the project area between 1998 and 2009 or during 2012 fatality surveys (Smallwood 2013). Additionally, no bald eagle fatalities were reported within the overall APWRA during fatality surveys conducted by the MT between 2005 and 2012 (ICF International 2013).

Golden Eagle

Golden eagle is a California species of special concern and a fully protected species under the California Fish and Game Code and BGEPA. Golden eagle is predominately a western North American species ranging from northern Alaska through the western states and Great Plains to Mexico, with some breeding and wintering locations in eastern North America (Kochert et al. 2002). Within California, the golden eagle is a year-round resident generally inhabiting mountainous and hilly terrain throughout the open areas of the state.

Golden eagles use nearly all terrestrial habitats of the western states except densely forested areas. In the interior central Coast Ranges, golden eagles favor open grasslands and oak savanna, with smaller numbers in oak woodland and open shrublands (Hunt et al. 1998). Secluded cliffs with overhanging ledges and large trees are used for nesting and cover. Preferred territories have a favorable nest site, a dependable food supply (medium to large mammals and birds), and broad expanses of open country for foraging. Hilly or mountainous country where takeoff and soaring are supported by updrafts is generally preferred to flat habitats (Johnsgard 1990). Deeply cut canyons rising to open mountain slopes and crags are ideal habitat (Kochert et al. 2002).

Suitable nesting habitat for golden eagle is not present in the study area, but golden eagle may forage in or fly through the area during seasonal movements. There are no CNDDB occurrences of nesting golden eagles in the study area (California Department of Fish and Game 2013c). Golden eagle is known to be susceptible to turbine collisions, including the turbines within the project area. A review of the MT data from 2005–2011 (bird years) for the *base layers of operating group boundaries* (BLOBs) that overlap with the project area indicates that fatalities occurred in 2006, 2008, and 2010. The average fatality rate (adjusted) for these BLOBs is approximately 0.183 golden eagles/MW/year. No golden eagle fatalities were detected during the 2012 fatality surveys (Smallwood 2013).

Northern Harrier

Northern harrier is a California species of special concern. Northern harrier is a year-round resident throughout the Central Valley and is often associated with open grassland habitats and agricultural fields. Nests are found on the ground in tall, dense herbaceous vegetation (MacWhirter and Bildstein 1996). Northern harrier nests from April to September, with peak activity in June and July. The breeding population has been reduced, particularly along the southern coast, because of the destruction of wetland habitat, native grassland, and moist meadows and from the burning and plowing of nesting areas during early stages of breeding (Zeiner et al. 1990a:124).

Suitable nesting and foraging habitat for northern harrier is present in the study area. Northern harrier is known to occur in the project region and one northern harrier fatality was detected during 8 years of fatality studies conducted within the project area between 1998 and 2009 (Smallwood 2013). No fatalities of Northern harrier were recorded during the Avian Study (Smallwood 2013).

Swainson's Hawk

Swainson's hawk is a state-listed threatened species. Swainson's hawks forage in grasslands, grazed pastures, alfalfa and other hay crops, and certain grain and row croplands. Vineyards, orchards, rice, and cotton crops are generally unsuitable for foraging because of the density of the vegetation (California Department of Fish and Game 1992:41). The majority of Swainson's hawks winter in South America, although some winter in the United States. Swainson's hawks arrive in California in early March to establish nesting territories and breed (California Department of Fish and Game 1994). They usually nest in large, mature trees. Most nest sites (87 percent) in the Central Valley are found in riparian habitats (Estep 1989:35), primarily because trees are more available there. Swainson's hawks also nest in mature roadside trees and in isolated trees in agricultural fields or pastures. The breeding season is from March through August (Estep 1989:12, 35).

Suitable nesting habitat for Swainson's hawk is not present in the study area, but the species may forage in or fly through the area during migration. There are no CNDDB occurrences of Swainson's hawk in the study area. The closest historic nest site is 2.2 miles northeast from the study area (California Department of Fish and Game 2013c). No Swainson's hawk fatalities were detected during 8 years of fatality studies conducted within the project area between 1998 and 2009 or during 2012 fatality surveys (Smallwood 2013).

White-Tailed Kite

White-tailed kite is fully protected under the California Fish and Game Code. White-tailed kites generally inhabit low-elevation grassland, savannah, oak woodland, wetlands, agricultural, and riparian habitats. Some large shrubs or trees are required for nesting and for communal roosting sites. Nest trees range from small, isolated shrubs and trees to trees in relatively large stands (Dunk 1995). White-tailed kites make nests of loosely piled sticks and twigs, lined with grass and straw, near the top of dense oaks, willows, and other tree stands. The breeding season lasts from February through October and peaks between May and August. They forage in undisturbed, open grassland, meadows, farmland, and emergent wetlands (Zeiner et al. 1990a:120).

Suitable nesting habitat for white-tailed kite is not present in the study area, but the species may forage in or fly through the area during seasonal movements. There are no CNDDB occurrences of white-tailed kite in the study area but the closest historic nest site is 0.3 mile north from the study

area (California Department of Fish and Game 2013c). No white-tailed kite fatalities were detected during 8 years of fatality studies conducted within the project area between 1998 and 2009 or during 2012 fatality surveys (Smallwood 2013).

American Badger

American badger is a California species of special concern. In California, American badgers occur throughout the state except in humid coastal forests of northwestern California in Del Norte and Humboldt Counties. American badgers occur in a wide variety of open, arid habitats but most commonly are associated with grasslands, savannas, and mountain meadows. They require sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground (Williams 1986:66–67). Badgers dig burrows, which are used for cover and reproduction. The species mates in summer and early autumn, and young are born in March and early April (Zeiner et al. 1990b:312).

Suitable denning and foraging habitat for American badger is present within annual grasslands in the study area. There are several occurrences of badgers near the study area (California Department of Fish and Wildlife 2013c). Based on the presence of suitable habitat and known occurrences within similar habitats in the project region, this species has potential to occur in the project area.

San Joaquin Kit Fox

The San Joaquin kit fox is state- and federally listed as endangered. San Joaquin kit foxes occur in some areas of suitable habitat on the floor of the San Joaquin Valley and in the surrounding foothills of the Coast Ranges, Sierra Nevada, and Tehachapi Mountains from Kern County north to Contra Costa, Alameda, and San Joaquin Counties (U.S. Fish and Wildlife Service 1998). Since 1998, the population structure has become more fragmented, with some resident satellite populations having been locally extirpated, and frequented by dispersing kit foxes rather than resident animals (U.S. Fish and Wildlife Service 2010:15). The largest extant populations of kit fox are in Kern County (Elk Hills and Buena Vista Valley) and San Luis Obispo County in the Carrizo Plain Natural Area (U.S. Fish and Wildlife Service 1998).

Natural habitats for San Joaquin kit fox include alkali sink, alkali flat, and grasslands. San Joaquin kit foxes may use agricultural lands such as row crops, orchards, and vineyards to a limited extent but kit foxes are unable to occupy farmland on a long-term basis (U.S. Fish and Wildlife Service 2010:19–21.) San Joaquin kit foxes usually prefer areas with loose-textured soils suitable for den excavation (Orloff et al. 1986:62) but are found on virtually every soil type (U. S. Fish and Wildlife Service 1998:129). Where soils make digging difficult, kit foxes may enlarge or modify burrows built by other animals, particularly those of California ground squirrels (Orloff et al. 1986:63; U.S. Fish and Wildlife Service 1998:127). Structures such as culverts, abandoned pipelines, and well casings may also be used as den sites (U. S. Fish and Wildlife Service 1998:127).

The breeding season begins during September and October when adult females begin to clean and enlarge natal or pupping dens. Mating and conception occur between late December and March, and litters of two to six pups are born between late February and late March (U.S. Fish and Wildlife Service 1998:126).

Suitable denning and foraging habitat for San Joaquin kit fox is present in the study area. San Joaquin kit foxes have not been detected in the vicinity of the study area in many years; however, there is a historic occurrence from 1986 documented within the southern parcel (California Department of Fish and Wildlife 2013c) (Figure 3.4-2). Given the lack of recent sightings in the project region, the overall potential for this species to occur in the project area is low.

Wind Turbine Effects on Avian Species

Background

In order to provide some context to assess the existing conditions related to avian and bat species for the Initial and Full Repower, it is necessary to describe the existing setting of turbines in the APWRA.

The older-generation turbines in the APWRA are arrayed in strings along ridgelines and other geographic features. The turbine string is the basic sampling unit in the current monitoring program being implemented by Alameda County (ICF International 2013b). The turbines in the APWRA were not installed all at once; rather, they were brought online in a series of projects (or individual conditional use permits) beginning in the 1960s and continuing into the 1980s. The turbine projects that were installed under separate permits typically share a common turbine type, geographic location, and owner/operator and are commonly referred to as operating groups. These operating groups were later refined into 29 BLOBs by the MT and the SRC to provide a basis for stratification across the various turbine types, topographies, and geographies of the APWRA.

At least 13 different turbine types have been installed in the APWRA since the first project was built in 1966. These turbine types vary widely in *rated capacity* (defined as the amount of power a turbine can produce at its rated wind speed), height, configuration, tower type, blade length, tip speed, and other characteristics (Table 1-1). The turbines also differ in their geographic distribution and relative concentration. The number of turbines in operation varies over time as a result of mechanical breakdowns, maintenance, seasonal and weather-related shutdowns, and attrition of turbines. Turbine operations have been reduced and modified under the conditions of approval for the CUPs issued in 2005 and were modified again under the Settlement Agreement in 2007, to shut down all turbine operations in the APWRA during the winter season bird migration period, and to remove numerous individual turbines identified as particularly hazardous to birds. Additionally, some repowering has occurred – the replacement of the old, smaller turbines with newer and larger turbines (both in size and rated capacity). Information provided by power companies with wind projects in the APWRA indicates that the total *installed capacity*—defined as the sum of the rated capacities of all of the extant (i.e., not removed) turbines each year—in the APWRA has changed significantly over time, dropping from a high of 525 MW in 2006 to a low of 442 MW in the 2010 bird year, and increasing to 454 MW in the 2011 bird year with the recent repowering of the Vasco Winds facility (ICF International 2013b). Installed capacity and bird monitoring years are essential concepts in the analysis of avian impacts, because avian fatality rates have been expressed and calculated by researchers and monitoring teams as a given number of bird deaths per MW per year.

Existing Avian Interactions with Turbines

Monitoring conducted in the APWRA indicates that the APWRA supports a broad diversity of resident, migratory, and wintering bird species that regularly move through the wind turbine area (Orloff and Flannery 1992). In particular, diurnal raptors (eagles and hawks) use the prevailing winds and updrafts for soaring and gliding during daily travel, foraging, and migration. Birds passing through the rotor plane of operating wind turbines are at risk of being injured or killed. Multiple studies of avian fatality in the APWRA show that substantial numbers of golden eagles, red-tailed hawks, American kestrels, burrowing owls, barn owls, and a diverse mix of non-raptor species are killed each year in turbine-related incidents (Howell and DiDonato 1991; Orloff and Flannery 1992; Howell 1997; Smallwood and Thelander 2004). Concerns over the number of birds killed annually in turbine-related incidents have led to significant controversy.

The recent MT report (ICF International 2013) and CEC/PIER study (Smallwood 2013) provide recent avian study information. The MT report covers bird years 2005–2011 and includes adjusted fatalities (birds/MW/year) for each BLOB, for the four focal species, individually and as a group. Additionally, the report provides adjusted fatality rates for individual species, and summaries for all raptors and all birds for the entire APWRA. The report provides estimated bird use rates by BLOB for the four focal species. The Initial Repower is located within all or portions of five BLOBs (9, 16, 17, 18, 22). The existing turbines within BLOB 18 were not monitored in the fatality study because they were not part of the sampling design (ICF International 2013). The Avian Validation Study focuses on mortality monitoring and behavioral surveys solely at 60 clusters of high risk turbines within the project area (i.e., turbines identified as having disproportional levels of avian fatalities when compared to other APWRA turbines). Because the Avian Validation Study conducts more frequent mortality surveys only on high-risk turbines in the project area, the resulting fatality rates are representative of existing conditions for the Initial Repower (which would install 40 FloDesign turbines within high-risk clusters only), but are not representative of existing conditions for the Full Repower, which includes both low- and high-risk turbines across the entire project area. Table 3.4-3 summarizes the avian data available from these two studies.

Table 3.4-3. Adjusted Fatality Rates and Estimated Bird Use at the APWRA and at the Sand Hill Facility

	Adjusted Rate of Fatalities (fatalities/MW/year)			Estimated Bird Use (observations/minute/km^3)	
Species or Group	Sand Hill BLOBs[a]	Smallwood (2013)[b]	APWRA-Wide[c]	Sand Hill BLOBs[d]	APRWA-Wide[c]
American kestrel	0.55	0.56	0.54	0.33	–
Burrowing owl	1.88	3.13	0.72	1.14	–
Golden eagle	0.06	0.00	0.08	0.03	–
Red-tailed hawk	0.63	0.19	0.41	0.25	–
Total focal species	3.12	3.88	1.74	1.75	–
Turkey vulture	–	–	0.01	–	–
White-tailed kite	–	–	0.01	–	–
Northern harrier	–	–	0.01	–	–
Red-shouldered hawk	–	–	0.00	–	–
Swainson's hawk	–	–	0.00	–	–
Ferruginous hawk	–	0.18	0.00	–	–
Unidentified buteo	–	–	0.01	–	–
Peregrine falcon	–	–	0.00	–	–
Prairie falcon	–	–	0.02	–	–
Barn owl	–	0.27	0.21	–	–
Great-horned owl	–	0.11	0.05	–	–
Total all raptors	–	4.44	2.07	–	–
Total all birds	–	–	11.17	–	–

[a] Average rates from ICF International (2013b) for BLOBs 9, 16, 17, and 22 for 2005–2011 bird years.

[b] Includes *high-risk* turbines only (Smallwood 2013).

[c] Average rates from ICF International (2013b) for 2005–2011 bird years.

[d] Average rates from ICF International (2013b) for BLOBs 9, 16, 17,18, and 22 for 2005–2011 bird years.

Hyphens in table 3.4-3 indicate that data on fatalities/observations of these species was not available or no fatalities/observations were recorded in the studies

Bat Species

The APWRA supports maternity, foraging, and migration habitat for special-status and common bats. Several of these species are susceptible to direct mortality through collision or other interactions with wind turbines. Studies at wind energy facilities in North America generally show a strong seasonal and species-composition pattern to bat fatalities, with the bulk of fatalities consisting of migratory species and occurring in late summer to mid-autumn.

Five species of bat have been documented in the APWRA: little brown bat, California myotis, western red bat, hoary bat, and Mexican free-tailed bat (Table 3.4-4) (Insignia Environmental 2012:47–48; ICF International 2013:3–3). Historically, the number of bat fatalities detected as part of the avian fatality monitoring program at old-generation turbines at the APWRA has been extremely low. A review of fatality data collected by the MT over a period of 7 years (2005–2010) indicates that bat fatalities have been detected, but occur at a rate of approximately 2–4 individual bats per year, with a total of 22 bat fatalities detected during that period (ICF International 2013b). As in other parts of North America, the majority of documented fatalities in the APWRA have occurred during the fall migration season and have consisted of migratory bat species. Hoary bats and Mexican free-tailed bats have made up the majority of the fatalities; western red bat, another migratory species and a California species of special concern, has suffered the third highest fatalities.

Table 3.4-4. Unadjusted Bat Fatalities by Species Detected in Standardized Searches at Various APWRA Monitoring Projects

Species	2005	2006	2007	2008	2009	2010	2011	Total
APWRA Monitoring (Variable: up to 417 MW installed, turbine heights of 60–164 feet)								
Hoary bat	0	2	1	0	2	0	0	5
Mexican free-tailed bat	0	1	1	1	1	0	0	4
Western red bat	0	1	1	1	0	0	0	3
Little brown bat	0	0	0	0	1	1	0	2
Unidentified bat	0	2	1	1	1	2	1	8
Total bats	0	6	4	3	5	3	1	22
Buena Vista Repowering Project (38 MW installed, turbine heights of 147–196 feet)								
Hoary bat				1	5	3	-	9
Mexican free-tailed bat				0	1	2	-	3
California myotis				0	0	1	-	1
Total bats				1	6	6	-	13
Sources: APWRA: ICF International 2013:3-3; Buena Vista: Insignia Environmental 2012:47-8								

Other than fatality records, occurrence data for bat species in the APWRA are limited, and expectations of presence are generally based on known ranges and habitat associations. However, preliminary analysis from preconstruction acoustic surveys conducted in 2010 at the relatively nearby Vasco Winds repower site in the Contra Costa County portion of the APWRA documented the presence of several species, and noted bat activity in all three seasons in which surveys were conducted, with a spike in the fall. The majority of acoustic records reflected Mexican free-tailed bat and hoary bat (Contra Costa County 2010:Appendix C C-7-10) .

Given the low (albeit unadjusted) numbers of reported fatalities, bats do not appear to be at significant risk, at least from old-generation wind turbines in the APWRA. The resulting focus of the County to date has therefore been on the quantification and reduction of avian fatalities.

3.4.2 Environmental Impacts

This section describes the methods and assumptions used to determine the direct and indirect impacts of the Initial and Full Repower phases on biological resources and identifies the criteria used to conclude whether an impact would be significant. The general methods for analysis are followed by discussions of the methods to evaluate and determine avian and bat fatality impacts. The thresholds used to conclude whether an impact would be significant are listed after the three methodology discussions. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion, where appropriate.

Analysis Methods

This biological impact analysis is based on professional standards and information cited throughout the section. The key effects were identified and evaluated qualitatively and quantitatively based on the environmental characteristics of the study area and the magnitude, intensity, and duration of activities related to the activities associated with the Initial and Full Repower phases (i.e., decommissioning, construction, and operation).

For decommissioning the existing facilities and construction of the Initial Repower, the potential for direct and indirect impacts on sensitive biological resources (i.e., special-status species, waters of the United States, waters of the State, and sensitive natural communities) was qualitatively evaluated based on the species or habitats known to occur within the project area. For decommissioning the remaining existing facilities, and construction of the Full Repower, the design and timing of those activities is unknown. While the Full Repower is expected to occur in the future, the location of turbines and other facilities is unknown because the Full Repower has not been designed yet, pending the outcome of the Avian Validation Study. Therefore, a programmatic-level analysis was conducted for impacts on biological resources associated with the Full Repower activities.

As discussed in Chapter 2, *Project Description*, a key factor when evaluating the effects of a project is the identification of baseline conditions. State CEQA Guidelines Section 15125 authorizes the lead agency to choose a baseline that most accurately reflects actual conditions, in cases where choosing the existing physical conditions at a single point in time would be misleading or misrepresent the potential impacts of the Initial and Full Repower phases, the baseline may be an average of conditions over a period of time (see *Communities for a Better Environment v. South Coast Air Quality Management District* (2010) 48 Cal.4th 310). For terrestrial species, as for most resource topics in this document, the County has determined that the baseline is most accurately represented by the physical conditions that existed at the time the NOP was published for the project (March 6, 2013).

The County determined not to use the physical conditions that existed at the time the NOP was published for the evaluation of potential impacts on avian and bat species. Using conditions that were present at the time of NOP publication (March 2013), could result in a misleading baseline because avian and bat fatality rates are known to vary over time (ICF International 2013). Instead, for this analysis, two baselines are employed – one for the Initial Repower and one for the Full Repower.

The baseline fatality rates for avian and bat species for the Initial Repower were primarily determined using the Avian Validation Study (Smallwood 2013). Although the study program currently provides only one year of data (from bird year 2011-12), it is the best available information specific to the project area and best serves to evaluate achievement of the goals of the Initial Repower (i.e., to demonstrate reductions in avian fatalities). The Avian Validation Study fatality surveys focus solely on 60 high-risk turbine clusters, including those in which the 40 Initial Repower turbines would be located. Because the 40 turbines would be placed only in high-risk locations, a baseline of comparison using the Avian Validation Study fatality rates would provide the most effective means of identifying how the new FloDesign shrouded turbine technology will affect fatality rates. Some species, including golden eagle, had no reported fatalities during the 1st year of the Avian Validation Study, but are known to be at risk from the existing turbines, and fatalities have been reported for this species in the past. Thus, the existing fatality rates from the MT must be included for golden eagle, because considering only the Avian Validation Study rate (zero) would not accurately represent the true risk to this species. Therefore, the baseline for avian and bat impacts for the Initial Repower is based on the Avian Validation Study, with the addition of golden eagle fatality rates from the MT.

The baseline fatality rates for the Full Repower are based on the existing fatality rates from the MT. The Full Repower would replace turbines in both high and lower risk areas. Therefore, the Avian Validation Study fatality rates, which are based solely on high-risk turbines, would not be entirely representative of the baseline rates expected for the Full Repower turbines. The Full Repower avian baseline is therefore based on the MT survey results from all of the project area BLOBs (9, 16, 17, 18, and 22) as an averaged value for 2005 through 2011 (bird years) to ensure an accurate frame of comparison against all existing turbines.

Impact Assumptions

Impacts on biological resources are based on the following assumptions about the Initial Repower and Full Repower phases.

- Initial Repower activities, including decommissioning and construction are expected to occur over a 6- to 9-month period.
- All ground disturbing activities would occur during dry weather.
- All impacts associated with decommissioning activities would be temporary.
- Excavation required to remove foundations of old turbines next to proposed new turbines would occur within the disturbance footprint of the proposed turbine.
- Removal of turbines that do not occur next to a proposed turbine would only have surface ground disturbance and would not require any excavation because foundations would remain in place.
- All equipment staging, materials storage, and vehicle parking would occur within one of the four designated staging areas, within the limits of construction for each turbine site, or on existing access roads.
- No new access roads, substation facilities, or operations and maintenance facilities would be required for Initial Repower.
- No new access roads or substation facilities would be required for Full Repower; however, a O&M building would be constructed on a 1-acre parcel within the project area.

- The widening of existing access roads is required on most roads and would be considered a permanent loss of upland habitat for terrestrial species.
- No suitable habitat for special-status fish species (including green sturgeon [*Acipenser medirostris*], Delta smelt [*Hypomesus transpacificus*], central California coastal steelhead Distinct Population Segment [DPS] [*Oncorhynchus mykiss*], and Central Valley steelhead DPS [*Oncorhynchus mykiss*] or designated critical habitat for these species occurs in the study area. Therefore, potential impacts on fish species and critical habitat are not discussed in this impact analysis.
- Avian fatalities are directly proportional to the operational period of wind turbines, calculated as the cumulative installed generation capacity.

Impact Mechanisms

Biological resources could be directly or indirectly affected during decommissioning and reclamation activities associated with the Initial Repower and Full Repower phases. Impacts on biological resources fall into the three categories: temporary, short-term, and long-term.

- A *temporary* impact would occur only during decommissioning or subsequent restoration.
- A *short-term* impact would last from the time decommissioning ceases to 3 years after decommissioning or subsequent restoration.
- A *long-term* impact would last longer than 3 years after decommissioning or subsequent restoration. In some cases, a long-term impact could be considered a permanent impact.

Some activities that could cause impacts on biological resources are listed below.

- Excavation to support removal of old turbine foundations and construction of new turbine foundations.
- Temporary ground disturbance associated with trenching to install power collection system.
- Temporary ground disturbance associated with staging areas, crane pads.
- Temporary stockpiling and side-casting of soil, construction materials, or other construction wastes.
- Widening and compaction of existing access roads.
- Short-term noise from equipment during decommissioning and construction activities.

These impact mechanisms were used to assess project-related impacts on biological resources in the project area.

Determination of Significance

Based on Appendix G of the State CEQA Guidelines, a proposed project would normally be required to determine if it would result in any of the conditions listed below.

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW or USFWS.

- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

Impacts and Mitigation Measures

Impacts on biological resources could occur as a result of decommissioning, repowering, and O&M activities. Potential impacts for the Initial Repower and Full Repower are discussed separately below, along with proposed mitigation to reduce potential impacts to a less-than-significant level. Wildlife species with similar habitat use (e.g., use similar habitat types, tree nesting species) were grouped in the impact discussions below.

Information from the EACCS (or Conservation Strategy) was used to develop mitigation measures for potential impacts from the Initial Repower. The Conservation Strategy was developed to assist with environmental compliance requirements of ESA, CESA, CEQA, NEPA, and other applicable laws for all projects within its study area with impacts on biological resources. To support this effort, the Conservation Strategy includes goals and objectives and a compensation program to offset impacts from projects in the study area. The project area lies within the Conservation Strategy study area. Where applicable, the goals and objectives in the Conservation Strategy were used to develop mitigation measures to minimize potential impacts resulting from the Initial Repower. Likewise, mitigation ratios from the Conservation Strategy were used when compensation for loss of habitat would be required. Additional and/or alternate mitigation measures may be necessary as conditions of permits (e.g., ESA Section 7 Incidental Take Statement, CESA Section 2081 Incidental Take Permit), if obtained by the Applicant.

Initial Repower

The Initial Repower would involve ground disturbance from the removal of existing project infrastructure and the installation of the Initial Repower phase infrastructure. Table 3.4-5 provides an estimate of the maximum acreages of impact associated with Initial Repower activities that would result in ground disturbance. Figures 3.4-4a though 3.4-4c depict the location of Initial Repower facilities within biological communities and sensitive habitats in the project area.

Additionally, the Initial Repower would operate for an expected life of 30 years, and thus impacts on biological resources (primarily avian species) are considered in that context.

Table 3.4-5. Summary of Impact Acreages Associated with Construction of Initial Repower Facilities

Activity	Required Area	Number of Units	Total Permanent Impact Area[a] (approximate acres)	Total Temporary Impact Area (approximate acres)
Removal of old turbine and construction of new turbine foundations[b]	0.4 acre temporary disturbance and 0.1 acre new permanent developed area per tower[c]	40 foundations	4	16
Temporary laydown	5 acres	4 laydown areas	0	20
Access road improvements	10 ft^2 disturbed area and 6 ft^2 permanent new roadway per linear foot of road	124,690 linear feet	17	29
Power collection and communication line installation[d]	10 ft^2 disturbed area per linear foot of conduit	8,403 linear feet	0	2
O&M facility parking/storage area	1 acre	1	1	0
Total			22	67

[a] All permanent and temporary impact acreages provided in this table are within annual grasslands that provide upland habitat for special-status plants and wildlife considered in this document.

[b] The existing tower foundation area includes the 100 by 100 foot assembly area, 50 by 70 foot crane pad, and 100-foot diameter foundation work area.

[c] For purposes of determining areas of permanent and temporary impacts, it was assumed that the assembly area, crane pad, and foundation work area would be separate areas; however, it is likely that these impact areas will overlap result in smaller impacts.

[d] Power collection system installation includes the construction of up to five new transformers at existing pad-mounted tie-in locations.

Impact BIO-1: Project construction could have direct or indirect impacts on special-status plants (less than significant with mitigation)

Surveys for special-status plants were conducted in 2012 and 2013, and although one special-status plant species (heartscale) was recorded in the project area, the results were not definitive for the presence or absence of spring-blooming special-status plants because of drought conditions. Heartscale, a species considered rare or endangered under CEQA (CRPR 1B.2) was located in the project area within an alkali meadow habitat. Impacts on this heartscale population could result in a substantial reduction in the species' distribution and therefore would be considered a significant impact. Similarly, impacts on other special-status plants that may occur on the project parcels, but which have not yet been detected, could result in substantial impacts and would be considered significant. Implementation of Mitigation Measures BIO-1a through BIO-1f, including BIO-1d (general avoidance and minimization measures from the Conservation Strategy) would ensure that special-status plants within the project area are identified and that impacts on biological resources

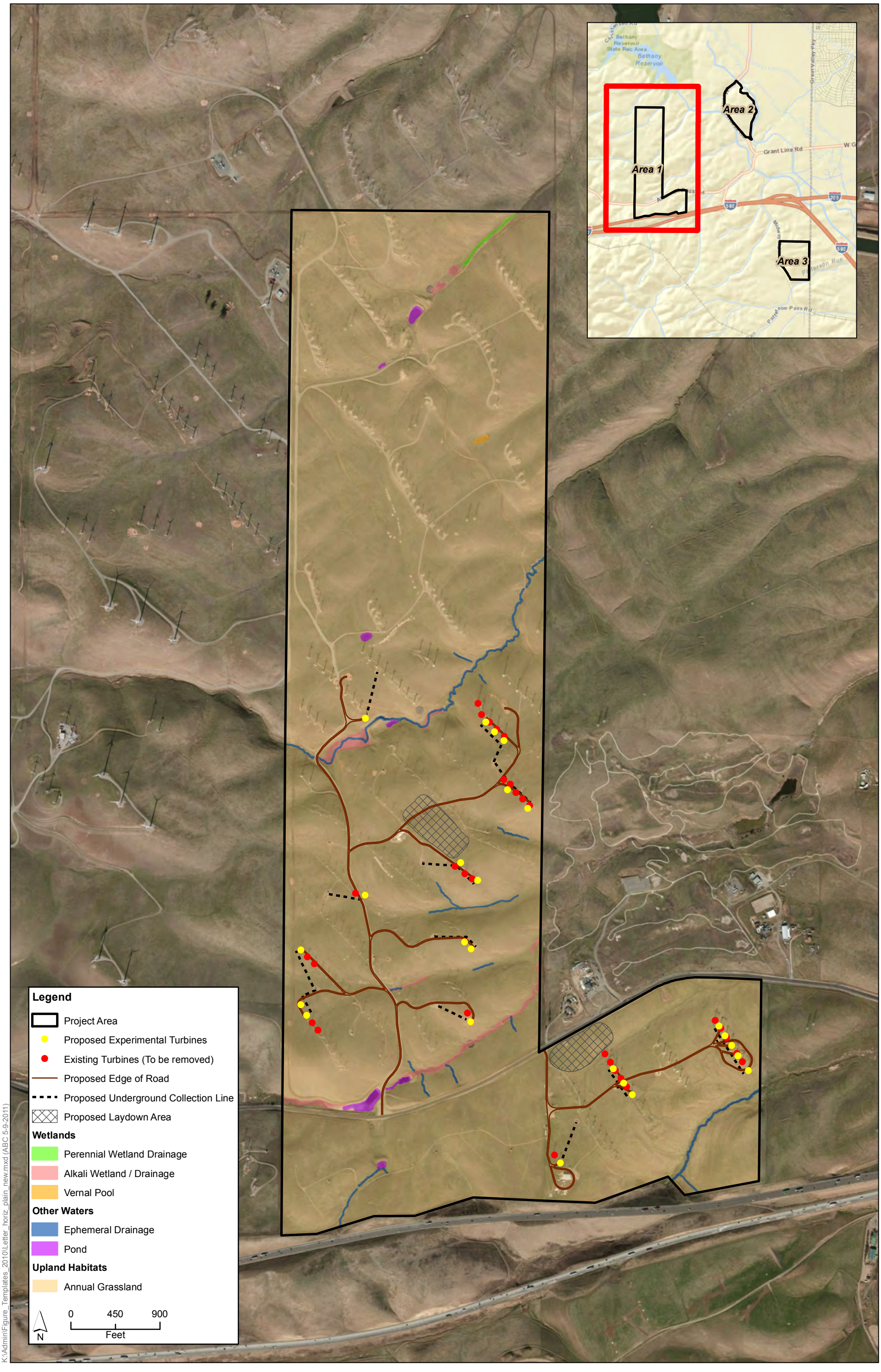

Figure 3.4-4a
Impacts to Biological Resources from Initial Repower – Area 1

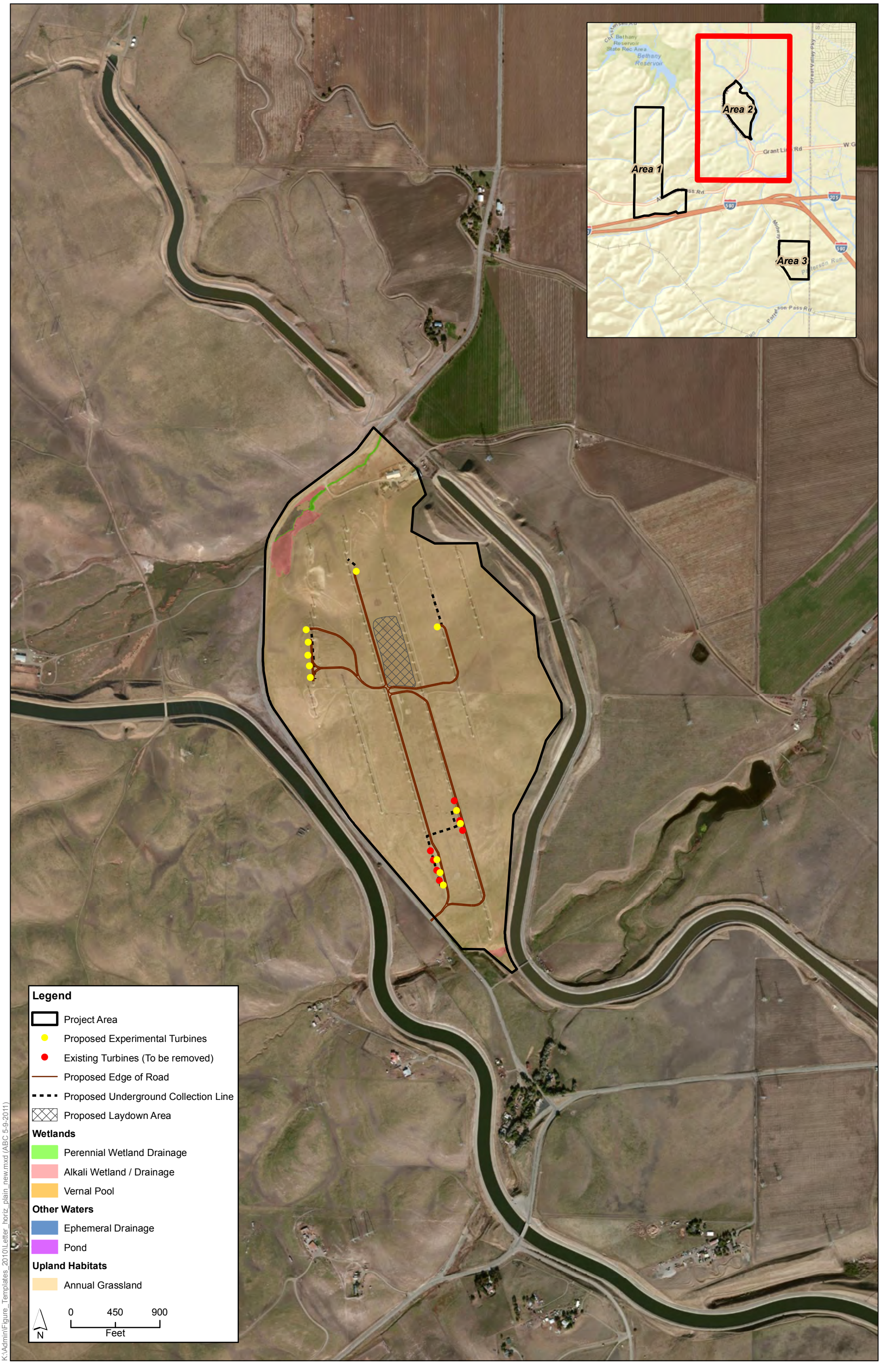

Figure 3.4-4b
Impacts to Biological Resources from Initial Repower – Area 2

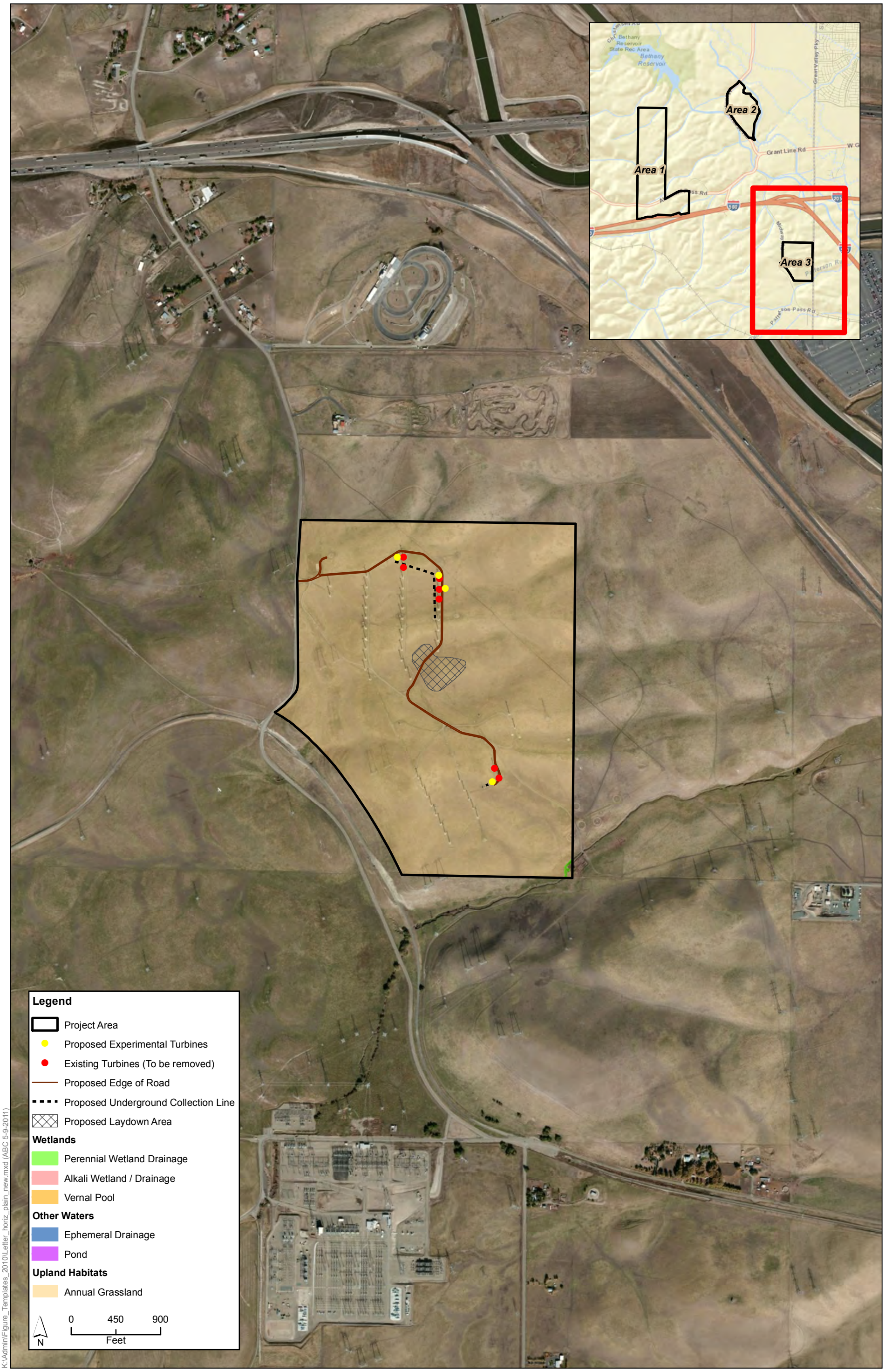

Figure 3.4-4c
Impacts to Biological Resources from Initial Repower – Area 3

would be avoided, minimized, and mitigated. With implementation of these measures, impacts on special-status plants would be considered less than significant. Accordingly, the impact on special-status plants would be less than significant with mitigation.

Mitigation Measure BIO-1a: Conduct surveys to determine the presence or absence of special-status plant species

The Applicant shall conduct spring surveys for the special-status plant species within and adjacent (i.e., within 250 feet) to all areas of proposed temporary or permanent disturbance prior to construction-related activities. All surveys shall be conducted by qualified biologists using the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (California Department of Fish and Game 2009) during the season that special-status plant species would be evident and identifiable, i.e., during their blooming season. Mitigation Measure BIO-1b will apply when the spring surveys determine that any special-status plant species is present.

Mitigation Measure BIO-1b: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones, where feasible

Where surveys determine that a special-status plant species is present in or adjacent to a project parcel, direct and indirect impacts of the project on the species (e.g., heartscale and/or other species detected as a result of surveys conducted in compliance with Mitigation Measure BIO-1a) shall be avoided where feasible through the establishment of activity exclusion zones, within which no ground-disturbing activities shall take place, including construction of new facilities, construction staging, or other temporary work areas. Activity exclusion zones for special-status plant species shall be established prior to construction activities around each occupied habitat site, the boundaries of which shall be clearly marked with standard orange plastic construction exclusion fencing or its equivalent. The establishment of activity exclusion zones shall not be required if no construction-related disturbances would occur within 250 feet of the occupied habitat site. The size of activity exclusion zones may be reduced through consultation with a qualified biologist and with concurrence from CDFW based on site-specific conditions. Mitigation Measure BIO-1c will apply when activity exclusion zones are not feasible (i.e., footprint of new turbine foundations cannot be moved or adjusted).

Mitigation Measure BIO-1c: Compensate for impacts on special-status plant species

Where avoidance of impacts on a special-status plant species is infeasible, loss of individuals or occupied habitat of a special-status plant species occurrence shall be compensated for through the acquisition, protection, and subsequent management in perpetuity of other existing occurrences at a 2:1 ratio (i.e., preserving two existing similar occurrences per individual similar occurrence impacts). Prior to implementing compensation measures, the Applicant shall provide detailed information to the lead agency and CDFW on the location of the preserved occurrences, quality of the preserved habitat, provisions for protecting and managing the areas in-perpetuity, responsible parties, and other pertinent information that demonstrates the feasibility of the compensation. The lead agency shall reserve the right to disallow the use of compensation when the Applicant has not clearly shown that compensation and management in perpetuity will be feasible. If compensation cannot be shown to be feasible, the Applicant will be required to avoid the impact by relocating the project activity.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

The general avoidance and minimization measures (AMMs) from the Conservation Strategy, with some modifications, have been included to avoid and minimize overall biological resources impacts. The general avoidance and minimization measures to be implemented include the following.

- Employees and contractors performing decommissioning and reclamation activities will receive environmental sensitivity training by a qualified biologist prior to commencing work. Training will include review of environmental laws and AMMs that must be followed by all personnel to reduce or avoid effects on special-status species during construction activities.
- Environmental tailgate trainings will take place on an as-needed basis in the field during decommissioning, construction, and reclamation activities. These trainings will be provided by the onsite biological monitor and will include a brief review of the biology of the covered species and guidelines that must be followed by all personnel to reduce or avoid negative effects on these species during decommissioning, construction, and reclamation. Directors, managers, superintendents, and the crew leaders will be responsible for ensuring that crewmembers comply with the guidelines.

The following will not be allowed at or near work sites for project activities: trash dumping, firearms, open fires (such as barbecues) not required by the activity, hunting, and pets .

- Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.
- Offroad vehicle travel will be avoided.
- Vehicles will not exceed a speed limit of 15 mph on unpaved roads within natural land cover types, or during offroad travel.
- Vehicles or equipment will not be refueled within 100 feet of a wetland, stream, or other waterway unless a bermed and lined refueling area (i.e., a created berm made of sandbags or other removable material) is constructed and refueling is restricted to that area.
- Vehicles will be washed only at approved areas. No washing of vehicles will occur at job sites.
- To discourage the introduction and establishment of invasive plant species, seed mixtures and straw used within natural vegetation will be either rice straw or weed-free straw.
- Pipes, culverts, and similar materials greater than 4 inches in diameter will be stored so as to prevent wildlife species from using these as temporary refuges, and these materials will be inspected each morning for the presence of animals prior to being moved. If an animal is observed to be occupying any construction materials that must be moved, the animal(s) will be allowed to passively leave on their own or the monitoring biologist will coordinate with the appropriate agency (USFWS for federally listed species and CDFW for all other species) to determine if trapping, rescue, or other measures are necessary and appropriate given the species and situation.
- Erosion control measures will be implemented during decommissioning, construction, and reclamation activities to reduce sedimentation in nearby aquatic habitat when activities are the source of potential erosion. Plastic monofilament netting (erosion control matting) or similar material containing netting will not be used at the project parcels. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.

- Material will be stockpiled only in areas that do not support special-status species or sensitive habitats.
- Grading will be restricted to the minimum area necessary.
- Prior to ground disturbing activities in sensitive habitats, construction boundaries and access areas will be flagged and temporarily fenced during construction to reduce the potential for vehicles and equipment to stray into adjacent habitats.
- Significant earth moving-activities will not be conducted in riparian areas within 24 hours of predicted storms or after major storms (defined as 1-inch of rain or more).
- Trenches and pits will be backfilled as soon as possible. Trenches that are left open overnight will be searched each day prior to construction activities to ensure no covered species are trapped. Earthen escape ramps will be installed at intervals prescribed by a qualified biologist. Work will not continue until trapped animals have moved out of open trenches.
- The Applicant will include special provisions in the bid solicitation package and final construction contract(s) that specify all relevant permit requirements and project AMMs that must be implemented during construction.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

The Applicant will retain a qualified biologist (as determined by Alameda County) to conduct periodic monitoring of decommissioning and construction activities that occur adjacent to sensitive biological resources (e.g., special-status species, sensitive vegetation communities, wetlands). The biologist will assist the crew, as needed, to comply with all project implementation restrictions and guidelines. In addition, the biologist will be responsible for ensuring that the Applicant or its contractors maintain exclusion areas adjacent to sensitive biological resources, and for documenting compliance with all biological resources–related mitigation measures.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Within 30 days prior to any ground disturbance, a qualified biologist will prepare a Grassland Restoration Plan in coordination with CDFW and subject to CDFW approval, to ensure that temporarily disturbed annual grasslands and areas planned for the removal of turbine pad areas are restored to preconstruction conditions. The Grassland Restoration Plan will include but not be limited to the following measures.

- Gravel will be removed from areas proposed for grassland restoration.
- To the maximum extent feasible, topsoil will be salvaged from within onsite work areas prior to construction and stockpiled for use in restoration. Imported fill soils will be limited to weed-free topsoil similar in texture, chemical composition, and pH to soils found at the reference site.
- Where appropriate, restoration areas will be seeded (hydroseeding is acceptable) to ensure erosion control. Seed mixes will be tailored to closely match that of reference site(s) within the project area and should include native or naturalized, non-invasive species sourced within the project area or within 50 miles of the project area.
- Reclaimed roads will be restored in such a way as to permanently prevent vehicular travel.

The plan will include a requirement to monitor restoration areas annually (between March and May) in years 1–3 following the year of restoration. At the end of 3 years, the restoration will be considered successful if the percent cover for restored areas is 70 percent absolute cover of the planted/seeded species compared to the percent absolute cover of nearby reference sites. No more than 5 percent relative cover of the vegetation in the restoration areas will consist of species designated as invasive plants in Cal-IPC's California Invasive Plant Inventory Database (http://www.cal-ipc.org). Remedial measures will be employed by the Applicant if the restoration does not meet these success criteria. Remedial measures included in the plan will include supplemental seeding, weed control, etc. as determined necessary to achieve the long-term success criteria. Monitoring may be extended for 2 additional years if necessary to ensure achievement of the success criteria. Other performance standards may also be required as they relate to special-status species habitat; these will be identified in coordination with CDFW and included in the plan. Prior to commencement of ground disturbing activities within the project area, the Applicant will provide evidence to the lead agency that CDFW has reviewed and approved of the Grassland Restoration Plan. Additionally, the Applicant will provide annual monitoring reports to the County by August 1 of each year, summarizing the monitoring results and any remedial measures implemented (if any are necessary).

Impact BIO-2: Construction of the proposed project has the potential to directly or indirectly affect sensitive natural communities (less than significant with mitigation)

The Initial Repower has the potential to affect wetlands and other sensitive natural communities present in the project area such as alkali grassland. Sensitive natural communities are considered rare by CDFW because of their limited distribution and/or habitat for special-status species. Consequently, impacts on sensitive natural communities would be considered significant. Implementation of Mitigation Measures BIO-1d (general avoidance measures), BIO-1e (retain a biological monitor), BIO-1f (restoration of temporarily disturbed annual grasslands), and BIO-2 (compensation) would reduce this impact to less than significant. Accordingly, the impact on sensitive natural communities would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under Impact BIO-1.

Mitigation Measure BIO-2: Compensate for the loss of alkali meadow habitat

If alkali meadow habitat is filled or disturbed as part of the project, the Applicant shall compensate for the loss of this habitat to ensure no net loss of habitat functions and values. Compensation ratios shall be based on site-specific information and determined through coordination with state and federal agencies (e.g., CDFW, USFWS, and USACE). The

compensation shall be at a minimum 1:1 ratio (1 acre restored or created for every 1 acre filled) and may be a combination of onsite restoration/creation, off-site restoration, or mitigation credits. The Applicant shall provide the lead agency with proof of the pertinent state and federal agencies' approvals of the compensation and any related permits.

Impact BIO-3: Construction of the proposed project has the potential to affect wetlands and other waters of the United States (less than significant with mitigation)

Aquatic resources, including stock ponds, alkali wetlands, and ephemeral drainages, occur within the project area. Existing facilities, particularly the access roads, may cross or occur adjacent to these aquatic resources and decommissioning or construction activities that result in ground disturbance (including temporary fill and extension of culverts) could directly or indirectly affect aquatic resources that may qualify as waters of the United States and waters of the State. Waters of the United States are regulated by USACE and waters of the State in California are regulated by the Regional Water Board. Wetlands are also considered sensitive communities.

In addition to direct impacts, construction activities under the Initial Repower could indirectly affect aquatic resources by causing increased erosion and sedimentation within resources located adjacent to work areas. Implementing Mitigation Measures BIO-1d (general protection measures), BIO-1e (retain a biological monitor), BIO-3a, and BIO-3b would ensure avoidance and minimization of impacts on waters of the United States and waters of the State. Mitigation Measure BIO-3c would compensate for any unavoidable impacts on waters of the United States. Together, implementation of these measures would reduce this impact on state or federally protected wetlands to a less-than-significant level. Accordingly, the impact on wetlands and other waters of the United States would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under Impact BIO-1.

Mitigation Measure BIO-3a: Identify and delineate waters of the United States and waters of the State (including wetlands)

Prior to construction activities and final siting of individual work areas, the Applicant will retain a qualified wetland ecologist (i.e., a wetland ecologist with previous experience conducting wetland delineations in the region) to identify areas that could qualify as waters of the United States and waters of the State, including wetlands, assuming such features exist within or adjacent to work areas identified for each project element. Wetlands will be identified using both the USACE and USFWS/CDFW definitions of wetlands. USACE jurisdictional wetlands will be delineated using the methods outlined in the 1987 Corps of Engineers *Wetlands Delineation Manual* (Environmental Laboratory 1987) and where appropriate, using the updated methods in the Arid West Supplement (U.S. Army Corps of Engineers 2008) to the 1987 manual. The jurisdictional boundary of other waters of the United States will be identified based on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear,

natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area (33 CFR 328.3[e]). This information will be mapped and documented in a wetland delineation report and submitted to USACE with a copy provided to the lead agency

Mitigation Measure BIO-3b: Avoid and minimize disturbance of waters of the United States, including wetland communities

The Applicant will avoid and minimize impacts on delineated wetlands and other waters of the United States (creeks and streams) by implementing the following measures.

- Redesign or modify the location of work areas to avoid direct and indirect impacts on wetland habitats.
- Protect wetland habitats that occur near the project area by installing fencing around the environmentally sensitive area at least 20 feet from the edge of the wetland. Depending on site-specific conditions and permit requirements, this buffer may be wider than 20 feet (e.g., 250 feet for seasonal wetlands considered special-status wildlife habitat). The location of the fencing will be marked in the field with stakes and flagging and shown on the construction drawings. The construction specifications will contain clear language that prohibits decommissioning- and reclamation-related activities, vehicle operation, material and equipment storage, and other surface-disturbing activities within the fenced environmentally sensitive area.
- Stabilize exposed slopes and streambanks immediately upon completion of decommissioning and reclamation activities. Other waters of the United States will be restored in a manner that encourages vegetation to re-establish to its pre-program condition and that reduces the effects of erosion on the drainage system.
- In highly erodible stream systems, stabilize banks using a non-vegetative material that will bind the soil initially and break down within a few years. If the project engineers determine that more aggressive erosion control treatments are needed, use geotextile mats, excelsior blankets, or other soil stabilization products.
- During decommissioning and reclamation, remove trees, shrubs, debris, or soils that are inadvertently deposited below the ordinary high water mark (OHWM) of drainages in a manner that minimizes disturbance of the drainage bed and bank.

Mitigation Measure BIO-3c: Compensate for unavoidable impacts on waters of the United States

If wetlands are filled or disturbed as part of the project, including situations where avoidance or minimization is infeasible, the Applicant shall compensate for the loss of wetland habitat to ensure no net loss of habitat functions and values. Compensation ratios shall be based on site-specific information and determined through coordination with state and federal agencies (e.g., CDFW, USFWS, and USACE). The compensation shall be at a minimum 1:1 ratio (1 acre restored or created for every 1 acre filled) and may be a combination of onsite restoration/creation, off-site restoration, or mitigation credits. A restoration and monitoring plan shall be developed and implemented. The plan shall describe how wetlands shall be created and monitored over a minimum period of time. The Applicant shall provide the lead agency with proof of the pertinent state and federal agencies' approval of the compensation and any related permits prior to commencement of project construction.

Impact BIO-4: Potential disturbance of vernal pool fairy shrimp, longhorn fairy shrimp, and vernal pool tadpole shrimp and their habitat (less than significant with mitigation)

Construction activities within the project area could result in indirect effects on the federally listed longhorn fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp (vernal pool branchiopods) or their habitats. The majority of impacts would occur on grassland habitat and loss of potential vernal pool branchiopod habitat would be avoided. However, indirect impacts on water quality may occur. Construction activities such as excavation, grading, or stockpiling of soil associated with decommissioning activities, installation of new foundations, collection and communication system installation and road widening could result in indirect effects on vernal pool branchiopods if vehicles or construction equipment are driven through occupied habitat, or if gasoline, oil, or other contaminants enter habitat. Changes in hydrology or sedimentation of habitat from erosion associated with Initial Repower construction could alter the suitability of habitat for vernal pool branchiopods.

O&M activities may also result in impacts on vernal pool branchiopods or their habitats. Use of herbicides upslope of occupied habitat could result in mortality or reduced fitness of vernal pool branchiopods (U.S. Fish and Wildlife Service 1996). These indirect impacts would be considered adverse because the Initial Repower could reduce habitat suitability for federally listed vernal pool branchiopods. This impact would be significant, but implementation of the following mitigation measures would reduce this impact to a less-than-significant level. Accordingly, the impact on vernal pool branchiopods and their habitat would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under Impact BIO-1.

Mitigation Measure BIO-3b: Avoid and minimize disturbance of waters of the United States, including wetland communities

Please refer to the discussion of Mitigation Measure BIO-3b under Impact BIO-3.

Mitigation Measure BIO-4: Implement measures to avoid, minimize, and mitigate for potential impacts on longhorn fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp

The following AMMs will be implemented during construction to ensure that repowering activitiesdo not have an adverse impact on listed vernal pool branchiopods. These measures are based on measures from the Conservation Strategy, with some modifications and additions. Additional conservation measures or conditions of approval may be required by applicable project permits (e.g., ESA incidental take permit).

- Ground disturbance within 250 feet of suitable vernal pool branchiopod habitat (i.e., alkali wetlands, ponds/pools, and ephemeral drainages) will be avoided from the first day of the first significant rain (1 inch or greater) until June 1, or until pools remain dry for 72 hours and no significant rain is forecast on the day of such ground disturbance.
- Locate staging areas at least 250 feet from suitable vernal pool branchiopod habitat (i.e., alkali grassland/wetland, ponds/pools, and ephemeral drainages).
- If alkali grassland/wetland, ponds/pools, and ephemeral drainages are present within the work area or within 250 feet of the work area, a qualified biologist will stake and flag an exclusion zone prior to construction activities. The exclusion zone will be fenced with orange construction zone and erosion control fencing (to be installed by construction crew). The exclusion zone will encompass the maximum practicable distance from the worksite and at least 250 feet from the aquatic feature wet or dry.
- No herbicide will be applied within 100 feet of aquatic habitat, except when applied to cut stumps or frilled stems or injected into stems. No broadcast applications will be applied.
- Avoid modifying or changing the hydrology of aquatic habitats.
- Install utility collection and communication lines across ephemeral drainages by directional boring or overheading and/or rerouting lines around or over wetlands and ponds, where feasible.

If all potential indirect effects cannot be avoided, the Applicant will consult with USFWS before construction occurs. Additional conservation measures or conditions of approval, in addition to the measures listed above, may be required in applicable project permits (e.g., ESA incidental take permit). These measures may include, increased exclusion zones and additional erosion control measures.

Impact BIO-5: Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander and California red-legged frog (less than significant with mitigation)

Construction activities within the project area could result in direct effects on California tiger salamander and California red-legged frog or their habitats (ponds, ephemeral drainages, and surrounding upland areas). The majority of impacts would occur on upland grassland dispersal and aestivation habitat for California tiger salamander and California red-legged frog. Aquatic habitats for these species would generally be avoided; however, indirect impacts on habitat from road construction or widening may occur. Project construction would result in permanent loss of 22 acres of annual grassland and temporary disturbance of 67 acres of annual grassland that provide upland habitat for California tiger salamander and California red-legged frog (Table 3.4-5).

Construction activities such as excavation, grading, or stockpiling of soil, could fill, remove or otherwise alter suitable habitat for, or result in injury or mortality of California tiger salamander and California red-legged frog. Potential direct impacts include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of upland habitat that results in damage or elimination of suitable aestivation burrows. Specific activities that may impact these species could include collection and communication system installation, wind turbine construction, and road infrastructure construction/maintenance and upgrades, temporary staging area set-up, and reclamation activities. California tiger salamander and California red-legged frog could also be injured or killed if vehicles or construction equipment are driven through

occupied habitat, or if gasoline, oil, or other contaminants enter habitat. Changes in hydrology or sedimentation of habitat from erosion associated with construction of the Initial Repower could alter the suitability of their habitat or cause mortality.

O&M activities may also result in impacts on special-status amphibians or their habitats. Travel on maintenance roads during the rainy season or when amphibians are dispersing could result in mortality of individuals. Road and firebreak maintenance may also result in degradation of habitat or injury or mortality of special-status amphibians. These impacts would be considered adverse because the proposed project could reduce the local population sizes, through direct mortality and/or habitat loss. This impact would be significant, but implementation of Mitigation Measures BIO-1d (general avoidance measures), BIO-1e (retain a biological monitor), BIO-1f (restoration of temporarily disturbed annual grasslands), BIO-3b (avoid and minimize impacts on wetlands), and BIO-5 would reduce this impact to a less-than-significant level. Therefore, impacts on California tiger salamander and California red-legged frog would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under Impact BIO-1.

Mitigation Measure BIO-3b: Avoid and minimize disturbance of waters of the United States, including wetland communities

Please refer to the discussion of Mitigation Measure BIO-3b under Impact BIO-3.

Mitigation Measure BIO-5: Implement measures to avoid, minimize, and mitigate for potential impacts on California tiger salamander and California red-legged frog

Where suitable aquatic (ponds) or upland (grassland) habitat for California tiger salamander and California red-legged frog occurs within proposed work areas, the following AMMs will be implemented to ensure that repowering activities do not have an adverse impact on these species. These measures are based on measures from the Conservation Strategy, with some modifications and additions. Implementation of some of these measures (i.e., relocation of listed species, excavation to install exclusion fencing) could result in take and will require that the Applicant consult with USFWS (California red-legged frog and California tiger salamander) and CDFW (California tiger salamander only) before construction begins. Additional conservation measures or conditions of approval, in addition to the measures listed below, may be required in applicable project permits (e.g., ESA incidental take permit).

- Direct impacts on potential breeding ponds will be avoided.
- Ground-disturbing activities within upland will be limited to dry weather between April 15 and October 31. No ground-disturbing work will occur during wet weather. Wet weather is defined as when there has been 0.25 inch of rain in a 24-hour period. Ground-disturbing

activities halted due to wet weather may resume when precipitation ceases and the National Weather Service 72-hour weather forecast indicates a 30 percent or less chance of precipitation. No ground-disturbing work will occur during a dry-out period of 48 hours after the above referenced wet weather. If construction would need to continue past October 31, the Applicant will request an authorization from USFWS and CDFW to extend the work period.

- Where applicable, barrier fencing will be installed around the worksite to prevent amphibians from entering the work area. Barrier fencing will be removed within 72 hours of completion of work.
- Before construction begins, a qualified biologist will locate appropriate relocation areas and prepare a relocation plan for special-status amphibians that may need to be moved during construction. The proponent will submit this plan to USFWS and CDFW for approval prior to the start of construction.
- A qualified biologist will conduct preconstruction surveys immediately prior to ground-disturbing activities (including equipment staging, vegetation removal, grading). The biologist will survey the work area and all suitable habitat within 300 feet of the work area. If individuals (including adults, juveniles, larvae, or eggs) are found, work will not begin until USFWS and/or CDFW is contacted to determine if moving these life-stages is appropriate. If relocation is deemed necessary, it will be conducted in accordance with the relocation plan. Incidental take permits are required for relocation of California tiger salamander (USFWS and CDFW) and California red-legged frog (USFWS).
- No monofilament plastic mesh or line will be used for erosion control.
- All construction activity will terminate 30 minutes before sunset and will not resume until 30 minutes after sunrise during the migration/active season from November 1 to June 15. Sunrise and sunset times are established by the U.S. Naval Observatory Astronomical Applications Department for the geographic area where the project is located.
- To prevent inadvertent entrapment of special-status amphibians during construction, all excavated, steep-walled holes or trenches more than 6 inches deep will be provided with one or more escape ramps constructed of earth fill or wooden planks and will be inspected by a qualified biologist prior to being filled.
- Work crews or onsite biological monitor will inspect open trenches, pits, and under construction equipment and material left onsite in the morning and evening to look for amphibians that may have become trapped or are seeking refuge.
- If special-status amphibians are found in the work area during construction and cannot or do not move offsite on their own, a USFWS and/or CDFW-approved biologist, will trap and move special-status amphibians in accordance with the relocation plan.

If all potential direct and indirect impacts on California tiger salamander and California red-legged frog cannot be avoided, the Applicant will consult with USFWS and CDFW under the ESA and CESA before construction can occur. Loss of habitat for California tiger salamander and California red-legged frog will be compensated for in accordance with the standardized mitigation ratios developed for the Conservation Strategy (Tables 3-7 and 3-8 of the Conservation Strategy). Based on the location of the impact site (proposed project area), which does not occur within designated critical habitat for either species and is within the California tiger salamander north mitigation area, the mitigation ratio would vary between 2.5:1 and 4:1 (2.5 to 4:1 acres of mitigation lands for every 1 acre affected). Because proposed habitat

compensation would be mitigated consistent with the Conservation Strategy, which was developed in coordination with USFWS and CDFW, the proposed compensation is expected to fully mitigate for direct impacts associated with repowering.

Impact BIO-6: Potential disturbance or mortality of and loss of suitable habitat for Pacific pond turtle (less than significant with mitigation)

Construction activities within the project area could result in direct effects on Pacific pond turtle or its habitats (ponds, ephemeral drainages). The majority of construction activity would occur on grassland habitat and loss of suitable aquatic habitat would be avoided; however, indirect impacts on water quality may occur. Potential direct impacts could include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of upland nesting habitat. Initial Repower activities would result in permanent loss of 22 acres of annual grassland and temporary disturbance of 67 acres of annual grassland that provide upland habitat for Pacific pond turtle (Table 3.4-5).

Declines in populations of western pond turtles throughout the species range have been documented (Jennings and Hayes 1994). Loss of individuals in the project area could diminish the local population and lower reproductive potential, which could contribute to the further decline of this species. The loss of upland nesting sites or eggs also would decrease the local population. This impact would be significant, but implementation of Mitigation Measure BIO-1d (general avoidance measures), BIO-1e (retain a biological monitor), BIO-1f (restoration of temporarily disturbed annual grasslands), BIO-3b (avoid and minimize impacts on wetlands), and BIO-6 would reduce this impact to a less-than-significant level. Accordingly, the impact on Pacific pond turtle would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under Impact BIO-1.

Mitigation Measure BIO-3b: Avoid and minimize disturbance of waters of the United States, including wetland communities

Please refer to the discussion of Mitigation Measure BIO-3b under Impact BIO-3.

Mitigation Measure BIO-6: Conduct preconstruction surveys for Pacific pond turtle and monitor construction activities if turtles are observed

Where suitable upland habitat (grasslands within 1,300 feet of ponds or ephemeral drainages) for Pacific pond turtle occurs within proposed work areas, the following AMMs will be implemented to ensure that the repowering activities do not have an adverse impact on Pacific pond turtle.

- One week before and within 24 hours of beginning work in or adjacent to suitable aquatic habitat (ponds, ephemeral drainages), a qualified biologist (one who is familiar with different species of turtles) will conduct surveys for Pacific pond turtle. The surveys should be timed to coincide with the time of day and year when turtles are most likely to be active (during the cooler part of the day between 8 a.m. and 12 p.m. during spring and summer). Prior to conducting the surveys, the biologist should locate the microhabitats for turtle basking (logs, rocks, brush thickets) and determine a location to quietly observe turtles. Each survey should include a 30-minute wait time after arriving onsite to allow startled turtles to return to open basking areas. The survey should consist of a minimum 15 minute observation time per area where turtles could be observed.
- If western pond turtles are observed during either survey, a biological monitor will be present during construction activities in the aquatic habitat where the turtle was observed. The biological monitor also will be mindful of suitable nesting and overwintering areas in proximity to suitable aquatic habitat and periodically inspect these areas for nests and turtles.
- If one or more western pond turtles are found in the work area during construction and cannot or do not move offsite on their own, a qualified biologist will remove and relocate the turtle to appropriate aquatic habitat outside and away from the construction area. Relocation of western pond turtle requires a letter from CDFW authorizing this activity.

Impact BIO-7: Potential disturbance or mortality of and loss of suitable habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip (less than significant with mitigation)

Construction activities within the project area could result in direct effects on Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip or their habitat (annual grasslands within the project area). Project construction would result in permanent loss of 22 acres of annual grassland and temporary disturbance of 67 acres of annual grassland that provide upland habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip (Table 3.4-5) . Potential direct impacts on the species include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of habitat. O&M activities, such as road and firebreak maintenance, may also result in injury or mortality of individuals. Blainville's horned lizard has disappeared from portions of its range and continues to be threatened by development in other portions of its range (Jennings and Hayes 1994:132). Alameda whipsnake is a federally and state threatened species as a result of habitat loss and fragmentation due to urban development (U.S. Fish and Wildlife Service 2002b:69). San Joaquin coachwhip has a restricted geographic range and is threatened by continued conversion of its habitat to croplands and urban development. Loss of individuals in the project area could diminish the local populations of these species and lower reproductive potential, which could contribute to the further decline of these species. This impact would be significant, but implementation of Mitigation Measures BIO-1d (general avoidance measures), BIO-1e (retain a biological monitor), BIO-1f (restoration of temporarily disturbed annual grasslands), and BIO-7 would reduce this impact to a less-than-significant level. Accordingly, the impact on Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under Impact BIO-1.

Mitigation Measure BIO-7: Implement measures to avoid, minimize, and mitigate for potential impacts on Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip

Where suitable habitat (annual grassland) for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip is identified within proposed work areas, the following AMMs will be implemented to ensure that the repowering activities do not have an adverse impact on these species. These measures are based on measures from the EACCS, with some modifications and additions. Implementation of some of these measures for the Alameda whipsnake would only apply if required by USFWS or CDFW after consultation under ESA or CESA. Additional conservation measures or conditions of approval may be required in applicable project permits (i.e., ESA incidental take permit).

- A qualified biologist will conduct preconstruction surveys immediately prior to ground-disturbing activities (including equipment staging, vegetation removal, grading) associated with repowering. If Blainville's horned lizard, Alameda whipsnake, or San Joaquin coachwhip are found, work will not begin until they are moved out of the work area to a USFWS- and/or CDFW-approved relocation site. Incidental take permits from USFWS and CDFW are required for relocation of Alameda whipsnake. Relocation of Blainville's horned lizard and San Joaquin coachwhip requires a letter from CDFW authorizing this activity.
- No monofilament plastic mesh or line will be used for erosion control.
- Where applicable, barrier fencing (sediment control material or similar) material will be used to exclude Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip. Barrier fencing will be removed within 72 hours of completion of work.
- Work crews or an on-site biological monitor will inspect open trenches, pits, and under construction equipment and materials left onsite for special-status reptiles each morning and evening during construction.
- Vegetation within the proposed work area will be removed prior to grading. Vegetation outside the work area will not be removed. All vegetation removal will be monitored by the qualified biologist to minimize impacts on special-status reptiles.
- If special-status reptiles are found in the work area during construction and cannot or do not move offsite on their own, a USFWS- and/or CDFW-approved biologist will trap and move special-status reptiles to a USFWS- and/or CDFW-approved relocation area.

If all potential direct impacts on Alameda whipsnake cannot be avoided consultation with USFWS and CDFW under the ESA and CESA will be required before construction can occur. Loss of habitat for Alameda whipsnake will be compensated for in accordance with the standardized mitigation ratios developed for the Conservation Strategy (Table 3-9 of the Conservation Strategy). The Applicant could acquire parcels, through fee title purchase and/or conservation easements, where known populations occur. Similarly, acquisition or protection of parcels that

include parts of important linkages as described in the *Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California* (U.S. Fish and Wildlife Service 2002b), may be approved as mitigation for this species. Prior to commencement of ground disturbing activities within the project area, the Applicant will provide evidence to the lead agency that CDFW and USFWS have reviewed and approved the proposed compensation plan. Because proposed habitat compensation would be mitigated consistent with the Conservation Strategy, which was developed in coordination with USFWS and CDFW, the proposed compensation would fully mitigate for direct impacts associated with repowering.

Impact BIO-8: Potential construction-related disturbance or mortality of special-status and non-special-status migratory birds (less than significant with mitigation)

Construction activities during the nesting season (generally February 1 to August 31) of northern harrier and western burrowing owl could result in direct effects on these species, as well as non-special status ground-nesting migratory birds, if nesting within the project area. Most of the potential nesting habitat within the project area consists of grasslands. Scattered shrubs and small trees are present in the vicinity of existing buildings and residences; however, these resources would not be affected by the Initial Repower.. Additionally, construction-generated noise has the potential to indirectly affect special-status raptor species, including Swainson's hawk and white-tailed kite, nesting within 0.5 mile of construction activities. Disturbance of grassland, wetlands, or burrows with active nests and/or indirect construction disturbance (i.e., noise, increased human presence) during the breeding season may result in nest abandonment and subsequent loss of eggs or young. Such losses could affect the local population of special-status and non-special-status birds and would be considered a significant impact. Implementation of Mitigation Measures BIO-1d (general avoidance measures), BIO-1e (retain a biological monitor), BIO-1f (restoration of temporarily disturbed annual grasslands), BIO-8a, and BIO-8b would reduce this impact to a less-than-significant level. Accordingly, the impact on special-status and non-special-status migratory birds would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under Impact BIO-1.

Mitigation Measure BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non-special-status nesting birds

Where suitable habitat (grassland, shrubs, trees) is present for tree/shrub- and ground-nesting migratory birds in and within 0.5 mile of proposed work areas, the following AMMs will be implemented to ensure that repowering activities do not have an adverse impact on nesting special-status and non-special-status birds.

- Remove suitable nesting habitat (grassland or other ground vegetation) during the non-breeding season (September 1 through January 31) for nesting birds.
- If construction activities (including vegetation removal, clearing, and grading) will occur during the nesting season for migratory birds, a qualified biologist will conduct preconstruction nesting bird surveys within 7 days prior to construction activities. The construction area and a 0.5-mile buffer area will be surveyed for Swainson's hawk nests. The construction area and a 500-foot buffer will be surveyed for all other raptors and a 50-foot buffer will be surveyed for all other bird species. Additional preconstruction surveys for nesting birds prior to 7 days before construction are recommended to identify any areas that may need to be avoided and would affect the construction schedule or plans.
- If an active nest is identified near a proposed work area and work cannot be conducted outside of the nesting season (February 1 to August 31), a no-activity zone will be established by a qualified biologist in coordination with USFWS and/or CDFW. To minimize the potential to affect the reproductive success of the nesting pair, the extent of the no-activity zone will be developed based on the type and extent of the proposed activity in proximity to the nest, the duration and timing of the activity, the sensitivity and habituation of the species nesting, and the dissimilarity of the proposed activity to background activities. The no-activity zone will be large enough to avoid nest abandonment and will range between 50 feet and 1,000 feet from the nest, or as otherwise required by USFWS and/or CDFW.

Mitigation Measure BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl

Where suitable habitat (grasslands) is present for western burrowing owl in and within 500 feet of proposed work areas, the following AMMs will be implemented to ensure that the repowering activities do not have an adverse impact on burrowing owls. The following measures are consistent with the EACCS and CDFW's revised *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012).

- A qualified biologist will conduct preconstruction take avoidance surveys for burrowing owl no less than 14 days prior to and within 24 hours of initiating ground-disturbing activities. The survey area will encompass the work area and a 500-foot buffer around this area.
- To the maximum extent feasible (i.e., where the construction footprint can be modified) , construction activities within 500 feet of active burrowing owl burrows will be avoided during the nesting season (February 1– August 31).
- If an active burrow is identified near a proposed work area and work cannot be conducted outside of the nesting season (February 1– August 31), a no-activity zone will be established by a qualified biologist and in coordination with CDFW. The no-activity zone will be large enough to avoid nest abandonment and will extend a minimum of 250 feet around the burrow.
- If burrowing owls are present at the site during the non-breeding season (September 1 through January 31), a qualified biologist will establish a no-activity zone that extends a minimum of 150 feet around the burrow.
- If the designated no-activity zone for either breeding or non-breeding burrowing owls cannot be established, a wildlife biologist experienced in burrowing owl behavior will evaluate site-specific conditions and in coordination with CDFW, recommend a smaller

buffer (if possible) that still minimizes the potential to disturb the owls (and is deemed to still allow reproductive success during the breeding season). The site-specific buffer will consider the type and extent of the proposed activity occurring near the occupied burrow, the duration and timing of the activity, the sensitivity and habituation of the owls, and the dissimilarity of the proposed activity to background activities.

- If burrowing owls are present within the direct disturbance area and cannot be avoided during non-breeding season (generally September 1 through January 31), passive relocation techniques (e.g., installing one-way doors at burrow entrances) shall be used instead of trapping. Passive relocation may also be used during the breeding season (February 1 through August 30) if a qualified biologist, coordinating with CDFW, determines through site surveillance and/or scoping that the burrow is not occupied by burrowing owl adults, young, or eggs by. Passive relocation would be accomplished by installing one-way doors (e.g., modified dryer vents or other CDFW approved method). The one-way doors shall be left in place for a minimum of one week and monitored daily to insure that the owls have left the burrow. Excavation of the burrow shall be conducted using hand tools and a section of flexible plastic pipe (at least 3 inches in diameter) shall be inserted into the burrow tunnel to maintain an escape route for any animals that may be inside the burrow.
- Avoid destruction of unoccupied burrows outside the work area and place visible markers near burrows to ensure they are not collapsed.
- Conduct ongoing surveillance of the project parcels for burrowing owls during project activities. If additional owls are observed using burrows within 500 feet of construction, the onsite biological monitor will determine if the owl(s) would be affected by future construction and if additional exclusion zones are required.

Impact BIO-9: Permanent and temporary loss of foraging habitat for Swainson's hawk, western burrowing owl, and other special-status and non-special-status birds (less than significant with mitigation)

Implementation of the Initial Repower would result in the temporary and permanent loss of grassland that provides suitable foraging habitat for Swainson's hawk, burrowing owl, and many other special-status and non-special status migratory birds. Project construction would result in permanent loss of 22 acres of annual grassland and temporary disturbance of 67 acres of annual grassland that provide foraging habitat for these species (Table 3.4-5). Because the availability of foraging habitat has been closely tied to the breeding success of Swainson's hawk, projects that would significantly modify suitable Swainson's hawk foraging habitat are considered to have potential to significantly affect this species (California Department of Fish and Game 1994). CDFW also recommends compensation for permanent loss of occupied burrowing owl habitat (documented occupancy in the last 3 years). The temporary loss of foraging habitat would be mitigated through implementation of Mitigation Measure BIO-1f (restoration of temporarily disturbed annual grasslands). For permanent loss of foraging habitat, implementation of Mitigation Measure BIO-9 would reduce this impact to a less-than-significant level. Accordingly, the impact related to the permanent and temporary loss of foraging habitat for Swainson's hawk, western burrowing owl, and other special-status and non-special-status birds would be less than significant with mitigation.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under Impact BIO-1.

Mitigation Measure BIO-9: Compensate for the permanent loss of foraging habitat for Swainson's hawk, western burrowing owl, and other special-status and non-special-status birds

Permanent removal of suitable foraging habitat for Swainson's hawks will be mitigated by providing offsite habitat management lands as described in CDFW's *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (California Department of Fish and Game 1994). The final acreage of off-site management lands to be provided will depend on the distance between the project area and the nearest active nest site. The mitigation ratio varies from 0.5:1 to 1:1(dependent on the location of the closest known nest site) of habitat preserved for each acre lost. In lieu of acquiring offsite mitigation lands, the Applicant may purchase mitigation credits for Swainson's hawk foraging habitat from a lead agency-approved mitigation or conservation bank that sell upland habitat credits with equal or similar habitat function to lands that are permanently affected by the project. Information on the nearest nest will be collected during preconstruction Swainson's hawk surveys conducted under Mitigation Measure BIO-8a, to determine the appropriate mitigation ratio. If no active nests are found during this survey, a search of the CNDDB will be conducted, and CDFW will be contacted to determine the nearest active nest. The protection of this habitat will also compensate for the loss of foraging habitat for other special-status and non-special-status bird species that depend on grassland for foraging habitat.

If construction activities will result in the removal of occupied burrowing owl habitat (determined during preconstruction surveys described in Mitigation Measure BIO-8a), this habitat loss will be mitigated by providing mitigation land as described in CDFW's *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012:11–13). The standardized mitigation ratios for non-listed species developed for the Conservation Strategy will be used for the loss of habitat for burrowing owl (Table 3-10 in the Conservation Strategy).

Impact BIO-10: Potential injury or mortality of and loss of habitat for San Joaquin kit fox and American badger (less than significant with mitigation)

Construction activities within the project area could result in direct effects on San Joaquin kit fox and American badger or their habitat (grassland). Project construction would result in permanent loss of 22 acres of annual grassland and temporary disturbance of 67 acres of annual grassland that provide suitable denning and foraging habitat for San Joaquin kit fox and American badger (Table 3.4-5). In addition to the permanent and temporary removal of habitat, other direct impacts could include mortality or injury of individuals from construction vehicles or heavy equipment, direct mortality or injury of individuals from den collapse and subsequent suffocation, temporary harassment from noise and human presence associated with construction activities, and harassment of individuals by construction personnel. Additionally, exposed pipes, large excavated holes, or trenches that are left open after construction has finished for the day could entrap San Joaquin kit foxes or American badgers. O&M activities, such as road and firebreak maintenance, may also result in injury or mortality of individuals. San Joaquin kit fox is a federally endangered and state threatened species as a result of habitat loss due to agricultural development, infrastructure construction, and urban development (U.S. Fish and Wildlife Service 2010:25). American badger has

experienced drastic declines, particularly in the Central Valley, and has been extirpated from many areas in southern California (Williams 1986:66). Loss of individuals in the project area could diminish the local populations of these species and lower reproductive potential, which could contribute to the further decline of these species. This impact would be significant, but implementation of Mitigation Measures BIO-1d (general avoidance measures), BIO-1e (retain a biological monitor), BIO-1f (restoration of temporarily disturbed annual grasslands), and BIO-10 would reduce this impact to a less-than-significant level. Accordingly, the impact on San Joaquin kit fox and American badger would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under Impact BIO-1.

Mitigation Measure BIO-10: Implement measures to avoid, minimize, and mitigate for potential impacts on San Joaquin kit fox and American badger

Where suitable habitat (grassland) is present for San Joaquin fit fox or American badger on or within 200 feet of proposed work areas, the following AMMs will be implemented to ensure that repowering activities do not have an adverse impact on San Joaquin kit fox or American badger. These measures are based on measures from the EACCS, with some modifications and additions, and are consistent with the USFWS *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox* (U.S. Fish and Wildlife Service 2011). Implementation of some of these measures (i.e., relocation of listed species, excavation to install exclusion fencing) could result in take and will require that the Applicant consult with USFWS and/or CDFW under the ESA and/or CESA for San Joaquin kit fox. Additional conservation measures, in addition to those measures listed below, or conditions of approval may be required in applicable project permits.

- The Applicant will retain qualified approved biologists (as determined by USFWS) to conduct a preconstruction survey for potential San Joaquin kit fox dens (U.S. Fish and Wildlife Service 2011) in areas proposed for disturbance as well as a 200-foot buffer around the disturbance area. Resumes of biologists will be submitted to the USFWS for review and approval prior to the start of the survey. The biologist(s) will also survey for American badger dens in conjunction with the San Joaquin kit fox surveys.
- To the maximum extent feasible, suitable dens for San Joaquin kit fox and American badger will be avoided.
- As described in U.S. Fish and Wildlife Service 2011, the preconstruction San Joaquin kit fox survey will be conducted no less than 14 days and no more than 30 days before the beginning of ground disturbance, or any activity likely to affect the San Joaquin kit fox. The biologist(s) will conduct den searches by systematically walking transects through project

disturbance areas and a buffer area to be determined in coordination with USFWS and CDFW. Transect distance should be determined based on the height of vegetation such that 100 percent visual coverage of the project disturbance area is achieved. The biologists will also determine the status of the dens and map the features. Dens will be classified in one of the following four den status categories defined by USFWS (U.S. Fish and Wildlife Service 2011).

- Potential den: Any subterranean hole within the species' range that has entrances of appropriate dimensions and for which available evidence is sufficient to conclude that it is being used or has been used by a kit fox. Potential dens include: (1) any suitable subterranean hole; or (2) any den or burrow of another species (e.g., coyote, badger, red fox, or ground squirrel) that otherwise have appropriate characteristics for kit fox use; or a human-made structure that otherwise has appropriate characteristics for kit fox use.
- Known den: Any existing natural den or manmade structure that is used or has been used at any time in the past by a San Joaquin kit fox. Evidence of use may include historical records, past or current radiotelemetry or spotlighting data, kit fox sign such as tracks, scat, and/or prey remains, or other reasonable proof that a given den is being or has been used by a kit fox (USFWS discourages use of the terms *active* and *inactive* when referring to any kit fox den because a great percentage of occupied dens show no evidence of use, and because kit foxes change dens often, with the result that the status of a given den may change frequently and abruptly).
- Known natal or pupping den: Any den that is used, or has been used at any time in the past, by kit foxes to whelp and/or rear their pups. Natal/pupping dens may be larger with more numerous entrances than dens occupied exclusively by adults. These dens typically have more kit fox tracks, scat, and prey remains in the vicinity of the den, and may have a broader apron of matted dirt and/or vegetation at one or more entrances. A natal den, defined as a den in which kit fox pups are actually whelped but not necessarily reared, is a more restrictive version of the pupping den. In practice, however, it is difficult to distinguish between the two; therefore, for purposes of this definition either term applies.
- Known atypical den: Any human-made structure that has been or is being occupied by a San Joaquin kit fox. Atypical dens may include pipes, culverts, and diggings beneath concrete slabs and buildings.

- Written results of the survey including the locations of any potential or known San Joaquin kit fox dens will be submitted to the USFWS within 5 days following the completion of the survey and prior to the start of ground disturbance and/or construction activities.
- After preconstruction den searches and before the commencement of construction activities, exclusion zones will be established as measured in a radius outward from the entrance or cluster of entrances of each den. Construction activities will be prohibited or greatly restricted within these exclusion zones to the extent avoidance is feasible. Only essential vehicular operation on existing roads and foot traffic will be permitted. All other repowering activities, vehicle operation, material and equipment storage, and other surface-disturbing activities will be prohibited in the exclusion zones. Barrier fencing will be removed within 72 hours of completion of work. Exclusion zones will be established as follows.

  - Potential and atypical dens: A total of four or five flagged stakes will be placed 50 feet from the den entrance to identify the den location.
  - Known den: Orange construction barrier fencing will be installed between the work area and the known den site at a minimum distance of 100 feet from the den. The fencing will be maintained until construction-related disturbances have ceased. At that time, all fencing will be removed to avoid attracting subsequent attention to the den.
  - Natal/pupping den: USFWS will be contacted immediately if a natal or pupping den is discovered at or within 200 feet of the work area.

- Any occupied or potentially occupied badger den will be avoided by establishing an exclusion zone consistent with a San Joaquin kit fox potential burrow (i.e., four or five flagged stakes will be placed 50 feet from the den entrance).
- In cases where avoidance is not a reasonable alternative, limited destruction of potential San Joaquin kit fox dens may be allowed as follows.
  - Natal/pupping dens: Natal or pupping dens that are occupied will not be destroyed until the adults and pups have vacated the dens and then only after consultation with USFWS. Removal of natal/pupping dens requires incidental take authorization from USFWS and CDFW.
  - Known dens: Known dens within the footprint of the activity must be monitored for 3 days with tracking medium or an infra-red camera to determine current use. If no kit fox activity is observed during this period, the den should be destroyed immediately to preclude subsequent use. If kit fox activity is observed during this period, the den will be monitored for at least 5 consecutive days from the time of observation to allow any resident animal to move to another den during its normal activity. Use of the den can be discouraged by partially plugging its entrance(s) with soil in such a manner that any resident animal can escape easily. Only when the den is determined to be unoccupied will the den be excavated under the direction of a biologist. If the fox is still present after 5 or more consecutive days of monitoring, the den may be excavated, when in the judgment of the biologist, it is temporarily vacant, such as during the fox's normal foraging activities. Removal of known dens requires incidental take authorization from USFWS and CDFW.
  - Potential dens: Potential dens can be removed (preferably by hand excavation) by biologist or under the supervision of a biologist without monitoring if authorized by USFWS and CDFG during ESA and CESA consultation. . If any den was considered a potential den but was later determined during monitoring or destruction to be currently or previously used by kit fox (e.g., kit fox sign is found inside), then all construction activities will cease and USFWS and CDFW will be notified immediately.
- Nighttime work will be minimized to the extent possible. The speed-limit will be reduced to 10 mph during nighttime work.
- A representative will be appointed by the Applicant who will be the contact for any employee or contractor who might inadvertently kill or injure a kit fox or finds a dead, injured, or entrapped kit fox. The representative will be identified during environmental sensitivity training (Mitigation Measure BIO-1d) and their name and phone number will be provided to USFWS and CDFW. Upon such incident or finding, the representative will

immediately contact USFWS at (916) 414-6620 or (916) 414-6600 and CDFW at (916) 445-0045 (State Dispatch) and/or the local warden or Mr. Paul Hoffman, wildlife biologist, at (530) 934-9309.

- The Sacramento USFWS office and CDFW will be notified in writing within 3 working days of the accidental death or injury to a San Joaquin kit fox during proposed project-related activities. Notification must include the date, time, and location of the incident, and any other pertinent information.

Compensation for permanent loss of San Joaquin kit fox habitat will be required before construction can occur and the standardized mitigation ratios developed for the EACCS will be applied (Table 3-11 of the Conservation Strategy). The standardized mitigation ratios for non-listed species developed for the EACCS will be used for the loss of habitat for American badger (Table 3-10of the EACCS). Because proposed habitat compensation would be mitigated consistent with the EACCS, which was developed in coordination with USFWS and CDFW, the proposed compensation is expected to fully mitigate for direct impacts on San Joaquin kit fox (a state and federally endangered species), associated with repowering.

Impact BIO-11: Operation of the proposed project could have direct impacts on special-status avian species (significant and unavoidable)

To date, all types of wind turbines are known to have the potential to affect avian species. Birds are struck by the blades resulting in injury or death. As discussed in this EIR, the Initial Repower is being implemented to test a new turbine technology and its potential to reduce avian impacts. The new turbines have shrouded blades, which have been theorized to pose less risk to avian species (Smallwood 2013). The unmoving shrouds present a physical barrier which should prevent birds from entering the rotor swept area when they approach parallel to the rotor plane, which is the most dangerous angle of entry of birds into the rotor plane (Appendix E). Additionally, the new turbine design is expected to make the turbines more visible to birds, when they approach perpendicular to the rotor plane (Appendix E). These turbine design features are expected to reduce impacts on avian species when compared to conventional turbine designs. Specifically, the CEC/PIER grant study design associated with the Avian Validation Study hypothesizes that the new turbine design will cause fewer collision fatalities when compared to the existing turbines. The new turbines include a shroud around the rotor that should help prevent the entry of birds into the rotor plane by providing a physical barrier to entry. Additionally, the new turbine design is hypothesized to be more visible to birds and should offset the effect of motion smear.

Recently, the focus within the APWRA has been to reduce avian fatalities, especially those of the four focal species, using several methods, including seasonal shutdowns, hazardous turbine removals, and repowering (replacing the existing small turbines with larger modern turbines). Therefore, on the basis of the Avian Validation Study assumption that the shrouded turbine would reduce avian collisions due to the increased visibility of the enclosure, the Initial Repower is expected to reduce the impacts on avian species from the rates listed in Table 3.4-3. However, because the CEC Avian Validation Study is not fully complete, and the new turbine type has not yet been tested in this regard, the potential impacts on avian species from the Initial Repower are unknown at this time. Based on the information available, and the theory that the shrouded turbines will present a physical barrier for birds resulting in less collision with moving blades, the new turbines are not expected to have greater impacts when compared to the existing turbines. However, three scenarios

are possible: (1) the proposed project would have a significant reduction in avian impacts; (2) the proposed project would have some reduction in avian impacts; or (3) the proposed project would have no reduction in avian impacts.

As stated in the objectives, the Applicant is proposing the project, in part, to determine if the new turbine technology would reduce impacts on avian and bat species. The Applicant has outlined an Avian Fatality Monitoring and Reduction Program that it would implement in addition to the mitigation required by the County through this EIR, as its own mitigation measures or strategy. The research and BACI testing of new wind technologies as a means to understanding and reducing avian impacts is a recognized form of avian impact mitigation as well as an Advanced Conservation Practice for the potential minimization and avoidance of risk to bald and golden eagles. Notwithstanding the foregoing, the Applicant proposes the following additional measures to address potential avian fatalities resulting from the Initial Repower, separate from mitigation measures required by this EIR, and which are therefore considered part of the project. Consequently, these Applicant proposed measures (APMs) must be considered in the context of determining the significance of the potential impacts on avian and bat species from the Initial Repower. These components and the decision-making protocol for the seasonal shutdowns are described below.

Applicant Proposed Measure 1: Conduct avian and bat fatality monitoring

The Applicant will monitor the Initial Repower to determine the effect of the new turbine technology, consistent with the CEC/PIER Avian Validation Study plan (i.e., for a period of 1 year following construction of the Initial Repower). The Applicant will provide Alameda County with the results of the CEC/PIER Avian Validation Study and will provide an assessment of the fatality rates for each of the four focal species and for all birds and all bats, if not otherwise included in the CEC/PIER report. If estimated fatality rates for any of the focal species exceed the baseline estimates (birds/MW/year) of 0.562 (American kestrel), 3.126 (burrowing owl), 0.190 (red-tailed hawk), or 0.06 (golden eagle), the Applicant shall either implement APM-2 or, at their discretion, may continue the monitoring program for a period of an additional 2 years to determine if the average fatality rates observed over a longer timeframe demonstrate a reduction below the baseline fatality rates. If, at the end of 3 years of monitoring, the fatality rates still exceed baseline rates, the Applicant will implement APM-2, to reduce fatality rates below the baseline rates. In either case, the Full Repower would not be implemented until reductions from the baseline rates for all four focal species have been documented and accepted by the County.

If either monitoring option (i.e., through the third year of the ongoing Study, or in additional years) shows a reduction in fatality rates of less than identified targets or objectives stated in specific percentages of the baseline fatality rates shown below for each individual focal species, APM-2 will be implemented to reduce fatality rates to levels below the applicable, species-specific baseline fatality rate. If any monitoring option (year 1, or year 1 and year 2 combined, or years 1–3 combined) identifies fatality rates below the applicable species-specific baseline rate, no additional APM's will be implemented.

Applicant Proposed Measure 2: Implement seasonal shutdowns

The Applicant will implement seasonal shutdowns to reduce fatality rates to the focal species to an appropriate target percentage of the individual baseline fatality rates described below for each focal species, as determined by the monitoring program outlined in APM-1. Turbines will

be turned off prior to November 1 each year and will remain off through February 15 of the following year. No operational modifications would be implemented within the February 16 to October 31 period. The Applicant will notify Alameda County each year when the turbines have been shut down, and again when they have resumed operating.

Seasonal shutdowns will remain in effect until the Applicant demonstrates to the County that improvements to the technology have been identified and implemented that would reduce the fatality rates to less than the target percentage reduction for each focal species, as identified below. If the Applicant makes such improvements, operation during the seasonal shutdown periods for the purposes of monitoring and testing improvements would be conducted. Once the Applicant demonstrates that fatality rates for each of the four focal species have been reduced to the appropriate target percentage of the baseline fatality rates, through an approved monitoring program, the seasonal shutdown period will be lifted, allowing year-round operations to resume. The threshold rates are as follows:

- For red-tailed hawk, if fatalities decrease by an amount less than 50 percent below baseline, the Applicant may, at its discretion, either implement APM-2, or delay implementation of APM-2 for up to 2 years for the purpose of continuing monitoring. If continued monitoring demonstrates a reduction of more than 50 percent below baseline over the long term, then no further APM would be implemented. If, at the end of 3 years, the average fatality rate across those years is not greater than 50 percent below the baseline, the Applicant would implement APM-2 until such time as improvements to the technology demonstrably reduce fatalities by 50 percent.
- Because burrowing owls exhibit large variability from year to year in fatality rates, have a very high reproductive potential, are regularly predated upon by other species, and the cause of death (i.e. turbine collision or predation) for many carcasses found during carcass searches cannot be determined, the threshold for reduction in fatalities is lower than that set for red-tailed hawks. For burrowing owls, if fatalities decrease by an amount less than 25 percent below baseline, the Applicant may implement APM-2 or delay implementation of APM-2 for up to 2 years for the purpose of continuing monitoring. If continued monitoring demonstrates a reduction of more than 25 percent below baseline over the long term, then no further APM's would be implemented. If, at the end of 3 years, the average fatality rate across years is not greater than 25 percent below baseline, the Applicant would implement APM-2 until such time as improvements to the technology demonstrably reduce fatalities by 25 percent.
- There is evidence to suggest that American kestrels may be subject to predation in a manner similar to burrowing owls, and many carcasses are found as feather spots, for which the cause of death cannot be determined. Therefore, the threshold for American kestrel is a fatality rate 30 percent below the baseline fatality rates. For American kestrel, if fatalities decrease by an amount less than 30 percent below baseline, the Applicant may implement APM-2 or delay implementation of APM-2 for up to 2 years for the purpose of continuing monitoring. If continued monitoring demonstrates a reduction of more than 30 percent below baseline over the long term, then no further APM's would be implemented. If, at the end of 3 years, the average fatality rate across years is not greater than 30 percent below baseline, the Applicant would implement APM-2 until such time as improvements to the technology demonstrably reduce fatalities by 30 percent.

- For golden eagle, the baseline fatality rate as defined above is 0.06. Therefore, for golden eagle, if eagle fatalities exceed this rate in a single year, the Applicant would implement APM-2 or delay implementation of APM-2 for up to 2 years for the purpose of continuing monitoring. If continued monitoring demonstrates no additional eagle fatalities over an additional 2 years of monitoring, no additional APM's would be implemented. If one additional eagle fatality is documented, then APM-2 would be required to be implemented immediately, and additional mitigation in the form of electric pole retrofits, consistent with USFWS guidelines and/or requirements would also be implemented at the discretion of the Applicant or the County.

Although the body of evidence points to a potential reduction in avian impacts from the Initial Repower, the amount of the potential reduction is currently unknown. Impacts on avian species, including the focal species, could be similar to the existing fatality rates of 3.88 focal species/MW/year (0.562 American kestrel, 3.126 burrowing owl, 0.190 red-tailed hawk, or 0.06 golden eagle fatalities/MW/year). Using a conservative assumption that the new turbines will be similar to the existing fatality rate, the Initial Repower may result in 15.5 total focal species fatalities each year. This equates to 2.2 American kestrels, 12.5 burrowing owls, 0.2 golden eagle, and 0.8 red-tailed hawk fatalities each year for the Initial Repower. Although these numbers represent relatively low numbers of fatalities in the context of the number of fatalities in the overall Altamont Pass Wind Resource Area, the project would reduce the numbers of these special-status species and thus the impact is considered a substantial effect. It is equally feasible that the Initial Repower would result in a significant reduction in these fatality rates.

As discussed above, the Applicant has proposed measures to monitor the impacts of the Initial Repower and to implement seasonal shutdowns if pre-determined thresholds are exceeded for the focal species. Implementation of these APM's would reduce, but would not eliminate the potentially significant impact from the proposed project. In addition to the APM's which would be implemented as part of the Initial Repower, the County must also adopt other feasible mitigation measures which may further reduce the potential impacts. Therefore, the Applicant would also be required to implement Mitigation Measures BIO-11a, BIO-11b, and BIO-11c. Implementation of these mitigation measures would further reduce, but would still not eliminate, this potentially significant impact, resulting in a significant and unavoidable impact.

Mitigation Measure BIO-11a: Incorporate avian-safe practices into design of turbine-related infrastructure

The Applicant will apply the following measures when designing and siting turbine-related infrastructure. These measures will reduce the electrocution and collision risk of birds with turbine-related infrastructure.

- Permanent meteorological stations will avoid use of guy wires. If it is not possible to avoid using guy wires, the wires will be at least 4/0 gauge to ensure visibility and be fitted with bird deterrent devices.
- All permanent meteorological towers will be unlit unless lighting is required by FAA. If lighting is required, it will be operated at the minimum allowable intensity, flashing frequency, and quantity allowed by FAA.
- When lines cannot be placed underground, appropriate avian protection designs must be employed (e.g., bird flight diverters or visibility enhancement such as spiral damping devices). As a minimum requirement, the collection system will utilize the most current edition of the Avian Power Line Interaction Committee guidelines to prevent electrocutions.

- Lighting will be focused downward and minimized to limit skyward illumination. Sodium vapor lamps and spotlights will not be used at any facility (e.g., lay-down areas, substations) except when emergency maintenance is needed. Lighting at collection facilities including substations will be minimized using downcast lighting and motion-detection devices. The use of high-intensity lighting, steady-burning, or bright lights such as sodium vapor, quartz, halogen, or other bright spotlights will be minimized. Where lighting is required it will be designed for the minimum intensity required for safe operation of the facility. Green or blue lighting will be used in place of red or white lighting.

Mitigation Measure BIO-11b: Compensate for the loss of burrowing owl

If avian impacts cannot be reduced to below the applicable species thresholds through the implementation of APM's 1 and 2, the Applicant will compensate for the unavoidable loss of avian species through the purchase and preservation of conservation lands, on an in perpetuity basis, from a local mitigation and/or conservation bank. The Applicant will preserve lands which provide habitat for burrowing owl (but which may also provide habitat for American kestrel and red-tailed hawk), the primary focal species potentially impacted by the proposed project, as well as other avian species. Lands will be preserved on a 1:1 rotor swept area basis, with the amount of land preserved equal to the total rotor swept area of the proposed turbines. Prior to relying on compensation, the Applicant shall provide detailed information to the lead agency and CDFW on the location of the preserved occurrences, quality of the preserved habitat, provisions for protecting and managing the areas in-perpetuity, responsible parties, and other pertinent information that demonstrates the feasibility of the compensation. The lead agency reserves the right to disallow the use of compensation when the Applicant has not clearly shown that compensation and management in perpetuity will be feasible. The Applicant will consult with and obtain approval on the mitigation site from the County.

Mitigation Measure BIO-11c: Mitigate for the loss of individual golden eagles by retrofitting electrical facilities

If golden eagle fatalities occur, the Applicant will mitigate for the proposed project's observed golden eagle mortality by retrofitting hazardous electrical poles in an onsite location (if any hazardous poles are located onsite), or in an offsite location. The mitigation must occur within 140 miles of the proposed project, the area typically defined by the USFWS as the *local population*. The Initial Repower is projected to result in the fatality of up to approximately one eagle every 4 years (0.24 golden eagles/MW/yr, although a smaller fatality rate is also possible. As described under APM 1, the Applicant has committed to monitoring the effects of the proposed project, and the monitoring will include documentation of any golden eagle fatalities. Based on current published draft guidance from the USFWS (2012), and using a general example, a ratio of 29 utility pole retrofits for each eagle is suggested by the USFWS. The Applicant will therefore retrofit 29 utility poles as mitigation for each eagle fatality from the proposed project, as determined through the Avian Validation Study and any supplemental monitoring efforts. The Applicant may contract directly with an electrical utility to fund this mitigation; however, a written agreement and evidence of the completion of the retrofits must be provided to the County. USFWS has estimated the cost of retrofits at $7,500 per pole, and therefore the Applicant may contribute the required funds, to a third party mitigation account (approved by Alameda County) instead of contracting directly with a utility. The third party mitigation account holder would have the responsibility of completing the mitigation or contracting for the mitigation to be completed. Evidence of completion of mitigation must be provided to the County within 1 year of completion of monitoring.

Impact BIO-12: Operation of the proposed project could have direct impacts on special-status bat species (less than significant)

Historically, the number of bat fatalities detected as part of the avian fatality monitoring program at old generation turbines in the APWRA has been extremely low. A review of fatality data collected by the MT over a period of 7 years (2005–2011) indicates that bat fatalities have been detected, but occur at a rate of approximately 0–6 individual bats per year, with a total of 22 bat fatalities detected during that period (ICF International 2013b). Five species of bat have been documented in the APWRA: little brown bat, California myotis, western red bat, hoary bat, and Mexican free-tailed bat (Insignia Environmental 2012:47–48; ICF International 2013:3-3). As in other parts of North America, the majority of documented fatalities in the APWRA have occurred during the fall migration season and have consisted of migratory bat species. Hoary bats and Mexican free-tailed bats have made up the majority of the fatalities; western red bat, another migratory species and a California species of special concern, has suffered the third highest fatalities.

Bat fatalities are being recorded as part of the Avian Validation Study. During the first year of monitoring for the Avian Validation Study (i.e., the *before* aspect of the study), only one bat species fatality was detected, a Mexican free-tailed bat (Smallwood 2013). In general, this result is consistent with the overall monitoring results for the APWRA and indicates that the rate of bat impacts, for the existing turbines, is very low. The Initial Repower is expected to reduce impacts on avian species as a result of the shrouded turbine design, which in part would prevent birds from entering the rotor plane, and could be expected to result in similar benefits to bats. Considering this information, the small size of the Initial Repower relative to the size of the APWRA, and the overall low level of impacts on bats within the APRWA, this impact would be less than significant. No mitigation is required.

Full Repower

The Full Repower is expected to be similar to the Initial Repower in terms of the types of impacts on biological resources. The Full Repower would also involve ground disturbance from the removal of existing project infrastructure and the installation of the Initial Repower infrastructure. Additionally, the Full Repower would result in almost eight times as much turbine replacement activity (30 MW repower for Full Repower and 4 MW repower for Initial Repower). The acreage of ground disturbance and potential direct and indirect effects on sensitive biological resources is expected to be somewhat smaller in magnitude than eight times that estimated for the Initial Repower, however, because many of the existing roads would have already been widened and improved for the Initial Repower phase. Although less permanent habitat loss is expected for road improvements, the Full Repower would result in 1 acre of permanent habitat removal associated with construction of a new O&M building. The overall biological resources present within the Full Repower project area are similar to the Initial Repower area. Considering this context, the potential impacts on biological resources from the Full Repower are expected to be similar in type, although substantially greater in magnitude, compared to the Initial Repower. Additional discussion regarding expected impacts on individual biological resources is provided below.

Impact BIO-1[F]: Project construction could have direct or indirect impacts on special-status plants (less than significant with mitigation)

Surveys for special-status plants were conducted in 2012 and 2013, and although one special-status plant species was recorded in the project area, the results were not definitive for the presence or absence of spring-blooming special-status plants because of drought conditions. Heartscale, a

species considered rare or endangered under CEQA (CRPR 1B.2) was located in the project area within an alkali meadow habitat. Impacts on this heartscale population could result in a substantial reduction in the species' distribution and therefore would be considered a significant impact. Similarly, impacts on other special-status plants that may occur on the project parcels, but which have not yet been detected, could result in substantial impacts and would be considered significant. Implementation of Mitigation Measures BIO-1a through BIO-1f, including BIO-1d (general avoidance and minimization measures from the conservation strategy) identified in the discussion of Initial Repower Impact BIO-1 would ensure that special-status plants within the project area are identified and that impacts on biological resources from construction of the Full Repower would be avoided, minimized, and mitigated. With implementation of these measures, impacts on special-status plants would be considered less than significant. Accordingly, the impact on special-status plants would be less than significant with mitigation.

Mitigation Measure BIO-1a: Conduct surveys to determine the presence or absence of special-status plant species

Please refer to the discussion of Mitigation Measure BIO-1a under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1b: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones, where feasible

Please refer to the discussion of Mitigation Measure BIO-1b under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1c: Compensate for impacts on special-status plant species

Please refer to the discussion of Mitigation Measure BIO-1c under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under *Initial Repower*, Impact BIO-1.

Impact BIO-2[F]: Construction of the proposed project has the potential to directly or indirectly affect sensitive natural communities (less than significant with mitigation)

Similar to the Initial Repower, the Full Repower could be expected to have minor impacts on sensitive natural communities from road construction, improvement, or decommissioning, as well as from turbine decommissioning and construction. Generally, depending on the extent of these natural communities in the specific areas that would be affected, the impact would be considered potentially significant. Implementation of Mitigation Measures BIO-1d, BIO-1e, BIO-1f, and BIO-2 identified in the discussion of the Initial Repower would reduce this impact to less than significant. Accordingly, the impact on sensitive natural communities would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under *Initial Repower,* Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under *Initial Repower,* Impact BIO-1.

Mitigation Measure BIO-2: Compensate for the loss of alkali meadow habitat

Please refer to the discussion of Mitigation Measure BIO-2 under *Initial Repower*, Impact BIO-2.

Impact BIO-3[F]: Construction of the proposed project has the potential to affect wetlands and other waters of the United States (less than significant with mitigation)

Aquatic resources, including stock ponds, alkali wetlands, and ephemeral drainages, occur within the project area. Existing facilities, particularly the access roads, may cross or occur adjacent to these aquatic resources and construction activities associated with Full Repower that result in ground disturbance (including temporary fill and extension of culverts) could directly or indirectly affect aquatic resources that may qualify as waters of the United States and waters of the State. Waters of the United States are regulated by USACE and waters of the State in California are regulated by the Regional Water Board. Wetlands are also considered sensitive communities. In addition to direct impacts, construction activities under the Full Repower could indirectly affect aquatic resources by causing increased erosion and sedimentation within resources located adjacent to work areas. Implementing Mitigation Measures BIO-1d (general protection measures), BIO-1e (retain a biological monitor), BIO-3a, and BIO-3b identified in the discussion of the Initial Repower would ensure avoidance and minimization of impacts on waters of the United States and waters of the State. Mitigation Measure BIO-3c also identified in the discussion of the Initial Repower would compensate for any unavoidable impacts on waters of the United States. Together, implementation of these measures would reduce this impact on state or federally protected wetlands to a less-than-significant level. Accordingly, the impact on wetlands and other waters of the United State would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under *Initial Repower,* Impact BIO-1.

Mitigation Measure BIO-3a: Identify and delineate waters of the United States and waters of the State (including wetlands)

Please refer to the discussion of Mitigation Measure BIO-3a under *Initial Repower,* Impact BIO-3.

Mitigation Measure BIO-3b: Avoid and minimize disturbance of waters of the United States, including wetland communities

Please refer to the discussion of Mitigation Measure BIO-3b under *Initial Repower,* Impact BIO-3.

Mitigation Measure BIO-3c: Compensate for unavoidable impacts on waters of the United States

Please refer to the discussion of Mitigation Measure BIO-3c under *Initial Repower,* Impact BIO-3.

Impact BIO-4[F]: Potential disturbance of vernal pool fairy shrimp, longhorn fairy shrimp, and vernal pool tadpole shrimp and their habitat (less than significant with mitigation)

Construction activities within the project area could result in indirect effects on the federally listed longhorn fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp (vernal pool branchiopods) or their habitats. The majority of impacts would occur on grassland habitat and loss of potential vernal pool branchiopod habitat would be avoided. However, indirect impacts on water quality may occur. Construction activities such as excavation, grading, or stockpiling of soil associated with decommissioning activities, installation of new foundations, collection and communication system installation and road widening could result in indirect effects on vernal pool branchiopods if vehicles or construction equipment are driven through occupied habitat, or if gasoline, oil, or other contaminants enter habitat. Changes in hydrology or sedimentation of habitat from erosion associated with Full Repower construction could alter the suitability of habitat for vernal pool branchiopods.

O&M activities associated with Full Repower may also result in impacts on vernal pool branchiopods or their habitats. Use of herbicides upslope of occupied habitat could result in mortality or reduced fitness of vernal pool branchiopods (U.S. Fish and Wildlife Service 1996). These indirect impacts would be considered adverse because the Full Repower could reduce habitat suitability for federally listed vernal pool branchiopods. This impact would be significant, but implementation of the following mitigation measures, as identified in the discussion of the Initial Repower, would reduce this impact to a less-than-significant level. Accordingly, the impact on vernal pool branchiopods and their habitat would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-3b: Avoid and minimize disturbance of waters of the United States, including wetland communities

Please refer to the discussion of Mitigation Measure BIO-3b under *Initial Repower*, Impact BIO-3.

Mitigation Measure BIO-4: Implement measures to avoid, minimize, and mitigate for potential impacts on longhorn fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp

Please refer to the discussion of Mitigation Measure BIO-4 under *Initial Repower*, Impact BIO-4.

Impact BIO-5[F]: Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander and California red-legged frog (less than significant with mitigation)

Construction activities within the project area could result in direct effects on California tiger salamander and California red-legged frog or their habitats (ponds, ephemeral drainages, and surrounding upland areas). The majority of impacts would occur on upland grassland dispersal and aestivation habitat for California tiger salamander and California red-legged frog. Aquatic habitats for these species would generally be avoided; however, indirect impacts on habitat from project excavation may occur. Based on the assumption that Full Repower could result in up to 8 times as much ground disturbance as Initial Repower, project construction associated with Full Repower would result in permanent loss of up to 176 acres of annual grassland and temporary disturbance of up to 536 acres of annual grassland that provide upland habitat for California tiger salamander and California red-legged frog. The actual area of permanent and temporary habitat disturbance is expected to be lower than estimated because the foundation area, crane pad, and laydown areas are expected to overlap.

Construction activities such as excavation, grading, or stockpiling of soil, could fill, remove or otherwise alter suitable habitat for, or result in injury or mortality of California tiger salamander and California red-legged frog. Potential direct impacts include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of upland habitat that results in damage or elimination of suitable aestivation burrows. Specific Full Power activities that may impact these species could include collection and communication system installation, wind turbine construction, and road infrastructure construction/maintenance and upgrades, O&M facility construction, temporary staging area set-up, and reclamation activities. California tiger salamander and California red-legged frog could also be injured or killed if vehicles or construction equipment are driven through occupied habitat, or if gasoline, oil, or other contaminants enter habitat. Changes in hydrology or sedimentation of habitat from erosion associated with construction of the Initial Repower could alter the suitability of their habitat or cause mortality.

O&M activities may also result in impacts on special-status amphibians or their habitats. Travel on maintenance roads during the rainy season or when amphibians are dispersing could result in mortality of individuals. These impacts would be considered adverse because the proposed project could reduce the local population sizes, through direct mortality and/or habitat loss. This impact

would be significant, but implementation of the following mitigation measures would reduce this impact to a less-than-significant level. Therefore, impacts on California tiger salamander and California red-legged frog would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-3b: Avoid and minimize disturbance of waters of the United States, including wetland communities

Please refer to the discussion of Mitigation Measure BIO-3b under *Initial Repower*, Impact BIO-3.

Mitigation Measure BIO-5: Implement measures to avoid, minimize, and mitigate for potential impacts on California tiger salamander and California red-legged frog

Please refer to the discussion of Mitigation Measure BIO-5 under *Initial Repower*, Impact BIO-5.

Impact BIO-6[F]: Potential disturbance or mortality of and loss of suitable habitat for Pacific pond turtle (less than significant with mitigation)

Construction activities within the project area could result in direct effects on Pacific pond turtle or its habitats (ponds, ephemeral drainages). The majority of construction activity associated with Full Repower would occur on grassland habitat and loss of suitable aquatic habitat would be avoided; however, indirect impacts on water quality may occur. Potential direct impacts could include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of upland nesting habitat. Based on the assumption that Full Repower could result in up to 8 times as much ground disturbance as Initial Repower, project construction associated with Full Repower would result in permanent loss of up to 176 acres of annual grassland and temporary disturbance of 536 acres of annual grassland that provide upland habitat for Pacific pond turtle. The actual area of permanent and temporary habitat disturbance is likely to be lower than estimated because the foundation area, crane pad, and laydown areas are expected to overlap.

Declines in populations of western pond turtles throughout the species range have been documented (Jennings and Hayes 1994). Loss of individuals in the project area could diminish the local population and lower reproductive potential, which could contribute to the further decline of this species. The loss of upland nesting sites or eggs also would decrease the local population. This impact would be significant, but implementation of the following mitigation measures would reduce this impact to a less-than-significant level. Accordingly, the impact on Pacific pond turtle would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-3b: Avoid and minimize disturbance of waters of the United States, including wetland communities

Please refer to the discussion of Mitigation Measure BIO-3b under *Initial Repower*, Impact BIO-3.

Mitigation Measure BIO-6: Conduct preconstruction surveys for Pacific pond turtle and monitor construction activities if turtles are observed

Please refer to the discussion of Mitigation Measure BIO-6 under *Initial Repower*, Impact BIO-6.

Impact BIO-7[F]: Potential disturbance or mortality of and loss of suitable habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip (less than significant with mitigation)

Construction activities within the project area could result in direct effects on Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip or their habitat (annual grasslands within the project area). Based on the assumption that Full Repower could result in up to 8 times as much ground disturbance as Initial Repower, project construction associated with Full Repower would result in permanent loss of up to 176 acres of annual grassland and temporary disturbance of 536 acres of annual grassland that provide potential habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip. The actual area of permanent and temporary habitat disturbance is likely to be lower than estimated because the foundation area, crane pad, and laydown areas are expected to overlap.

Potential direct impacts on the species include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of habitat. O&M activities, such as road and firebreak maintenance, may also result in injury or mortality of individuals. Blainville's horned lizard has disappeared from portions of its range and continues to be threatened by development in other portions of its range (Jennings and Hayes 1994:132). Alameda whipsnake is a federally and state threatened species as a result of habitat loss and fragmentation due to urban development (U.S. Fish and Wildlife Service 2002b:69). San Joaquin coachwhip has a restricted geographic range and is threatened by continued conversion of its habitat to croplands and urban development. Loss of individuals in the project area could diminish the local populations of these species and lower reproductive potential, which could contribute to the further decline of these species. This impact would be significant, but implementation of the following mitigation measures would reduce this impact to a less-than-significant level. Accordingly, the impact on Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-7: Implement measures to avoid, minimize, and mitigate for potential impacts on Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip

Please refer to the discussion of Mitigation Measure BIO-7 under *Initial Repower*, Impact BIO-7.

Impact BIO-8[F]: Potential construction-related disturbance or mortality of special-status and non-special-status migratory birds (less than significant with mitigation)

Construction activities during the nesting season (generally February 1 to August 31) of northern harrier and western burrowing owl could result in direct effects on these species, as well as non-special status ground-nesting migratory birds, if nesting within the project area. Most of the potential nesting habitat within the project area consists of grasslands. Scattered shrubs and small trees are present in the vicinity of existing buildings and residences. Additionally, construction-generated noise has the potential to indirectly affect special-status raptor species, including Swainson's hawk and white-tailed kite, nesting within 0.5 mile of construction activities. Disturbance of grassland, wetlands, or burrows with active nests and/or indirect construction disturbance (i.e., noise, increased human presence) during the breeding season may result in nest abandonment and subsequent loss of eggs or young. Such losses could affect the local population of special-status and non-special-status birds and would be considered a significant impact. Implementation of the following mitigation measures would reduce this impact to a less-than-significant level. Accordingly, the impact on special-status and non-special-status migratory birds would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non-special-status nesting birds

Please refer to the discussion of Mitigation Measure BIO-8a under *Initial Repower*, Impact BIO-8.

Mitigation Measure BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl

Please refer to the discussion of Mitigation Measure BIO-8b under *Initial Repower*, Impact BIO-8.

Impact BIO-9[F]: Permanent and temporary loss of foraging habitat for Swainson's hawk, western burrowing owl, and other special-status and non-special-status birds (less than significant with mitigation)

Implementation of the Full Repower would result in the temporary and permanent loss of grassland that provides suitable foraging habitat for Swainson's hawk, burrowing owl, and many other special-status and non-special status migratory birds. Based on the assumption that Full Repower could result in up to 8 times as much ground disturbance as Initial Repower, project construction associated with Full Repower would result in permanent loss of up to 176 acres of annual grassland and temporary disturbance of 536 acres of annual grassland that provide potential foraging habitat for these species. The actual area of permanent and temporary habitat disturbance is likely to be lower than estimated because the foundation area, crane pad, and laydown areas are expected to overlap.

The availability of foraging habitat has been closely tied to the breeding success of Swainson's hawk; therefore, projects that would significantly modify suitable Swainson's hawk foraging habitat are considered to have potential to significantly affect this species (California Department of Fish and Game 1994). CDFW also recommends compensation for permanent loss of occupied burrowing owl habitat (documented occupancy in the last 3 years). The temporary loss of foraging habitat would be mitigated through implementation of Mitigation Measure BIO-1f (restoration of temporarily disturbed annual grasslands). For permanent loss of foraging habitat, implementation of Mitigation Measure BIO-9 would reduce this impact to a less-than-significant level. Accordingly, the impact related to the permanent and temporary loss of foraging habitat for Swainson's hawk, western burrowing owl, and other special-status and non-special-status birds would be less than significant with mitigation.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-9: Compensate for the permanent loss of foraging habitat for Swainson's hawk, western burrowing owl, and other special-status and non-special-status birds

Please refer to the discussion of Mitigation Measure BIO-9 under *Initial Repower*, Impact BIO-9.

Impact BIO-10[F]: Potential injury or mortality of and loss of habitat for San Joaquin kit fox and American badger (less than significant with mitigation)

Construction activities within the project area could result in direct effects on San Joaquin kit fox and American badger or their habitat (grassland). Based on the assumption that Full Repower could result in up to 8 times as much ground disturbance as Initial Repower, project construction

associated with Full Repower would result in permanent loss of up to 176 acres of annual grassland and temporary disturbance of 536 acres of annual grassland that provide suitable denning and foraging habitat for San Joaquin kit fox and American badger. The actual area of permanent and temporary habitat disturbance is likely to be lower than estimated because the foundation area, crane pad, and laydown areas are expected to overlap.

In addition to the permanent and temporary removal of habitat, other direct impacts could include mortality or injury of individuals from construction vehicles or heavy equipment, direct mortality or injury of individuals from den collapse and subsequent suffocation, temporary harassment from noise and human presence associated with construction activities, and harassment of individuals by construction personnel. Additionally, exposed pipes, large excavated holes, or trenches that are left open after construction has finished for the day could entrap San Joaquin kit foxes or American badgers. O&M activities, such as road and firebreak maintenance, may also result in injury or mortality of individuals. San Joaquin kit fox is a federally endangered and state threatened species as a result of habitat loss due to agricultural development, infrastructure construction, and urban development (U.S. Fish and Wildlife Service 2010:25). American badger has experienced drastic declines, particularly in the Central Valley, and has been extirpated from many areas in southern California (Williams 1986:66). Loss of individuals in the project area could diminish the local populations of these species and lower reproductive potential, which could contribute to the further decline of these species. This impact would be significant, but implementation of the following mitigation measures would reduce this impact to a less-than-significant level. Accordingly, the impact on San Joaquin kit fox and American badger would be less than significant with mitigation.

Mitigation Measure BIO-1d: Implement general avoidance and minimization measures from the Conservation Strategy

Please refer to the discussion of Mitigation Measure BIO-1d under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities within environmentally-sensitive habitat areas

Please refer to the discussion of Mitigation Measure BIO-1e under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-1f: Restore disturbed annual grasslands

Please refer to the discussion of Mitigation Measure BIO-1f under *Initial Repower*, Impact BIO-1.

Mitigation Measure BIO-10: Implement measures to avoid, minimize, and mitigate for potential impacts on San Joaquin kit fox and American badger

Please refer to the discussion of Mitigation Measure BIO-10 under *Initial Repower*, Impact BIO-10.

Impact BIO-11[F]: Operation of the proposed project could have direct impacts on special-status avian species (significant and unavoidable)

The Initial Repower phase is being undertaken to assess the performance of the new turbine technology and its effect on birds and bats. As discussed in this document, the new turbine design is expected to reduce the potential for birds and bats to collide with the turbine blades by providing a visual and physical barrier preventing the birds and bats from coming in contact with the rotor

plane. The Avian Validation Study currently in progress is designed to determine the effect the new turbine design may have on avian fatality rates. Thus, the Initial Repower results will ultimately help to inform the potential impacts of the Full Repower.

As with the Initial Repower, the new turbines for the Full Repower are not expected to have greater impacts when compared to the existing turbines. However, three scenarios are possible for both the Initial Repower and the Full Repower: (1) the proposed project would have a significant reduction in avian impacts; (2) the proposed project would have some reduction in avian impacts; or (3) the proposed project would have no reduction in avian impacts.

The existing fatality rate for the overall project area (based on MT data of selected BLOBs), which is the baseline fatality rate for the Full Repower, is 3.12 focal species/MW/year (Table 3.4-3). Overall, this baseline rate is somewhat similar, but slightly lower than the fatality rate from the Avian Validation Study (the baseline rate for the Initial Repower), which is 3.88 focal species/MW/year (Table 3.4-3). Despite anticipated reductions in avian mortality, in the absence of site-specific repower monitoring data, the relative mortality rates cannot be ascertained. Therefore, based on this uncertainty, and to exercise a conservative approach to impact assessment, impacts on avian species from the Full Repower are assumed to be similar to the existing fatality rate of 3.12 focal species/MW/year. Using a conservative assumption that the new turbines will be similar to the existing fatality rate, the Full Repower may result in 112 total focal species fatalities each year. This equates to 20 American kestrel, 68 burrowing owl, 2 golden eagle, and 23 red-tailed hawk fatalities each year. However, the shrouded turbine design is expected to reduce impacts from these baseline rates.

As discussed throughout this EIR, the Applicant is proposing the project, in part, to determine if the new turbine technology would reduce impacts on avian and bat species. The Applicant has committed to several APMs as part of the proposed project (Initial Repower and Full Repower) to quantify impacts and results of the Avian Validation Study, and to avoid, minimize, and mitigate effects on avian species. Consequently, these APM's must be considered in the context of determining the significance of the potential impacts on avian and bat species.

Similar to the effects described for the Initial Repower, the body of evidence points to a potential reduction in avian impacts from the Full Repower. However, impacts on avian species, including the focal species, could be similar to the existing fatality rates. This level of impact would be considered a substantial effect and would therefore be considered a significant impact, although it is equally feasible that the Initial Repower would result in a significant reduction in fatality rates.

As discussed above, the Applicant has proposed measures to monitor the impacts of the Initial Repower and to implement seasonal shutdowns if pre-determined thresholds are exceeded for the focal species. Implementation of these APM's would also reduce, but would not eliminate the potentially significant impact from the Full Repower. In addition to the APMs, which would be implemented as part of the Initial Repower and the Full Repower, the County must also consider other feasible mitigation measures which may further reduce the potential impacts. Therefore, the Applicant would also be required to implement Mitigation Measures BIO-11a, BIO-11b, BIO-11c, and BIO-11d, which would further reduce impacts on avian species. Implementation of these mitigation measures would further reduce, but would still not eliminate, this potentially significant impact. Therefore, the impact on special-status avian species would be significant and unavoidable.

Mitigation Measure BIO-11a: Incorporate avian-safe practices into design of turbine-related infrastructure

Please refer to the discussion of Mitigation Measure BIO-11a under Initial Repower, Impact BIO-11.

Mitigation Measure BIO-11b: Compensate for the loss of burrowing owl

Please refer to the discussion of Mitigation Measure BIO-11b under Initial Repower, Impact BIO-11.

Mitigation Measure BIO-11c: Mitigate for the loss of individual golden eagles by retrofitting electrical facilities

Please refer to the discussion of Mitigation Measure BIO-11c under *Initial Repower*, Impact BIO-11.

Mitigation Measure BIO-11d: Implement additional measures to reduce Full Repower avian fatality rates

If the results of the Avian Validation Study demonstrate that the Full Repower will likely cause avian fatality rates in excess of the Initial Repower performance standards, the results of the Avian Validation Study will be analyzed to formulate measures to reduce the effects of the Full Repower to or below specified performance standards. The specific form such mitigation may take will depend on the results of the Avian Validation Study and engagement with the County, USFWS and CDFW on the basis of such results. Examples of potential measures may include the following.

- Technology modifications
- Hazard-based micrositing
- Hazard-based capacity limitations
- Hazard-based cut-in-speed or real-time curtailment
- Compensatory research funding, habitat protection, ground squirrel control restrictions, or electric pole retro-fits to APLIC standards
- Partial or full siting of conventional turbines instead of shrouded turbines
- Such other measures as may be required by the County, USFWS or CDFW under their respective applicable regulatory regimes applicable to avian species (e.g., County planning and zoning regulations, BGEPA, MBTA, California Fish & Game Code)
- Additional avian fatality monitoring to increase sample size needed for any of the above components of BIO-11d.

Impact BIO-12[F]: Operation of the proposed project could have direct impacts on special-status bat species (less than significant)

As discussed above, the Initial Repower phase is being undertaken to assess the performance of the new turbine technology and its effect on birds and bats. Either similar fatality rates or reductions in fatality rates, when compared to the existing turbines, are expected. Additionally, the Avian Validation Study currently in progress is designed to determine the effect the new turbine design may have on avian and bat fatality rates. Thus, the Initial Repower results will ultimately help to inform the potential impacts of the Full Repower with respect to bats as well as birds.

The Full Repower is expected to reduce impacts on avian species as a result of the shrouded turbine design, which in part would prevent birds from entering the rotor plane, and could be expected to result in similar benefits to bats. Considering this information, the small size of the Full Repower relative to the size of the APWRA, and the overall low level of impacts on bats within the APRWA, this impact would be less than significant. No mitigation is required.

3.4.3 References Cited

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